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EVALUATING THE IMPACT OF INTEGRATED MANAGEMENT SYSTEMS ON OPERATIONAL RISKS AND FINANCIAL PERFORMANCE IN A RESEARCH ORGANIZATION[1]

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Abstract:
The study builds on the findings of Jonović *et al.* (2024) and aims to: 1) determine whether the implementation of Integrated Management Systems (IMS) based on the Committee of Sponsoring Organizations (COSO) Enterprise Risk Management (ERM) model enhances sustainable operational risk management (ORM) and financial performance in a Scientific research organization; and 2) develop a method for improving (ORM) and financial outcomes. Primary research of Strengths, Weaknesses, Opportunities, and Threats (SWOT) analyses conducted from 2021 to 2024, with an average response rate of over 71%, confirms a sustainable business context. Following the Plan-Do-Check-Act (PDCA) cycle, it strives to enhance the response of scientific research organizations to strategic goals and operational risks. The analysis of financial indicators and Pearson's correlation supports the impact of IMS on the organization's financial and operational stability, as outlined in the COSO ERM model. It emphasizes the importance of effective ORM for achieving better financial performance. However, it suggests that implementing IMS is not sufficient for upgrading ORM within the organization. Future research will compare the Institutes of National Importance in the Republic of Serbia to refine risk management and enhance financial performance.

Keywords:
operational risks, COSO, ERM, (IMS), SWOT analysis, scientific research organization.

JEL Classification:
G12, M32

INTRODUCTION

The research represents a continuation of the work of Jonović *et al.* (2024) published at the International Scientific Conference FINIZ 2024. As on the executed research, this article uniquely offers new insights into the impact of Operational Risk Management (ORM) on the financial performance of a Scientific research organization/Institute (name withheld for data protection purposes) that has implemented

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an Integrated Management System (IMS) aligned with the Committee of Sponsoring Organizations – Enterprise Risk Management (COSO ERM) model. It includes a longer period of primary research (from 2021 to 2024), incorporating relevant financial indicators and their relationships over the same timeframe to assess the effectiveness of operational risk management. Furthermore, it includes Strengths, Weaknesses, Opportunities, Threats (SWOT), Plan-Do-Check-Act (PDCA) cycle, analysis of business performance indicators, and Pearson's correlation for the same period (longer period span compared to the previous research).

Risk refers to the potential for an unfavorable deviation from expected outcomes, characterized by uncertainty, randomness, and potential economic loss in financial operations (Vaughan & Vaughan, 1995). According to COSO (2017), the fundamental categories of business risk include strategic, financial, operational, and hazard risks. Operational risks are defined as the risks arising from the execution of a company's day-to-day operations, including the potential for losses resulting from inadequate or failed internal processes, personnel, systems, or external events. ERM (COSO, 2017) is defined as: "The culture, capabilities, and practices integrated with strategy setting and performance, on which organizations rely to manage risk in creating, preserving, and realizing value".

The rapid development of technology, increasingly aggressive competition, and globalization expose the Institute to growing operational risks. The activities of an institute engaged in Research and Development (R&D) across technical and technological sciences broadly encompass the following: scientific research work, applied and developmental research, economic solutions in design, as well as providing engineering services and technical consulting in the field of mining and metallurgy, and other technical-technological areas. The institute under analysis operates an Integrated Management System (IMS) aligned with the COSO ERM framework. This IMS comprises a Quality Management System (QMS) certified under ISO 9001:2015, an Environmental Management System (EMS) under ISO 14001:2015, and an Occupational Health and Safety Management System (OHSMS) under ISO 45001:2015. According to Bakator *et al.* (2018), ISO 9001 certification can enhance operational efficiency, customer satisfaction, financial performance, and overall business performance. EMS (ISO 14001:2015) offers a systematic method to plan, execute, oversee, and enhance environmental performance by ensuring regulatory compliance. OMS (ISO 45001:2018) enables organizations to foster a safer workplace, decrease workplace accidents, and improve the overall well-being of employees.

The implementation of an IMS based on the COSO ERM model, combined with SWOT analysis and the PDCA cycle, plays a crucial role in managing operational risks and opportunities within a scientific research organization. This structured approach enhances decision-making processes for effective risk mitigation and financial performance. The study aims to evaluate the significance of IMS in optimizing ORM and its direct impact on financial stability in an institute. The research examines the implementation of IMS following the COSO ERM model for sustainable ORM and the institute's economic performance.

Considering the above, the research hypotheses are as follows:

H0: The implementation of the IMS according to the COSO ERM model for risk management, combined with SWOT analysis and the PDCA cycle, has no significant effect on managing operational risks and opportunities in the scientific research organization.

H1: The application of an IMS aligned with the COSO ERM model significantly enhances the organization's ORM and financial performance.

The research is structured into four chapters. The first chapter provides an introduction to the study. The second chapter outlines the literature review. The third chapter presents the methodology employed. The fourth chapter shows the results of the primary and secondary research. Finally, the fifth chapter presents the conclusion.

LITERATURE REVIEW

The foundation of the study is based on a review of existing literature on risk in general, including ERM, COSO, and ISO ERM models, their impact on operational risks and financial performance. The review also covered ORM, financial risks, risk management for various organizations, regardless of the sector, as well as scientific research institutions.

