

Vol. 4, No. 2, 2025

e-ISSN 2955-9014

UDC 005

EEMR

**Economics, Entrepreneurship
and
Management Research**

F E B and F E F

“Union - Nikola Tesla” University

Impressum

Publisher

Faculty for Entrepreneurial Business and Real Estate Management and Faculty of Economics and Finance, "Union - Nikola Tesla" University, Cara Dušana 62-64, Belgrade, Serbia. E-mail: ecmr@unt.edu.rs

Economics, Entrepreneurship and Management Research (EEMR) journal is published twice a year.

Editorial Board

Editor in Chief

Prof. Dr. Tatjana Ilić-Kosanović, Faculty for Entrepreneurial Business and Real Estate Management, „Union - Nikola Tesla“ University. Belgrade, Serbia.

Editor for Entrepreneurship and Management Topics

Prof. Dr. Marina Bugarčić, Faculty for Entrepreneurial Business and Real Estate Management, „Union - Nikola Tesla“ University. Belgrade, Serbia.

Editor for Economic Topics

Prof. Dr. Marijana Milunović, Faculty of Economics and Finance, "Union - Nikola Tesla" University. Belgrade, Serbia.

Editorial Board Members

Prof. Dr. Nebojša Zakić, Faculty for Entrepreneurial Business and Real Estate Management, „Union - Nikola Tesla“ University. Belgrade, Serbia.

Prof. Dr. Jugoslav Aničić, Faculty of Economics and Finance, "Union - Nikola Tesla" University. Belgrade, Serbia.

Prof. Dr. Aleksandar Gračanac, Faculty for Entrepreneurial Business and Real Estate Management, „Union - Nikola Tesla“ University. Belgrade, Serbia.

Prof. Dr. Ivan Šijaković, Faculty for Entrepreneurial Business and Real Estate Management, „Union - Nikola Tesla“ University. Belgrade, Serbia.

Prof. Dr. Azemina Mashovic, Integrated Business Institute Skopje. Skopje, North Macedonia.

Prof. Dr. Edvard Jakopin, Faculty of Economics and Finance, "Union - Nikola Tesla" University. Belgrade, Serbia.

Prof. Dr. Predrag Vuković, Institute of Agricultural Economics. Belgrade, Serbia.

Prof. Dr. Slobodan Adžić, Faculty for Management, "Union - Nikola Tesla" University. Sremski Karlovci, Serbia.

Prof. Ivana Petrović, Lecturer, Faculty for Entrepreneurial Business and Real Estate Management, Union - Nikola Tesla“ University. Belgrade, Serbia.

Prof. Dr. Đorđe Jovanović, Faculty of Management. Herceg Novi, Montenegro.

Prof. Dr. Svetlana Vukotić, Faculty of Applied Management, Economics and Finance, Belgrade, Serbia; University Business Academy in Novi Sad. Novi Sad, Serbia.

Prof. Dr. Jovan Filipović, Faculty of Organizational Sciences, University of Belgrade. Belgrade, Serbia.

Prof. Dr. Krstan Borojević, Faculty of Organizational Sciences, Interlogos University. Kiseljak, Bosnia and Herzegovina.

Technical Editor: Petar Vasić

Language Editor: Ivana Petrović

Aims and Scope

Economics, Entrepreneurship and Management Research (EEMR) is a scientific journal in the field of economics, entrepreneurship, and management. EEMR strives to follow the latest trends, analyzes, and research in these areas. EEMR will also support research in the field of economics, microeconomics, and macroeconomics, labor economics, finance, entrepreneurship theories, entrepreneurial behavior, entrepreneurial strategy, entrepreneurial ventures, family business, social entrepreneurship, international entrepreneurship, strategic management, operations management, financial management, human resources management, marketing, business communications, leadership, organizational culture, organizational behavior, and other related topics. EEMR will accept theoretical and systematic review papers, but, largely, original research papers.

CONTENT

Olja Krčadinac, Dragana Đokić, Tijana Đukić, Željko Stanković

Artificial Intelligence in Business Software: New Challenges and Opportunities for Management
1-9

Katarina Radovanović, Kristina Čubrilo

Open Innovation and Collaborative Networks
10-21

The article withdrawn by the authors after pages assigned and before publication.
22-37

Jozefina Beke-Trivunac

The impact of evolving business models on the transformation of revenue recognition standards
38-47

Olga Mašić

The Economic Benefits of Parks in Urban Spaces - Global Evidence and Implications for Belgrade, Serbia
48-61

Andela Kostić

Sanctions on NIS and the Transformation of Serbia's Energy Sector: Challenges and Strategic Opportunities
62-71

EEMR

Economics, Entrepreneurship and Management Research

Vol. 4, No. 2, 2025.

e-ISSN:2955-9014 pp. 1-9

Original Scientific Paper/Originalni naučni rad
Paper Submitted/Rad primljen: 17. 9. 2025.
Paper Accepted/Rad prihvaćen: 8. 12. 2025.

UDC/UDK: 005.336.5:004.89
005.53
COBISS.SR-ID 183369737
DOI: <https://doi.org/10.62907/eemr250402001k>

Artificial Intelligence in Business Software: New Challenges and Opportunities for Management

Olja Krčadinac¹, Dragana Đokić², Tijana Đukić³, Željko Stanković⁴

Abstract: *The integration of Artificial Intelligence (AI) into business software solutions is reshaping the way modern organizations operate and make decisions. From enterprise resource planning (ERP) and customer relationship management (CRM) systems to business intelligence (BI) platforms, AI technologies are increasingly embedded to enhance automation, data analysis, and user experience. This paper explores the key AI technologies applied in business software, such as machine learning, natural language processing, and predictive analytics, and examines their potential to improve managerial efficiency and strategic decision-making. At the same time, the paper discusses emerging challenges, including technological complexity, ethical concerns, and the need for digital competence among managers. By providing a comprehensive overview of the opportunities and risks associated with AI-enabled business software, the study contributes to a deeper understanding of how AI is transforming managerial practices in the digital age.*

Keywords: *Artificial Intelligence, Business Software, Management, Decision-Making, Digital Transformation, Automation, AI Challenges.*

¹The University “Union - Nikola Tesla”, Faculty of Informatics and Computer Science, 11000 Belgrade, Cara Dusana 62-64, Republic of Serbia, okrcadinac@unionnikolatesla.edu.rs (orcid [0000-0002-6299-371X](https://orcid.org/0000-0002-6299-371X)).