Stanišić & Stanojević (2010) argue that some theorists view risk as uncertainty, acknowledging that although profit cannot be predicted with absolute certainty, investment opportunities and their probabilities are known. Operational risks arise from internal factors, such as human errors, process failures, and system malfunctions, and external threats, including fraud, natural disasters, and geopolitical crises (BIS, 2021; Segal, 2006). Also, Qu & Zhang (2013) described operational risk as a complex, interconnected factor that can trigger other risks.

Risk management, in a broad sense, is the art of making decisions in an unpredictable environment (Barjaktarović, 2015). Furthermore, effective risk management integration enhances enterprise performance, while industry regulations, employee expertise, ownership structures, and technology significantly shape risk management practices (Barjaktarović & Vićentijević, 2017). Moreover, companies with mature ERM processes demonstrate improved operational performance, while effective ERM practices have a positive impact on overall business outcomes (Nocco & Stulz, 2006; Callahan & Soileau, 2017; Ai *et al.*, 2018; Jonović, 2023). Specifically, research conducted by Jonović (2023; 2024; 2025) highlighted that the implementation of IMS, based on the COSO ERM model, supports timely decision-making and a sustainable business strategy. Risk mitigation, resilience, and resource allocation highlight the positive impact of IMS on the financial performance of scientific institutes in the Republic of Serbia.

Miletić *et al.* (2015) emphasized that the success of Serbian mining companies relies on selecting the optimal IMS model to enhance stakeholder satisfaction, particularly in financial performance. Likewise, (Volanović, 2014) proposed an ISO 31000 ERM-based IMS model, ISO 9001, and ISO 14001, with OHSAS 18001, for optimal risk management, which leads to lower costs and enables efficient management of the company. Additionally, Sunaryo *et al.* (2025) add that effective risk management substantially enhances organizational resilience, reduces financial and operational risks, and improves corporate governance, with ISO 31000 frameworks and ERM as crucial for integrating risk management with strategic goals and sustainable growth.

Priyarsono *et al.* (2019) found that research institutions strengthened risk management by integrating ISO 31000 with ISO 9001, ISO 27032, and ISO 14000, noting that universities particularly favored ISO 31000 for its comprehensive capabilities. Candra (2021) advised the Bandung Institute of Technology to adopt ISO 31000 alongside other standards to enhance leadership and sustainability. Furthermore, Tirayoh & Pangeran (2023) demonstrated that integrating ISO 31000:2018 ERM process with the Balanced Scorecard improves financial performance and strategic goal achievement of the organization. Moreover, Marković *et al.* (2025) present an innovative approach using the ISO 31000 risk management framework to comprehensively quantify uncertainty in strategic mining planning.

Effective ORM enhances financial performance in SMEs (small and medium-sized companies) across Central Europe (Hudáková *et al.*, 2023). It is in alignment with the findings of Asif & Shahzad (2023), who demonstrated that structured ORM frameworks improve financial stability and business outcomes. According to Muriithi & Muigai (2017), the Central Bank plays a crucial role in establishing and monitoring Operational Risk Management (ORM) in commercial banks, in order to effectively mitigate risks and improve profitability. Furthermore, Kopia *et al.* (2017) emphasized that efficient ORM influences financial outcomes across industries, though its precise impact remains uncertain. Finally, Pagach & Warr (2010) found no significant impact of risk management systems on financial performance.

This research aligns with the key findings discussed in this chapter, demonstrating that an IMS based on the COSO ERM model enhances ORM and supports financial stability in research organizations.

METHODOLOGY

Primary research for the Scientific research organization was conducted from 2021 to 2024, whole the secondary covered the period from 2020 to 2023. Based on the conducted primary scientific research, SWOT analyses were prepared to improve and provide better understanding of the scientific research organization's environment and to help minimize potential operational risks. A SWOT analysis is a framework used to assess the internal and external factors that may present opportunities or pose risks to an organization (Corporate Finance Institute, 2025). SWOT analysis can also be considered a key tool that enables a scientific research organization to align its strategic goals with current business conditions. The PDCA cycle enables continuous process improvement through planning, execution, evaluation, and action, thereby continuously improving operational activities and mitigating operational risks. To optimize ORM in an institute, the following methods for conducting primary research, in the form of SWOT analysis, were used: interviews with employees, monitoring, anonymous closed-ended questionnaires, and quantitative methods. The illustrative method presented the results of primary research, and the deductive method was used to draw conclusions. Anonymous closed-ended questionnaires, consistent across all years, were designed to investigate employees' attitudes, opinions, and perceptions on key aspects. They contained 35 questions divided into four parts (for each year in the analyzed period). Parts of the anonymous questionnaires are: 1) potential strengths of the internal business context of an institute, containing 10 questions, 2) potential weaknesses of the internal business context of an institute, containing 9 questions, 3) potential opportunities in the external business context of an institute, including 9 questions, and 4) potential threats in the external business context of an institute, consisting of 7 questions. Data collection for the SWOT analysis took place as follows: for 2021, from March 30, 2021, to February 5, 2022. The authors distributed the SWOT analysis surveys to 147 employees' addresses, and 106 respondents answered (response rate 72.10%); 2) for 2022, from March 30, 2022, to February 4, 2023. The surveys for the SWOT analysis were sent to 149 employees' addresses, and 108 respondents answered (response rate 72.48%); 3) for 2023 -from March 31, 2023, to February 8, 2024. The surveys for the SWOT analysis for 2023 were sent to 146 employees' addresses, and 104 respondents answered (response rate 71.23%); 4) for 2024, data collection lasted from March 21, 2024, to January 11, 2025. The surveys for the SWOT analysis for 2024 were sent to 143 employees' addresses, and 103 respondents answered (response rate 72.03%). Participants responded using a five-point Likert scale, where 1 represented strong disagreement, 2 disagreement, 3 partial agreement, 4 agreement, and 5 absolute agreement. The questionnaire draft had initially been distributed to numerous

risk managers, experts, and practitioners for revision before being distributed to the employees of the institute, the subject of this research. The purpose was to cover relevant topics, define adequate closed-type questions to minimize potential risks, protect the respondent's identity, achieve a high response rate, and evaluate the questionnaires. The most effective approach was to utilize a questionnaire based on the Likert scale, which offers both advantages and limitations. The questionnaire was designed in an online format, ensuring respondent anonymity and improving response rates. Most of the questions were closed-ended, facilitating easier data processing and quicker responses. The key limitation was the absence of an option for respondents to express their opinions in an open-ended format, which can be seen as a drawback of the analysis. Additionally, another disadvantage is that certain elements of risk assessment and management are shaped by personal perspectives and expertise of the individuals involved, which can result in variability in the accuracy of the assessment. Lastly, an important limitation is that the internal consistency of the questionnaire was not assessed, which is recommended as an area for future validation.

To assess how effectively operational risks are being managed, secondary research was conducted relying on publicly accessible data (albeit with some limitations on data quality) from the Serbian Business Register Agency (SBRA) covering the period 2020 to 2023. The authors also calculated key financial indicators (following the current accounting regulation for the preparation and announcement of financial reports for calendar and fiscal years in the Republic of Serbia). This dataset provides a comprehensive picture of the organization's financial health, including critical metrics such as business income, business expenses, business results, financial income, financial expenses, financial results other income, other expenses, other results, net profit, equity, total assets, equity and assets, and calculated indicators such as year over year changes, assets turnover ratio, Return on Equity (ROE), Return on Assets (ROA) and Return on Investment (ROI). For the secondary research, we analyzed individual financial indicators, an illustrative method for research results, complemented by a deductive method to draw conclusions. The results aimed to highlight the influence of IMS, based on the COSO ERM model, on the organization's financial and operational resilience. Research limitations include data availability, the scope of variables considered, potential challenges in generalizing findings, and time-related constraints.

Pearson's correlation coefficient was calculated according to the following formula:

$$r = \frac{\sum_{i=1}^{n} (x_i - \overline{x}) \cdot (y_i - \overline{y})}{\sqrt{\sum_{i=1}^{n} (x_i - \overline{x})^2 \cdot (y_i - \overline{y})^2}} \quad (1)$$

In the formula, n is the number of indicators in the relationship (n=4); xi is the independent indicator (other income); yi is the dependent indicator (other expenses); $\overline{x}$ $\overline{x}$ and the averages (of the relevant indicators). The values of Pearson's correlation coefficient exhibit the following: (1) ± 0 to ± 0.2 (no relationship), (2) ± 0.21 to ± 0.4 (weak relationship), (3) ± 0.41 to ± 0.6 (mid-relationship), (4) ± 0.61 to ± 0.8 (strong relationship), and (5) ±0.81 to ±1 (very-strong relationship).

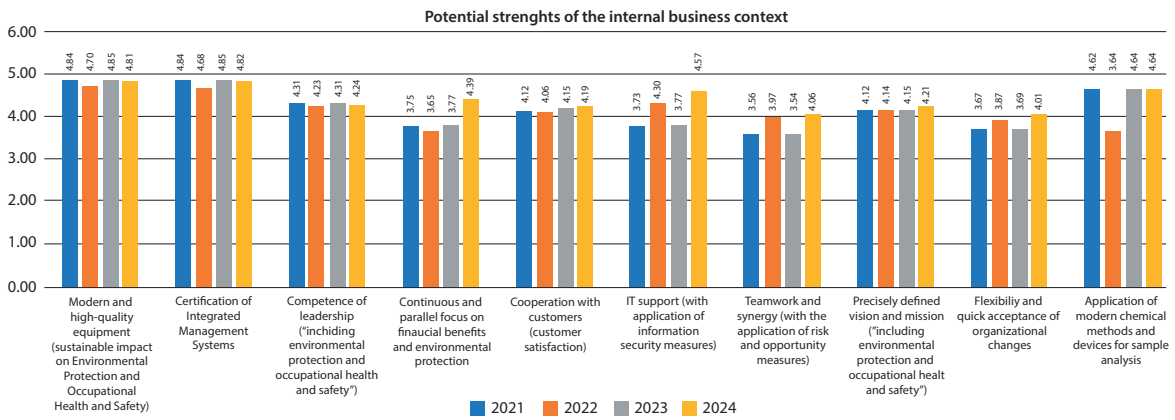
RESULTS AND DISCUSSION

The research results will be presented in three subchapters as follows: 1) A description of the SWOT analysis results, illustrated in Figures 1 through 5, 2) An overview of selected financial indicators relevant to ORM, presented in Tables 1 and 2; and 3) Pearson's correlation results of relevant financial indicators, presented in Table 3.