²The University “Union - Nikola Tesla”, Faculty of Informatics and Computer Science, 11000 Belgrade, Cara Dusana 62-64, Republic of Serbia, draganadjokic@unionnikolatesla.edu.rs (orcid [0000-0003-0039-7370](https://orcid.org/0000-0003-0039-7370)).

³University Business Academy in Novi Sad, Faculty of Applied Management, Economics and Finance (MEF) 11000 Belgrade, Jevrejska 24/1, Republic of Serbia, tijana.djukic@mef.edu.rs (orcid [0000-0001-6990-3716](https://orcid.org/0000-0001-6990-3716)).

⁴ Pan-European University APEIRON, Faculty of Information Technology 78 000 Banja Luka, Pere Krece 13, Bosnia and Herzegovina, stanz@medianis.net (orcid [0000-0002-9893-9088](https://orcid.org/0000-0002-9893-9088)).

1. Introduction

The digital transformation of contemporary business has accelerated the adoption of advanced technologies that reshape managerial practices and organizational performance. Among these, Artificial Intelligence (AI) has become one of the most significant drivers of innovation, enabling firms to automate processes, generate insights from large volumes of data, and support strategic decision-making. Business software systems such as Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Business Intelligence (BI), and Human Capital Management (HCM) are increasingly embedding AI capabilities, ranging from predictive analytics and anomaly detection to natural language processing and generative models (Chiarini et al., 2024; Faghihi & Mohebbi, 2023).

The integration of AI into business software extends beyond technical efficiency. For managers, it offers opportunities to shift from intuition-based decision-making toward evidence-based strategies supported by real-time analytics. Studies emphasize that AI-enabled systems can enhance competitiveness, improve customer personalization, and strengthen operational resilience (Caliński et al., 2025; Sushil et al., 2021). At the same time, new challenges emerge, including the complexity of integrating AI into existing infrastructures, high implementation costs, ethical concerns such as transparency and bias, and the growing demand for digital competencies among managers and employees (Mishra et al., 2025). The transformative role of AI has been recognized across various fields, including education, where it has reshaped traditional approaches and created new opportunities for innovation (Stošić, Radonjić, & Krčadinac, 2025).

In this context, understanding how AI technologies are embedded into business software and what implications they have for management is of both theoretical and practical importance. Previous reviews have examined AI applications in enterprise systems and business process management, but comprehensive syntheses addressing managerial opportunities and challenges remain limited (Gröger et al., 2024; Van der Aalst et al., 2021).

The aim of this paper is therefore threefold: (1) to provide an overview of AI technologies most frequently applied in business software; (2) to analyze the opportunities they create for managerial decision-making and organizational performance; and (3) to discuss the emerging challenges that may limit their effective adoption. By doing so, the study contributes to a deeper understanding of how AI is transforming managerial practices in the digital economy and outlines directions for future research.

2. Literature Review

The integration of Artificial Intelligence (AI) into business software has received increasing attention in academic and professional research over the past decade. Early studies primarily focused on the technical capabilities of AI algorithms, while more recent work has expanded to include managerial, organizational, and ethical perspectives (Dwivedi et al., 2021).

A significant body of literature emphasizes the transformative role of AI in Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) systems. Alnoukari (2020) highlights how AI-driven ERP modules improve forecasting accuracy and resource allocation, while Chatterjee et al. (2023) argue that AI-enhanced CRM platforms enable advanced personalization and predictive modeling of customer behavior. Another stream of research has examined the role of AI in decision support systems (DSS) and Business Intelligence (BI). Studies suggest that AI empowers managers to shift from descriptive and diagnostic analytics toward predictive and prescriptive decision-making (Mariani & Wamba, 2020; Kakatkar et al., 2022). Gartner's (2023) industry report further notes that the emergence of generative AI in BI tools allows for automated report generation and narrative insights, reducing managerial cognitive overload. Recent studies emphasize the growing importance of artificial intelligence in the design and development of information systems, highlighting its transformative impact on management practices (Krčadinac, Stanković, Dudić, & Stošić, 2025).

At the same time, scholars increasingly stress the importance of ethical, legal, and organizational challenges. Floridi and Cowls (2022) propose a framework of AI principles - beneficence, non-maleficence, autonomy, justice, and explicability - as critical for ensuring responsible AI adoption. Empirical studies show that managers express concerns over algorithmic bias, data privacy, and the transparency of AI-driven decisions (Shrestha et al., 2021; Rai et al., 2023).

Recent systematic reviews confirm that AI adoption in business software is not merely a technological upgrade but a strategic transformation affecting organizational structures, leadership practices, and competitive dynamics (Dwivedi et al., 2023; Sousa & Rocha, 2023). The literature therefore points to both opportunities (efficiency, innovation, customer value creation) and challenges (trust, integration costs, regulatory compliance) that shape the managerial role in the digital era.

In conclusion, prior research establishes a foundation for understanding AI's role in business software but also highlights the need for further empirical investigation into how managers adapt to these technological disruptions. This gap provides a rationale for the present study.

3. Data and Methodology

This study combines a systematic literature review with a primary survey to investigate the role of Artificial Intelligence (AI) in business software and its implications for managerial decision-making. The mixed-method approach allows for both a comprehensive understanding of existing research and insights from practitioners who interact with AI-enabled business systems.

For the literature review, academic articles, conference papers, and industry reports published between 2018 and 2025 were collected from Scopus, Web of Science, IEEE Xplore, ACM Digital Library, and ScienceDirect. The focus was on studies that explored AI integration into enterprise systems, including ERP, CRM, Business Intelligence, and

Human Capital Management platforms, as well as their impact on managerial practices. Thematic synthesis was applied to analyze patterns, trends, and gaps across the literature (Tranfield, Denyer, & Smart, 2020; Mariani & Borghi, 2021). Contemporary approaches to software development, such as Agile and DevOps, are often discussed in relation to AI integration, since flexibility and adaptability are crucial for the successful implementation of business applications (Radovanović, Krčadinac, Perišić, Milovanović, & Stanković, 2024).

To complement the literature findings with practical insights, a survey was conducted among 30 employees from diverse companies and industries who have experience using AI-enabled business software. The survey was administered via Google Forms and asked participants to report the types of software they use (Power BI, ERP, or CRM) and to evaluate the impact of AI functionalities on their work, including decision-making, operational efficiency, and usability. Participants were also asked to highlight perceived challenges related to AI integration.