SWOT analysis

The Institute demonstrates a robust internal business context, with an average survey rating of 4.21 for strengths during the analyzed period (2021 to 2024). The highest ratings, ranging from 4.81 to 4.85, were awarded for the quality of modern and high-quality equipment, with a positive impact on environmental sustainability and occupational safety and health. Similarly, the IMS certifications—including ISO 9001, ISO 14001, and ISO 45001—received high ratings between 4.82 and 4.84. In 2023, collaboration and synergy received the lowest rating of 3.54, prompting corrective measures in the examined area. The team addressed these issues through workshops that emphasized the importance of teamwork and flexibility in adapting to organizational changes. These corrective measures had a positive effect, as reflected in the improved rating of 4.01 for the same question in 2024.

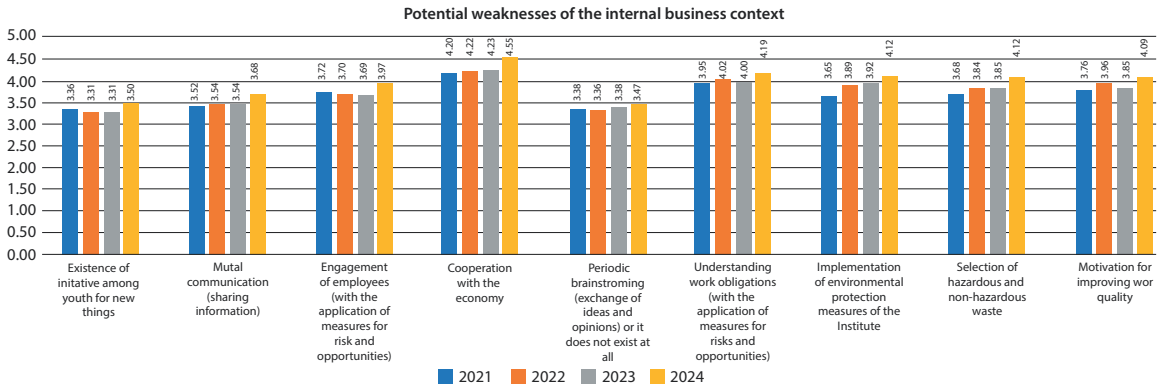
Figure 1. Potential strengths of the internal business context in the period 2021-2024



Source: Authors' data
Legend: Possible strengths: >4.20; Sustainable context: >2.60<4.20; Possible weaknesses: <2.60

The survey on potential weaknesses for the analyzed period indicates a generally sustainable internal business context with an average rating of 3.79. The initiative among young people for new ideas received the lowest rating of 3.31 during 2022 and 2023, underscoring the need to better foster innovation and idea-sharing within this group. By applying the proposed corrective measures in 2024, the same question achieved a result of 3.50, which belongs to a sustainable context, and further improvement is suggested. During the observed period, questions 1 and 5 in Figure 2 received the lowest ratings, highlighting key weaknesses. Applying the PDCA cycle enhances performance, which can eliminate potential threats, provided the necessary measures are taken and a new SWOT analysis is conducted throughout 2025. Conversely, the highest rating of 4.55 in 2024 for the question of cooperation with industry suggests strong partnerships.

Figure 2. Potential weaknesses of the internal business context in the period 2021-2024

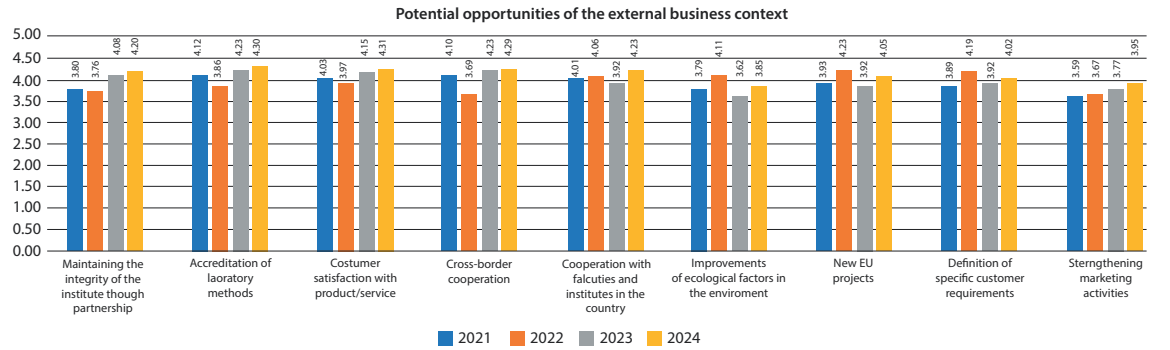


Source: Authors' data

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

Figure 3 shows the opportunities in the external business context. The Institute has an average survey rating of 4.00 for the period from 2021 to 2024, indicating significant potential for growth and improvement. The highest rating during the observed period was 4.31 in 2024, for the question on customer satisfaction with product/service, reflecting strong opportunities in these areas. However, the lowest rating of 3.59 in 2021 for the question on strengthening marketing activities increased to 3.95 by 2024, representing progress in the marketing activities of the scientific research organization.

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

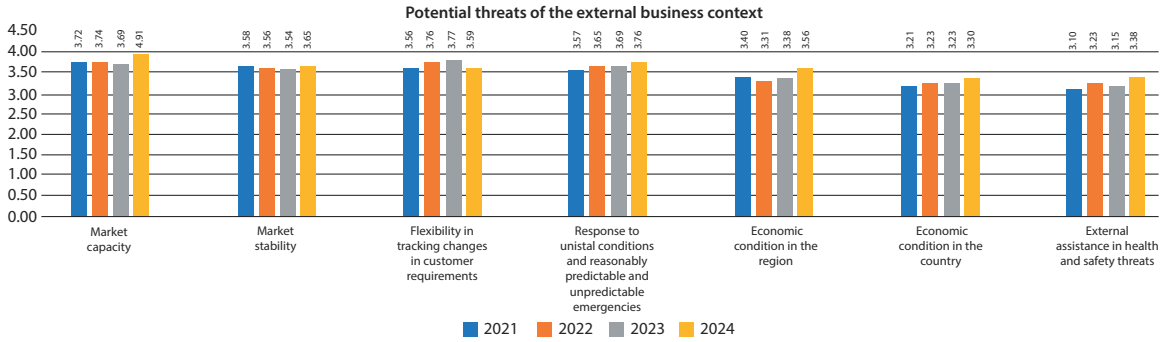


Source: Author's data

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

Figure 4 presents the threats of the external business context and reveals several key points: In 2024, the question on market capacity received the highest rating of 3.91, showing an improvement over the previous three years covered by the survey. The lowest ratings, over the four years, ranging from 3.10 to 3.30, were for questions about the economic situation and external assistance in the event of health and safety threats. This suggests a significant area for improvement, as external support in such critical situations is currently perceived as inadequate. The average rating of 3.50 indicates that, although some external threats are beyond the Institute's control, there is a need to develop strategies to mitigate these risks. This could involve establishing agreements with local municipalities and communities to enhance resilience against external threats.

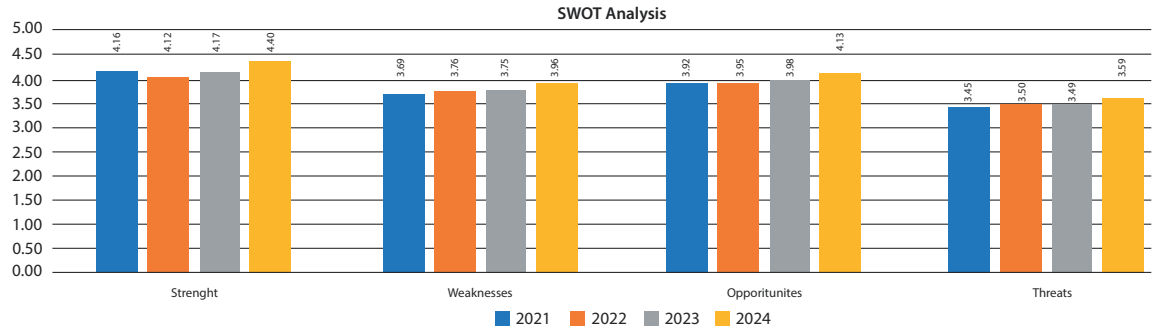
Figure 4. Potential threats of the external business context in the period 2021-2024



Source: Author's data
Legend: Possible strengths: >4.20; Sustainable context: >2.60<4.20; Possible weaknesses: <2.60

Figure 5 represents the average ratings of the conducted SWOT analyses for strengths, weaknesses, opportunities, and threats for the analyzed period. The conducted SWOT analyses and implemented measures, and the results of corrective actions carried out through the PDCA cycle for the period from 2021 to 2024 indicate a sustainable business context for the Institute. The average score of the strengths of the internal business context in 2021 is 4.16. Considering that this was a year marked by the COVID-19 pandemic, the Institute supports a high level of sustainable business context. In the following two years (2022 and 2023), the context remains sustainable with average scores of 4.12 and 4.17. In 2024, the strengths in the internal business context exceeded a value of 4.20 – an excellent result for the business, in terms of modern equipment and the application and certification of the IMS. The weaknesses in the internal business context had an average score of 3.69 in 2021, increasing slightly to 3.76 in 2022, and remaining relatively stable at 3.75 in 2023. In 2024, the weaknesses of the internal business context, with an average score of 3.96, still represent a sustainable context for the Institute. It can be concluded that there are no significant fluctuations in the weaknesses of the internal business context during the observed period, thanks to the corrective measures taken. The opportunities in the external business context of the Institute for all four observed years support a growth trend, with an average score of 3.92 in 2021 and an average score of 4.13 in 2024. The threats in the external business context, for the achieved average ratings during the observed period, are within a sustainable context for the Institute's operations. The primary research, a SWOT analysis conducted from 2021 to 2024, with an average result of 3.88, reflected a sustainable business environment for the Institute and confirmed the hypothesis (H0). These results correspond with the research of Jonović *et al.* (2024) and Jonović & Barjaktarović (2025).