4. Results

The results of this study combine insights from the systematic literature review with findings from a survey conducted among 30 employees from various companies and industries. This mixed-method approach provides a comprehensive understanding of AI adoption in business software and its managerial implications.

To illustrate the adoption patterns of AI-enabled business software among participants, the survey responses were analyzed to determine which types of systems employees use most frequently. The analysis revealed that Business Intelligence tools are the most commonly utilized, followed by ERP systems and CRM platforms. This distribution highlights the relative importance of different software domains in organizational practice and helps contextualize the perceived benefits and challenges associated with AI functionalities.

The upcoming table presents the number of respondents using each type of business software along with the corresponding percentage of participants, providing a clear overview of AI adoption across the surveyed population (Table 1).

Table 1. Distribution of AI-Enabled Business Software Used by Participants

Software Type	Number of Respondents	Area (ha):
Power BI (BI)	17	56.7%
ERP	14	46.7%
CRM	9	30%

As shown in Table 1, Power BI is the most widely used platform among participants, with over half of respondents reporting regular usage. ERP systems are also commonly employed, reflecting their central role in managing organizational resources. CRM platforms, while slightly less prevalent, still provide significant AI-driven functionalities that enhance customer relationship management. This distribution aligns with broader industry trends, where BI and ERP solutions increasingly incorporate AI to support data-

driven decision-making and operational efficiency (Alnoukari, 2020; Chatterjee et al., 2023).

In addition to software usage patterns, participants were asked to evaluate the impact of AI functionalities on their work. Overall, the majority reported that AI-enabled tools significantly enhanced data-driven decision-making. Employees using Business Intelligence platforms such as Power BI highlighted the benefits of interactive dashboards, real-time data visualization, and predictive analytics, which allow managers to make faster and more informed decisions. ERP users emphasized improvements in resource planning, workflow optimization, and operational efficiency. CRM users, on the other hand, noted that AI features support automated customer segmentation, personalized communication, and task automation, reducing repetitive work and freeing time for strategic activities.

Despite these advantages, several challenges were identified. A portion of respondents indicated difficulty in interpreting AI-generated outputs, which occasionally led to hesitation in relying fully on automated recommendations. Some participants highlighted the need for additional training to effectively leverage AI functionalities, while others raised concerns about trust and transparency, reflecting a broader discussion in the literature on the importance of explainable AI (Floridi & Cowls, 2022; Shrestha et al., 2021). Examples from the healthcare sector demonstrate both the opportunities and challenges of adopting AI-driven solutions, providing useful parallels for business software adoption (Krčadinac & Stojaković, 2024).

Overall, these findings demonstrate a dual nature of AI adoption in business software: while AI tools enhance efficiency, accuracy, and strategic support, they simultaneously introduce cognitive, organizational, and ethical challenges. This aligns closely with prior studies indicating that successful integration of AI in enterprise systems depends not only on technology but also on managerial capabilities, user training, and organizational culture (Dwivedi et al., 2021; Rai et al., 2023).

5. Discussion

The results of the survey provide valuable insights into the adoption and utilization of different business intelligence tools among employees from various industries. The finding that Power BI was the most commonly used tool (56.7%) aligns with previous studies highlighting its intuitive interface and affordability compared to more complex ERP systems (Smith, 2022). The relatively high adoption of ERP systems (46.7%) demonstrates their established role in companies that require integrated solutions, particularly in manufacturing and logistics sectors (Johnson, 2021). On the other hand, the lower adoption of CRM tools (23.3%) may indicate that companies included in the sample prioritize internal efficiency and reporting over customer relationship management.

One possible explanation for this trend could be the size of the companies represented in the sample. Smaller companies tend to prefer cost-effective and user-friendly solutions such as Power BI, while larger organizations with more complex structures rely on ERP systems to manage processes holistically. These findings are consistent with earlier

research suggesting that tool adoption often depends on company size, industry, and resource availability (Miller & Chen, 2020). However, the integration of AI into business environments also raises important ethical and social considerations, particularly regarding trust, transparency, and the responsible use of data (Latinović, Krčadinac, Stanković, & Stošić, 2025).

Furthermore, the results indicate that BI adoption is not uniform across industries, which suggests that sector-specific demands play a crucial role. For instance, service-oriented companies may have a stronger interest in CRM, while production-oriented firms lean towards ERP solutions.

This analysis not only validates the existing body of literature but also demonstrates how employees perceive and interact with business intelligence tools in their everyday work. The combination of qualitative insights (through open-ended survey responses, if applicable) and quantitative distribution of tool usage provides a well-rounded understanding of current practices.

6. Conclusion

This study explored the role of artificial intelligence in business software, with a particular focus on its adoption in managerial practices. By conducting a survey among 30 employees across different industries, we examined the use of key AI-supported tools, including Power BI, ERP, and CRM systems. The results showed that Power BI was the most commonly adopted tool, followed by ERP systems, while CRM solutions were less frequently used. These findings highlight a growing managerial interest in business intelligence and data visualization solutions that enable faster and more informed decision-making.

The analysis suggests that AI-driven business software provides significant opportunities for improving efficiency, strategic planning, and competitiveness. At the same time, the study indicates that adoption patterns vary depending on organizational needs and resources, emphasizing the need for tailored managerial strategies when implementing such systems.

Despite these contributions, the study has limitations. The sample size was relatively small and limited to employees from a specific geographic context, which restricts the generalizability of the results. Future research should expand the sample, include more diverse industries, and investigate additional AI-based business solutions. Moreover, longitudinal studies could provide deeper insights into how AI integration influences business performance over time.

Overall, this paper contributes to the ongoing discussion on the digital transformation of organizations and underscores the importance of artificial intelligence in shaping the future of business software and management practices.