Figure 5. SWOT Analysis in the period 2021-2024



Source: Author's data

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

Overview of financial indicators

The following paragraphs provide an analysis of selected financial indicators relevant for the determination of success in ORM for the Institute.

Table 1. Financial indicators of the Institute in the period 2020-2023

Year / (RSD 000)	Business income (1)	Business expenses (2)	Business result (3) = (1)-(2)	Financial income (4)	Financial expenses (5)	Financial result (6) = (4)-(5)	Other income (7)	Other expenses (8)	Other result (9) = (7)-(8)	Net profit (10)
2020	844,322	781,178	63,144	1,649	3,255	-1,606	10,531	47,148	-36,617	18,289
2021	694,884	705,139	-10,255	6,408	782	5,626	2,918	4,873	-1,955	20,641
2022	840,483	839,997	486	10,717	5,120	5,597	48,659	12,141	36,518	35,704
2023	1,011,013	945,566	65,447	156	5,568	-5,412	6,013	8,242	-2,229	3,674
					Year-over-Year changes in (%)					
2020 to 2021	-17.70	-9.73	-116.24	288.60	-75.98	-450.31	-72.29	-89.66	-94.66	12.86
2021 to 2022	20.95	19.13	104.74	67.24	554.73	-0.52	1567.55	149.15	1967.93	72.98
2022 to 2023	20.29	12.57	13,366.46	-98.54	8.75	-196.69	-87.64	-32.11	-106.10	-89.71

Source: SBRAs' data for the period 2020 to 2023 and authors' calculation

Based on Table 1, the Institute had fluctuations in business results. i.e., business income and expenses had the same direction as the business result. Business results are indicators of the Institute's profitability, growth, risk mitigation, performance activities, and compliance with relevant regulations. In percentage terms, business changes: 1) income decreased by 17.70% between 2020 and 2021, followed by an increase of 20.95% in 2022 and 20.29% in 2023.; 2) expenses dropped by 9.73% in 2021, then increased by 19.13% in 2022, and by 12.57% in 2023; and 3) results fluctuated significantly, with an increase of 116.24% in 2021 and an exceptional rise of 13,366.46% in 2023. These results changed due to market conditions caused by: 1) the COVID-19 pandemic, which had an impact on sales and working conditions, and 2) the conflict in Ukraine, which affected global inflation. The management emphasizes

that the focus was on increasing and maintaining production while preserving human lives (especially older employees) and ensuring workplace safety. Accordingly, changes in business results depend on: 1) the fluctuations in inventory value; 2) employees' salaries; 3) the collection of large receivables after the report was compiled (by the key customer of the Institute), and 4) payments from international projects (especially in 2021). It can be concluded that there is room for risk management, receivables, pricing, sales activities, and customer negotiations.

In terms of the Institute's financial activities, varying degrees of success were observed: 1) In 2021, financial income was 288.60% higher compared to 2020. In 2022, financial income was 67.24% higher than in 2021, while in 2023, it dropped by (-) 98.54% compared to 2022; 2) financial expenses recorded a decline of (-) 75.98% in 2021 compared to 2020, followed by an increase of 554.73% in 2022 compared to 2021. In 2023, they grew by 8.75% compared to 2022; 3) financial results showed negative performance throughout the observed period: (-) 450.31% in 2021, (-) 0.52% in 2022, and (-) 196.69% in 2023. To mitigate these risks, it is recommended that the Institute employ financial derivatives to manage foreign exchange exposures (EUR and USD, per the annual report) and interest rate fluctuations. This approach would help stabilize business revenues and expenses subject to market risks.

The Institute was less successful in managing other revenues, costs, and results compared to its performance in the financial section of the income statement. It is important to inform stakeholders about the organization's ORM accomplishments. However, for the Institute, the impact of other results on net profit is more relevant than financial results. In percentage terms: 1) income declined by (-) 72.29% in 2021, then surged by 1567.55% in 2022, before falling by (-) 87.64% in 2023; 2) expenses decreased by (-) 89.66% in 2021, then increased by 149.15% in 2022, and dropped again by (-) 32.11% in 2023; 3) results decreased by (-) 94.66% in 2021, experienced a substantial increase of 1,967.93% in 2022, and then declined by 106.10% in 2023. The Institute had positive results only in 2022. During the analyzed period, annual reports indicate legal disputes in 4 to 5 cases, with more instances where the Institute was the plaintiff rather than the defendant. It is consistently emphasized that legal proceedings were ongoing at the time the report was prepared. It was not clear what significantly increased or decreased in other income and other expenses, as these two categories had the most significant impact on the value of the result. Based on management's information about the health of employees as the primary target, it can be concluded that the Institute invested in measures to provide safety for employees. The initial period of the analysis included some of these costs as other expenses following the definition of operational risk. However, there is space for further improvement of ORM in the Institute.

Net profit depends on the Institute's success across all activities: business, financial, and other activities, as well as its performance in previous periods. However, in the long term, success in business activities is the most crucial factor for effective risk management and sustainable performance of the scientific research organization. In the case of unexpected losses, the scientific organization covers these from retained profit. During the analyzed period, the Institute achieved a net profit, with the following fluctuations: an increase of 12.86% in 2021 compared to 2020, a further rise of 72.98% in 2022, and a decline of 89.71% in 2023. Based on the data, it is evident that the Institute has demonstrated effective risk management practices.

Table 2. Financial indicators of the Institute in the period 2020-2023

Year	Equity (in RSD 000)	Total Assets (in RSD 000)	Asset turnover ratio (in %)	Equity changes (in %)	Total Assets changes (in %)	ROE (in %)	ROA (in %)	ROI (in %)
2020	1,110,706	1,353,626	n.a	n.a	n.a	1.65	1.35	0.74
2021	1,13,.532	1,420,914	0.64	1.78	4.97	1.83	1.45	0.81
2022	1,165,582	1,416,033	0.69	3.10	-0.34	3.06	2.52	1.38
2023	1,519,426	1,73,.904	0.66	30.36	22.66	0.24	0.21	0.11

Source: SBRA's data for the period 2021 to 2023 and authors' calculation

According to Table 2, the evidence supports the following conclusion: equity's growing trend suggests the organization has been able to retain earnings and possibly attract additional investments, leading to an overall increase in shareholders' equity. In the analyzed period, the equity grew from 1.78% to 30.36%. It indicates financial stability with investment capability. In the annual report, capital management is presented by the net liabilities/capital indicator, which ranges from 0.26 to 0.23, highlighting effective risk management. Furthermore, the share capital remained the same throughout all analyzed years (since 2017).

Assets recorded an increasing trend based on the movements of real estate (depreciation and prepared for leasing), inventory (prepared for leasing), long-term financial investments, equity in other companies, stock, and receivables. Additionally, the report indicates that total assets: 1) raised 4.97% in 2021 as result of movements of stocks; 2) dropped (-) 0.34% in 2022 as combination of increased value of depreciation, real estate and inventory on leasing, long term financial investments and equity in other companies; reduced inventory (which is not on leasing), stock and receivables; 3) increased 22.66% in 2023 due to an increase in the value of all forms of current assets. Finally, the Asset Turnover Ratio indicates a relatively stable efficiency in utilizing assets for revenue generation. The values are in accordance with the trend of asset volumes, i.e., increased to 0.64% in 2021 and 0.69% in 2022, and slightly dropped to 0.66% in 2023.

Based on the profitability indicators' values of ROE (from 0.24% to 3.06%) and ROA (from 0.21% to 2.52%), it can be concluded that the Institute has space for further improvement and better revenue management. Furthermore, ROI had the same trend as ROE and ROA (range from 0.11% to 1.38 %), reflecting improved investment efficiency, cost optimization, revenue growth, and significant investments in laboratory equipment and research infrastructure. Finally, 2022 marked the best year in terms of the Institute's earning capacity.

The analysis of the Institute's financial indicators concludes that Hypothesis H1 is partially confirmed, primarily due to effective equity management, which aligns with the findings of Jonović & Barjaktarović's (2025) research. The Institute had room to improve revenue management in all business segments, particularly concerning items exposed to market risk. Furthermore, the Institute should improve ORM in the future period. It means that the management should cross-reference the surveys and financial results to advance the management of operational risks.

Results of applying Pearson's correlation

The study analyzed the following relationships: 1. Other Income vs. Other Expenses, 2. Other Income vs. Net Profit, 3. Other Results vs. Net Profit, 4. Business Results vs. Financial Results, 5. Total Assets vs. Equity. The main findings are presented in Table 3.

A Pearson's correlation coefficient (r) of -0.065 indicates a very weak negative relationship between Other Income and Other Expenses. It means that there is no significant correlation between these two variables. Changes in Other Income do not predict changes in Other Expenses, and vice versa, due to the physiognomy and the impact of operational risk on the organization's performance. Furthermore, the Pearson's correlation coefficient (r) of 0.57 indicates a moderate positive relationship between Other Results and Net Profit. This means that as Other Results increase, net profit decreases and vice versa. Given the nature of the accounting items in Other Results, the Institute should focus on enhancing capabilities in areas outside its core business. This includes investing more in employee training, improving working conditions, upgrading equipment, and securing appropriate insurance coverage. Therefore, managing operational risks effectively should lead to obtaining, maintaining, and improving the organization's Net Profit. Moreover, the Pearson's correlation coefficient (r) of 0.81 indicates a strong relationship between Other Income and Net Profit. It can be explained that if Other Income increases, Net Profit increases significantly. Moreover, the strong correlation highlights that effective ORM measures are positively impacting financial performance. Hence, the Institute should explore how to increase Other Income through products and services outside its core business. This may include evaluating suitable insurance policies, identifying beneficial contracts, considering the sale of non-essential assets, and engaging legal experts for ongoing judicial processes. It is important for the Institute's risk management department to propose operational risk mitigation strategies and educate employees on risk management measures and acceptable behavior.