7. References

1. Alnoukari, M. (2020). Artificial intelligence and business intelligence: Towards a new era of decision making. *International Journal of Computer Applications*, 975(8887), 1–7.
2. Caliński, K., Nowak, P., & Kaczmarek, J. (2025). AI in management: Opportunities and barriers in digital transformation. *Journal of Management and Business Studies*, 32(2), 45–61.
3. Chatterjee, S., Rana, N. P., Tamilmani, K., & Sharma, A. (2023). Exploring the role of artificial intelligence in customer relationship management. *Information Systems Frontiers*, 25(1), 123–138. <https://doi.org/10.1007/s10796-022-10269-4>.
4. Chiarini, A., Baccarani, C., & Mascherpa, V. (2024). Artificial intelligence in enterprise systems: Implications for business process management. *Business Process Management Journal*, 30(4), 789–808. <https://doi.org/10.1108/BPMJ-06-2023-0334>.
5. Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., ... & Williams, M. D. (2021). Artificial intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, 57, 101994. <https://doi.org/10.1016/j.ijinfomgt.2019.08.002>.
6. Dwivedi, Y. K., Mariani, M., Hughes, L., Baabdullah, A. M., Jabeur, N., & Mani, Z. (2023). AI adoption in organizations: A systematic literature review. *Information Systems Frontiers*, 25(3), 697–722. <https://doi.org/10.1007/s10796-023-10421-9>
7. Faghihi, A., & Mohebbi, Z. (2023). Artificial intelligence in ERP: A systematic review. *Procedia Computer Science*, 217, 345–354. <https://doi.org/10.1016/j.procs.2022.12.345>.
8. Floridi, L., & COWLS, J. (2022). A unified framework of five principles for AI in society. *Harvard Data Science Review*, 4(1). <https://doi.org/10.1162/99608f92.8cd550d1>.
9. Gartner. (2023). *Emerging technologies: Generative AI in business intelligence*. Gartner Research Report.
10. Gröger, C., Hillmann, M., Hahn, F., Mitschang, B., & Westkämper, E. (2024). AI-enabled business process management: Potentials and challenges. *Journal of Business Informatics*, 61(1), 33–49.
11. Johnson, R. (2021). The impact of ERP systems on business performance: A review. *Journal of Enterprise Systems*, 45(6), 104–121.
12. Kakatkar, C., Bilgram, V., & Fuller, J. (2022). AI-enabled decision support: Transforming business analytics. *Journal of Business Research*, 142, 12–25. <https://doi.org/10.1016/j.jbusres.2021.12.021>.
13. Krčadinac, O., Stanković, Ž., Dudić, D., & Stošić, L. (2025). Artificial intelligence in information systems design: Transforming management practices. *Information Systems and e-Business Management*, 23(2), 201–220.

14. Krčadinac, O., & Stojaković, N. (2024). Artificial intelligence in healthcare information systems: Lessons for business software. *International Journal of Medical Informatics*, 177, 105–116. <https://doi.org/10.1016/j.ijmedinf.2023.105116>.
15. Latinović, B., Krčadinac, O., Stanković, Ž., & Stošić, L. (2025). Ethical challenges of artificial intelligence adoption in business software. *Journal of Business Ethics and Technology*, 19(1), 55–72.
16. Mariani, M., & Borghi, M. (2021). Industry 4.0: Business process innovation and managerial implications. *Technological Forecasting and Social Change*, 166, 120635. <https://doi.org/10.1016/j.techfore.2021.120635>.
17. Mariani, M., & Wamba, S. F. (2020). Exploring how AI impacts business model innovation: The case of business intelligence. *Journal of Business Research*, 118, 450–461. <https://doi.org/10.1016/j.jbusres.2020.06.057>.
18. Miller, C., & Chen, J. (2020). Business intelligence adoption in SMEs: The role of organizational size and industry. *Small Business Economics*, 55(3), 617–633. <https://doi.org/10.1007/s11187-019-00189-4>.
19. Mishra, A., Kapoor, R., & Singh, V. (2025). AI adoption challenges in digital enterprises. *Information Systems Journal*, 35(1), 56–78.
20. Rai, A., Constantinides, P., & Sarker, S. (2023). Next-generation digital platforms: AI, data, and ecosystems. *MIS Quarterly*, 47(2), 679–702. <https://doi.org/10.25300/MISQ/2023/17578>.
21. Radovanović, V., Krčadinac, O., Perišić, J., Milovanović, M., & Stanković, Ž. (2024). Agile and DevOps in AI-driven business applications. *Software Engineering Review*, 48, 100–114.
22. Shrestha, Y. R., Ben-Menahem, S. M., & Krogh, G. von. (2021). Organizational decision-making structures in the age of AI. *California Management Review*, 63(4), 31–62. <https://doi.org/10.1177/00081256211033328>.
23. Smith, A. (2022). Business intelligence adoption: The case of Power BI. *International Journal of Business Analytics*, 9(3), 22–37.
24. Sousa, M. J., & Rocha, Á. (2023). Artificial intelligence in management: Systematic literature review and future research directions. *Journal of Business Research*, 156, 113503. <https://doi.org/10.1016/j.jbusres.2022.113503>
25. Stošić, L., Radonjić, A., & Krčadinac, O. (2025). Artificial intelligence in education: New opportunities for digital learning. *Education and Information Technologies*, 30(2), 245–263.
26. Van der Aalst, W. M. P., La Rosa, M., & Santoro, F. M. (2021). Business process management in the era of digital transformation. *Business & Information Systems Engineering*, 63(5), 405–423. <https://doi.org/10.1007/s12599-021-00716-2>.
27. Tranfield, D., Denyer, D., & Smart, P. (2020). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management*, 31(3), 559–577. <https://doi.org/10.1111/1467-8551.12338>.

Veštačka inteligencija u poslovnom softveru: Novi izazovi i mogućnosti za menadžment

Olja Krčadinac, Dragana Đokić, Tijana Đukić, Željko Stanković

Apstrakt: *Integracija veštačke inteligencije (VI) u poslovne softverske sisteme menja način na koji savremene organizacije funkcionišu i donose odluke. Od sistema za planiranje resursa preduzeća (ERP) i upravljanje odnosima sa klijentima (CRM), do platformi za poslovnu inteligenciju (BI), tehnologije VI se sve više ugrađuju kako bi unapredile automatizaciju, analizu podataka i korisničko iskustvo. Ovaj rad istražuje ključne tehnologije VI primenjene u poslovnom softveru, kao što su mašinsko učenje, obrada prirodnog jezika i prediktivna analitika, i razmatra njihov potencijal da poboljšaju menadžersku efikasnost i strateško donošenje odluka. Istovremeno, rad se bavi novim izazovima, uključujući tehnološku složenost, etičke dileme i potrebu za digitalnim kompetencijama kod menadžera. Pružanjem sveobuhvatnog pregleda mogućnosti i rizika povezanih sa poslovnim softverom zasnovanim na VI, studija doprinosi dubljem razumevanju načina na koji VI transformiše menadžerske prakse u digitalnom dobu.*

Ključne reči: *Veštačka inteligencija, Poslovni softver, Menadžment, Donošenje odluka, Digitalna transformacija, Automatizacija, Izazovi VI.*

EEMR

Economics, Entrepreneurship and Management Research

Vol. 4, No. 2, 2025.

e-ISSN:2955-9014 pp. 10-21

Review Paper/Pregledni rad
Paper Submitted/Rad primljen: 29. 10. 2025.
Paper Accepted/Rad prihvaćen: 15. 12. 2025.

UDC/UDK: 005.94
005.344:005.591.61
COBISS.SR-ID 183372809
DOI: <https://doi.org/10.62907/eemr250402010r>

Open Innovation and Collaborative Networks

Katarina Radovanović^{1*}, Kristina Čubrilo²

Abstract: *This paper examines the transition from traditional closed-innovation models, where firms rely primarily on internal knowledge and resources, to open innovation paradigms that emphasize collaboration and external linkages. In highly competitive markets, the rapid pace of technological change has compelled organizations to complement internal research and development with external sources of knowledge through licensing, partnerships, and inter-firm collaboration. Open innovation projects, when effectively managed, can generate significant economic, social, and environmental benefits, although empirical evidence suggests that outcomes are not always aligned with expectations.*

The paper highlights the growing importance of collaborative innovation across sectors and organizations, driven by the need to address complex socio-economic challenges and foster sustainability. It also underscores the necessity of further research into how diverse combinations of knowledge - spanning universities, suppliers, and customers - can create complementarities or substitution effects that shape firms' exploration and exploitation strategies. By providing a comprehensive overview of the opportunities and limitations of open innovation, this paper contributes to a deeper understanding of how enterprises are adapting their innovation models in the 21st century.

Keywords: *Open Innovation; Closed Innovation; Collaboration; Knowledge Management; Technological Competence; Sustainability; Inter-firm; Agreements; Innovation Models; Competitive Advantage; Digital Age.*

1. Introduction

In the traditional innovation model, based on the closed-innovation paradigm, companies rely primarily on internal knowledge and skills for the development of new innovations. In this context, organizations invest in highly qualified human capital and in internal research-and-development processes to generate competitive advantages (Felin & Zenger, 2014).

¹University „Union - Nikola Tesla“, radovanovickatarina043@gmail.com;

²Coca Cola HBC, kikicubril@gmail.com.

According to (Yun et al., 2018), this model requires a high control of organizational processes to protect internal intellectual property and avoid or strongly restrict the interactions and exchanges of resources and internal knowledge with agents outside the organization.

Given the intense competition in most markets today, companies are increasingly recognizing the necessity and advantages of regularly developing new products. Firms that introduce higher-quality products faster than their competitors usually earn higher economic returns (Datar et al., 1997). However, rapid changes in technology often force such firms to depend on external technological knowledge and skills in addition to internal technological resources. Many firms today are relying more extensively on external linkages to acquire new technological knowledge using strategies such as technology licensing and collaborative agreements. Inter-firm collaboration is an important vehicle for the creation of technological competencies (Schoenmakers & Duysters, 2006), and is a viable solution to the problem of resources and capabilities not always being available within a firm and difficult to obtain efficiently in the market (Das and Teng, 2000).

One of the biggest benefits in engaging in well-managed open innovation projects, is the positive impact in economic, social, and environmental sustainability (Rauter et al., 2018). However, despite the benefits, that can easily be found in the literature, according to a survey conducted by Accenture in 2015 (a consultancy company) about 50% of surveyed organizations, said that open innovation don't seem to be yielding as many new products or other benefits as they had hoped (Deichmann et al., 2017).

2. Convergence of Open Innovations and Collaborative Networks

The major motivation for open innovation (Dahlander & Gann, 2010; West & Bogers, 2014, 2017; Obradovic et al., 2021) is that it improves a firm's ability to generate knowledge spillovers (Griliches, 1979; Jaffe et al., 1993; Audretsch & Feldman, 1996; Griffith et al., 2006) and create new products internally and in collaboration with external partners (Cappelli et al., 2014; Bogers et al., 2018, 2019; Granstrand & Holgersson, 2020). In this context, we draw on West et al. (2014a,b) and Bogers et al. (2018) in defining open innovation as a concept that encompasses the novel challenges, norms and practices of innovation processes. Open innovation strategies increase the likelihood of knowledge complementarities, leading to faster and higher-quality innovation along with greater firm productivity (Hall et al., 2013 Audretsch & Belitski, 2020). It has become a "key innovation strategy" (Frenz & Ietto-Gillies, 2009; Hsieh et al., 2018; Kobarg et al., 2019) as small and large firm, start-ups and incumbents promote open collaborative activities, deepening and broadening the portfolio of activities with innovation partners (Roper et al., 2017; Audretsch et al., 2021).

Underlying the theoretical positioning of this strategy is the assumption that collaboration has a positive impact on innovation (Denicolai et al., 2016; Roper et al., 2017), which in practice results in the proposition that knowledge collaboration is often an 'objective in itself' (Del Giudice & Maggioni, 2014). The downside of collaboration includes resource redeployment and relocation, along with the use of time and effort (Stadler et al., 2022), in

addition to operational, technological, cognitive, cultural and regulatory barriers that limit open innovation.

The role of networks in fostering open innovation

When organizations collaborate, they aim to obtain more resources while achieving their goals and interests (Dias & Selan, 2022; Minson & Mueller, 2012; Tseng et al., 2020). Aiming to obtain more resources and working together with common interests makes organizations more innovative because with collaboration, different organizations can learn from each other (Demircioglu & Audretsch, 2020; Martínez-Costa et al., 2019; Tseng et al., 2020). Thus, collaboration has become highly relevant to innovation, particularly when there are agreements of goals, interests, and values across different organizations (Van der Voet & Steijn, 2021).

The concept of open innovation, initially defined by Chesbrough (2006) is relevant as cross-sectoral collaborative innovation can be understood as a sub-case of the open innovation model (Gallaud, 2013). Indeed, Gallaud defines collaborative innovation and its rationale as:

“an organization cooperates with other firms (suppliers, customers, competitors, and consultants) or other organizations (such as universities or public research organism) to develop or commercialize a new innovation. The organizations agree to pool their resources or to share information and knowledge to develop one project, at the end of the project, they keep independent from the legal point of view. The main goal of such collaborative innovation is to gain access to the partner’s knowledge and competences especially to tacit knowledge”.