Table 3. Results of the Pearson's correlation coefficient of the selected Institute's financial indicators for the period 2020-2023

Variable 1	Variable 2	Pearson's correlation coefficient (r)
Other Income	Net profit	0.81
Business result	Financial result	-0.74
Total Assets	Equity	0.99

Source: Authors' calculations based on Table 1

Next, the Pearson's correlation coefficient (r) of -0.74 indicates a strong negative relationship between Business Result and Financial Result. This inverse relationship suggests that as the Business Result improves, the Financial Result tends to decline, and vice versa. There is room for improvement of the strategies and implementation of practices, including knowledge increase – starting with the finance department and extending to other areas, enabling the Institute to generate more Financial Income from sales, contracts, and associated financial instruments. This is important for the long-term sustainability of the Institute.

Finally, Pearson's correlation coefficient (r) of 0.99 indicates a positive relationship between Total Assets and Equity, due to the nature of these two indicators for the Institute operations (i.e., what the Institute owns and how it is financed).

It can be concluded that Pearson's coefficient can be applied specifically to the Institute under study, hence confirming Hypothesis H1. Nonetheless, due to the small sample size (n = 4), the results should be considered exploratory, ensuring transparency in statistical interpretation.

CONCLUSION

Contemporary business conditions are risky and interconnected with global developments. The Institute needs to manage operational risks in an integrated and proactive manner to ensure sustainability and maintain competitiveness. The adoption of this approach enhances business performance and helps achieve organizational goals. Considering that operational risks affect financial performance through various channels (organizational, macro-financial, external), establishing a conducive environment within the organization generally facilitates better management of these risks. Effective ORM is crucial for positively influencing the financial performance of the Institute.

Based on the identified weaknesses/potential risks of the SWOT analyses, the risk management sector of the research organization has taken measures to mitigate risks (conducting training on identified weaknesses as a result of identified potential risks), as well as re-evaluation through the PDCA cycle. Overall, the Institute demonstrates a sustainable and strong internal business context with excellent capabilities for recognizing and leveraging its strengths. However, there is a need for improvement in teamwork, encouraging young employees in all departments of the Institute to take initiative, and enhancing environmental factors in the external context. By addressing these areas, the scientific research organization can further strengthen its position and achieve sustainable growth. Moreover, the Institute shows a strong ability to adapt to changing customer demands and maintains a favorable working environment. Critical areas need improvement, strengthening external support for health and safety threats, and emergency preparedness.

Targeted training programs and strategic partnerships with competent and reliable external entities enable the research organization to enhance its resilience and operational efficiency. Over a four-year research, the institute maintained a stable business with no significant fluctuations. The confirmation of H0 shows that a structured risk management framework enhances resilience and strategic decision-making.

The results of the Pearson's correlation coefficient confirm Hypothesis H1 for the researched institute, while the analysis of financial indicators suggests its partial confirmation, emphasizing efficient equity management. There is room for improvement in revenue management across all business segments, especially in terms of items exposed to market risk. Moreover, the scientific research organization should improve ORM in the future period, based on the implementation of the survey's outcome and the financial results.

Furthermore, it correlates with COSO ERM principles, which do not explicitly validate IMS implementation as the sole driver of ORM and financial performance improvements.

Future research should focus on comparative analysis within Institutes of National Importance in the Republic of Serbia (6), which will include interviews with their experts in finance and risk management, to refine risk management models and optimize financial strategies.

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OCENA UTICAJA INTEGRISANOG SISTEMA MENADŽMENTA NA OPERATIVNI RIZIK I FINANSIJSKE POKAZATELJE ISTRAŽIVAČKE ORGANIZACIJE

Rezime:

Studija se oslanja na nalaze Jonović i saradnika (2024) i ima za cilj da: 1) utvrdi da li implementacija integrisanih sistema menadžmenta (IMS) zasnovanih na modelu Komiteta sponzorskih organizacija (COSO) za upravljanje rizikom u preduzeću (ERM) poboljšava održivo upravljanje operativnim rizicima i finansijskim performansama u naučnoistraživačkoj organizaciji; i 2) razvije metodu za unapređenje upravljanja operativnim rizicima i finansijskim rezultatima. Primarno istraživanje uključuje SWOT (snage, slabosti, mogućnosti i pretnje) analize sprovedene od 2021. do 2024. godine, sa prosečnom stopom odgovora većom od 71%, što potvrđuje održiv poslovni kontekst. Istraživanje takođe za cilj ima da, prateći PDCA (*Plan-Do-Check-Act*) ciklus, poboljša odgovor naučnoistraživačkih organizacija na strateške ciljeve i operativne rizike. Studija pruža podatke i o analizi finansijskih pokazatelja, kao rezultat sekundarnog istraživanja (za isti period), i Pirsonovom koeficijentu korelacije, koji pokazuje uticaj IMS zasnovanog na COSO ERM modelu na finansijsku i operativnu stabilnost organizacije. Rezultati istraživanja naglašavaju važnost efikasnog upravljanja operativnim rizicima za bolje finansijske performanse instituta. Međutim, oni takođe sugerišu i da implementacija IMS-a nije dovoljna za unapređenje upravljanja operativnim rizicima unutar organizacije. Buduća istraživanja će se fokusirati na poređenje instituta od nacionalnog značaja u Republici Srbiji kako bi se precizirali modeli upravljanja rizicima i unapredile finansijske performanse.

Ključne reči:

operativni rizici,
COSO,
ERM,
(IMS),
SWOT analiza,
naučno-istraživačka organizacija.

JEL klasifikacija:
G12, M32