Chesbrough & Brunswicker (2014) observed that knowledge created outside of a corporation’s boundaries, such as that created by and acquired from startups, has become increasingly important for increasing the pace of innovation. Disruption of major industries in recent years has been attributed to startups such as Airbnb and Uber that play a key role in accelerating innovation, an essential requirement for the survival of corporations. Startups are typically agile, adaptive and resilient because they are not restricted by established processes and administrative procedures (Schättgen & Mur, 2016; Weiblen & Chesbrough, 2015). This is especially apparent when considering how the practice of formal partnerships has significantly increased over the last ten years (Ringel, Taylor, & Zablit, 2016). In fact, disruptive innovations emerging from startups have long been considered a threat to the survival of corporations.

However, as of late, this threat is being turned into an opportunity by both startups and corporations, in addressing individual resource or knowledge gaps through collaborative partnerships (Schättgen & Mur, 2016). Neyens, Faems, & Sels (2010) found that collaborating corporations outperform those that do not initiate collaboration with external partners. Synergies resulting from such collaborations offer many advantages for both parties. Collaborations with startups primarily allow large corporations to detect, develop, and test new technologies with lower costs and less risk. These collaborations also promote engagement with creative fresh talent and exposure to new ideas. On the other hand,

startups are interested in profiting from the considerable resources a corporation has to offer, such as market knowledge and experience, networks, finance, the strong reputation of the corporation itself, and the chance to test their products to see how they would fit within the market (Weiblen & Chesbrough, 2015).

Governance, coordination and leadership in innovation networks

In today's complex, and unpredictable business landscape, if organizations want to achieve sustainable competitive advantages, they need to develop strategies that enable them to enhance performance and innovation to meet actual market needs and demands (Nuryakin, 2018; Ng & Law, 2015). Innovation and performance strongly depend on how an organization's top management drives and motivates the organization's employees to overcome barriers such as different geographic locations, time-zones, cultures, and functions (Hansen, 2009), as well as to have the capacity to acquire the necessary resources (human, technological) and to adopt an effective innovation model. For example, some authors argue that an organizational ambidextrous leadership style enhances the chances of gaining and holding sustainable competitive advantage. Such a style is essentially characterized by the exploitation of the present conditions in order to optimize the current business models operation and, at the same time, exploring the opportunities that contribute to redefining the business model by making decisions in a pioneering risky way (Lutfihak & Evrim, 2016; Lee et al., 2017).

However, most organizations do not contain, on their own, all the resources, such as brilliant minds, technologies, and know-how, just to name a few, necessary to be able to respond today's market complex and dynamic demands. In an attempt to overcome such constraints, organizations engage in collaborative or trade-off partnerships, whereby in interacting with other organizations or individuals such as business partners, customers, universities, scientific institutes, public institutions, and even inventors, they hope to find the best methods for supporting innovation and improving organizational performance. Such collaborative partnerships are essentially characterized by an exchange of ideas, resources, and technologies in a controlled environment-enhancing synergy. The aim of these partnerships is to provide organizations with benefits such as reduced innovation costs, faster innovative processes, increased differentiation, easier access to the market, creation of new revenues streams, more diverse R&D investments, and the sharing of innovation development risks (Ullrich et al., 2016).

Digital platforms and innovation intermediaries

Digital transformation (DT) has become a significant phenomenon in innovation studies (Kochetkov, 2023), management, sustainability, and information science. It reshapes the value creation pathways of organizations and industries (Vial, 2019) through digital and information communications technologies (ICTs). In the industry context, DT underlies the fourth industrial revolution, or Industry 4.0, and leads digital revolutions (Ghobakhloo, 2020). For businesses, DT drives business model innovations through digitization, and digitalization (Verhoef et al., 2021). This multidisciplinary interest in DT demands integration across disciplines and sectors (Nambisan et al., 2019). Examples of DT

powered by digital platforms such as Amazon, Microsoft, and Alibaba have demonstrated cross-sectoral potential in value creation (Gamidullaeva et al., 2021), described as “ecosystem building” (Freundt et al., 2023) or “ecosystem economy” (Atluri & Dietz, 2023; Jacobides, 2019). Thus, understanding DT is essential for strategic decision-making and exploring its impact on innovation landscapes (Kochetkov, 2023).

With the advance of digital and online systems, interactions also have become more multi-layered and differentiated. Thus, Kuenne et al. (2013) outline five levels of interaction in their review of ‘health 2.0 platforms’ going from: information; communication; consultation; through to cooperation; and, collaboration. In the healthcare systems that were studied, the collection, synthesis and exploitation of users' knowledge in these systems was becoming ever more important in the role and activity of innovation intermediaries. The growth of more open, networked and distributed innovation systems in combination with the growth of online platforms and digital technologies has therefore created further opportunities and new ways of undertaking intermediation over the last twenty years. Thus, new forms of relational market transactions has meant that older formal forms of market exchange, such as formal market research or trade shows, have been superseded (Perry, 1996) or at least overlain by more online, digital provision.

Industry 4.0, Open Innovation 2.0 and the development of innovation ecosystems

The fourth industrial revolution, rooted in Industry 4.0 (I4.0), has drawn attention to the innovation opportunities linked to enhanced data gathering and elaboration within an interconnected organization (Schwab, 2017). From this perspective, the emerging technological scenario has crucial implications for manufacturing firms and their ability to strengthen their competitive advantage through adequate I4.0 adoption and implementation dynamics (Frank et al., 2019), with positive consequences at a broader national level (Edquist et al., 2021).

Inter-organizational networks in high-tech industries

Inter-industry collaborative innovation involves cooperation between different industries, achieving technological, resource, and informational complementarity and synergy through cross-industry collaboration (Lee, 2001; Cooke & Uranga, 1997; Wang & Zhong, 2022). This type of cooperation not only brings new opportunities and resources to different industries but also effectively promotes innovation and enhances competitiveness (Van de Ven, 1993). As one of the key drivers of modern economic development, strategic emerging industries play an important role in shaping economic structure, driving technological progress, and leading future development directions (Van de Ven, 1993). Therefore, in-depth research on the innovation networks among strategic emerging industries has both theoretical value and practical implications for policy-makers and enterprise managers, aiding in promoting high-quality economic development.

Open innovation in SMEs

For small and medium-sized companies (SMEs), open innovation presents itself as a way for these companies to overcome certain dimensions resulting from their size, and thus be able to adapt and thrive in an increasingly competitive and turbulent environment.

Table 1. ANOVA analysis for the number of years of activity

Variable	Less than 3	Between 3 and 10	More than 10
Practices			
Outside-in	0.220	0.162	0.234
Inside-out	0.322	0.193	0.264
Coupled	0.167	0.292	0.151
Benefits			
Develop of innovative capacity	$<1 \times 10^{-3}$	$<1 \times 10^{-3}$	$<1 \times 10^{-3}$
Cost reduction	0.257	0.195	0.179
Diversification	0.388	0.372	0.310
Reduced time to market	0.128	0.250	0.239
Risk-sharing	0.167	0.122	0.225
Increased accept of innovation	0.199	0.125	0.171
Challenges			
Lack of resources	0.190	0.079	0.111
Lack of competencies	0.121	0.152	0.108
Diff. in integration knowledge	0.012	0.097	0.003
Loss of control	0.256	0.192	0.231
Cultural challenges	0.180	0.131	0.188

The source: <https://doi.org/10.3390/joitmc7030169>

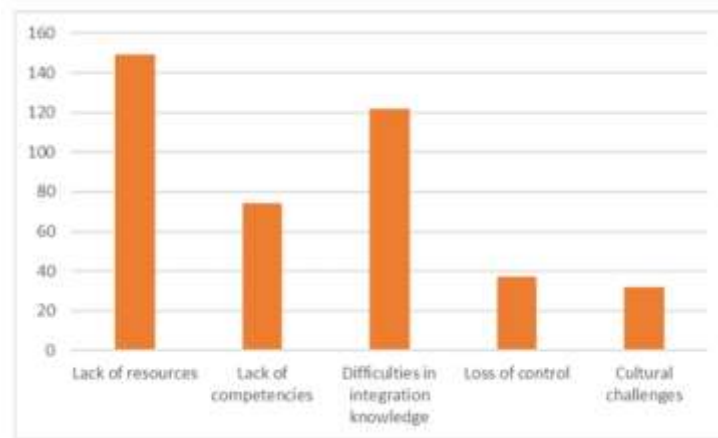
Table presents the result of applying analysis of variance (ANOVA) for the number of years of activity. Some significant differences emerged in the identification of the benefits associated with the development of the innovative capacity of organizations. SMEs with less than three years of activity favored the adoption of open innovation for the development of their innovative capacity. On the challenges, SMEs with more than 10 years of activity presented greater difficulties in integrating knowledge arising from open innovation; on the contrary, younger companies (i.e., with less than 3 years of activity) showed greater ease in incorporating this external knowledge.

Studies by Hossain (2015) show that SMEs are usually less bureaucratic and more risk-taking. Their flexibility, agility, and focus/niche strategy for a particular product or service allows them to innovate faster (Pierre & Fernandez, 2018). However, their small size means that these organizations have limited financial resources and use few structured and solidified innovation processes.

Despite the unequivocal benefits associated with the practices of innovation in SMEs, studies have also shown that these types of companies have greater difficulty in developing mechanisms capable of effectively implementing open innovation due to their size (Oumlil & Juiz, 2016; McPhillips, 2020). In these studies, it was emphasized that the greater flexibility and adaptability of these organizations did not compensate for the lack of resources and skills to develop a culture of permanent innovation. Faria et al. (2020) also confirmed this view by highlighting the difficulties of SMEs in absorbing and exploring scientific discoveries, which consequently made it difficult for them to integrate and monitor external knowledge in the internal innovation process. The loss of control was

another challenge highlighted by Rauter et al. (2019), while Aquilani et al. (2017) underlined the cultural barriers that emerged from the collaborative participation of a large number of diversified players.

Graph 1. Challenges of open innovation for SMEs.



The source: <https://doi.org/10.3390/joitmc7030169>

Graph shows the challenges posed by open-innovation practices in SMEs. A lack of resources was identified in a total of 149 responses (79.68%), and the difficulties in integrating knowledge from open-innovation processes in 122 responses (65.24%). On the opposite side, the loss of control and cultural barriers had a much smaller weight, and were less than 20%.

3. Conclusion

We are witnessing the emergence of a new paradigm in enterprises' activity – an open innovation model. The open innovation is a complete novelty in the concept of innovation and it stands for a cheaper and faster solution of problems in a global network compared with traditional methods. The 21st century has stimulated visible market changes, which made enterprises modify their innovation models.

There is growing interest in analyzing collaborative innovation because innovation is pursued through the cross-sectoral collaboration of different sectors and organizations. This interest is primarily justified by the (untested) assumptions that collaboration is conducive to innovation, that it is able to solve organizational and socio-economic problems, and that it can deal with grand challenges or wicked problems.

Further research could focus on understanding how different combinations of knowledge can generate complementarities and substitution effects. This research could further build on Bogers and West (2012) and Bogers et al. (2018) who emphasized that different ecosystem actors (universities, suppliers, customers) may have different effects on the exploration and exploitation behavior of firms.

4. References

1. Altenburg, T. (2011). Industrial Policy in Developing Countries: overview and lessons from seven country cases, Discussion Paper. Bonn: German Institute of Development and Sustainability (IDOS).
2. Atluri, V., & Dietz, M. (2023). *The Ecosystem Economy: How to Lead in the New Age of Sectors without Borders*. John Wiley & Sons.
3. Audretsch, D. B., & Feldman, M. P. (1996). R&D spillovers and the geography of innovation and production. *Am. Econ. Rev.*, 86 (3), 630-640.
4. Audretsch, D. B., & Belitski, M. (2020). The role of R&D and knowledge spillovers in innovation and productivity. *Eur. Econ. Rev.*, 123, 103391.
5. Audretsch, D. B., Belitski, M., & Caiazza, R. (2021). Start-ups, innovation and knowledge spillovers. *J. Technol. Tran.*, 46 (6), 1995-2016.
6. Aquilani, B., Abbate, T., & Codini, A. (2017). Overcoming cultural barriers in open innovation processes through intermediaries: A theoretical framework. *Knowl. Manag. Res. Pract.*, 5, 447-459.
7. Bogers, M., Chesbrough, H., & Moedas, C. (2018). Open innovation: research, practices, and policies. *Calif. Manag. Rev.*, 60 (2), 5-16.
8. Cappelli, R., Czarnitzki, D., & Kraft, K. (2014). Sources of spillovers for imitation and innovation. *Res. Pol.*, 43 (1), 115-120.
9. Chesbrough, H. W. (2006). Open innovation: A new paradigm for understanding industrial innovation. In H. W. Chesbrough, W. Vanhaverbeke, & J. West (Eds.), *Open innovation: Researching a New Paradigm* (1–12). Oxford University Press.
10. Chesbrough, H. & Brunswicker, S. (2014). A Fad or a Phenomenon? The Adoption of Open Innovation Practices in Large Firms. *Research Technology Management*, 57(2), 16-25. Retrieved May 4, 2018, from <https://doi.org/10.5437/08956308X5702196>.
11. Cooke, P., Uranga, M. G., & Etxebarria, G. (1997). Regional innovation systems: Institutional and organisational dimensions. *Res. Policy*, 26, 475-491.
12. Dahlander, L., & Gann, D. M. (2010). How open is innovation? *Res. Pol.*, 39 (6), 699-709.
13. Das, T., & Teng, B. (2000). A resource-based theory of strategic alliances. *Journal of Management*, 26 (1), 31-61.
14. Datar, S., Jordan, C. C., Kekre, S., Rajiv, S., & Srinivasan, K. (1997). Advantages of timebased new development in a fast-cycle industry. *Journal of Marketing Research*, 34 (1), 36-49.
15. Deichmann, D., Rozentale, I., & Barnhoorn, R. Open Innovation Generates Great Ideas, So Why Aren't Companies Adopting Them? Available online: <https://hbr.org/2017/12/open-innovation-generates-great-ideas-so-why-arent-companies-adopting-them> (accessed on 1 January 2019).
16. Del Giudice, M., & Maggioni, V. (2014). Managerial practices and operative directions of knowledge management within inter-firm networks: a global view. *J. Knowl. Manag.*, 18 (5), 841-846.
17. Demircioglu, M. A., & Audretsch, D. B. (2020). Conditions for complex innovations: Evidence from public organizations. *The Journal of Technology Transfer*, 45(3), 820-843.

18. Denicolai, S., Ramirez, M., & Tidd, J. (2016). Overcoming the false dichotomy between internal R&D and external knowledge acquisition: absorptive capacity dynamics over time. *Technol. Forecast. Soc. Change*, 104, 57-65.
19. Dias, A., & Selan, B. (2022). How does university-industry collaboration relate to research resources and technical-scientific activities? An analysis at the laboratory level. *The Journal of Technology Transfer*, 1-24.
20. Edquist, H., Goodridge, P., & Haskel, J. (2021). The Internet of Things and economic growth in a panel of countries. *Economics of Innovation and New Technology*, 30(3), 262-283.
21. Faria, P., Noseleit, F., & Los, B. (2020). The influence of internal barriers on open innovation. *Ind. Innov.*, 27, 205-209.
22. Frank, A. G., Dalenogare, L. S., & Ayala, N. F. (2019). Industry 4.0 technologies: implementation patterns in manufacturing companies. *International Journal of Production Economics*, 210, 15-26.
23. Frenz, M., & Ietto-Gillies, G. (2009). The impact on innovation performance of different sources of knowledge: evidence from the UK Community Innovation Survey. *Res. Pol.*, 38 (7), 1125-1135.
24. Freundt, T., Jenkins, P., Kabay, T., Khan, H., & Rab, I. (2023). Growth And Resilience through Ecosystem Building (Growth, Marketing & Sales Practice, Leap Practice, and Ecosystem Strategy Hub). McKinsey & Company. <https://www.mckinsey.com/capabilities/growth-marketing-and-sales/our-insights/growth-and-resilience-through-ecosystem-building>.
25. Gallaud, D. (2013). Collaborative innovation and open innovation. *Encyclopedia of creativity, invention, innovation and entrepreneurship*, 236-241.
26. Gamidullaeva, L., Tolstykh, T., Bystrov, A., Radaykin, A., & Shmeleva, N. (2021). Cross-sectoral digital platform as a tool for innovation ecosystem development. *Sustainability* 13 (21), 11686. <https://doi.org/10.3390/su132111686>.
27. Ghobakhloo, M. (2020). Industry 4.0, digitization, and opportunities for sustainability. *J. Clean. Prod.*, 252, 119869. <https://doi.org/10.1016/j.jclepro.2019.119869>.
28. Granstrand, O., & Holgersson, M. (2020). Innovation ecosystems: a conceptual review and a new definition. *Technovation*, 90, 102098.
29. Griffith, R., Harrison, R., & Van Reenen, J. (2006). How special is the special relationship? Using the impact of US R&D spillovers on UK firms as a test of technology sourcing. *Am. Econ. Rev.*, 96, 1859-1875.
30. Griliches, Z. (1992). The search for R&D Spillovers. *Scand. J. Econ.*, 94, 29-48.
31. Hall, B.H., Lotti, F., & Mairesse, J. (2013). Evidence on the impact of R&D and ICT investments on innovation and productivity in Italian firms. *Econ. Innovat. N. Technol.*, 22 (3), 300-328.
32. Hansen, M. (2009). *Collaboration: How Leaders Avoid the Traps, Create Unity, and Reap Big Results*. Cambridge, MA, USA: Harvard Business School Press.
33. Hossain, M. (2015). A review of literature on open innovation in small and medium-sized enterprises. *J. Glob. Entrep. Res.*, 5, 6.
34. Hsieh, W. L., Ganotakis, P., Kafouros, M., & Wang, C. (2018). Foreign and domestic collaboration, product innovation novelty, and firm growth. *J. Prod. Innovat. Manag.*, 35 (4), 652-672.

35. Hvolkova, L., Klement, L., Klementova, V., Kovalova, M. (2019). Barriers Hindering Innovations in Small and Medium-Sized Enterprises. *J. Compet.*, 11, 51-67.
36. Jacobides, M. G. (2019). In the Ecosystem Economy, What's Your Strategy? *Harvard Business Review*, September 1. <https://hbr.org/2019/09/in-the-ecosystem-economy-whats-your-strategy>.
37. Jaffe, A. B., Trajtenberg, M., & Henderson, R. (1993). Geographic localization of knowledge spillovers as evidenced by patent citations. *Q. J. Econ.*, 108, 577-598.
38. Kobarg, J., Stumpf-Wollersheim, S., & Welp, I. M. (2019). More is not always better: effects of collaboration breadth and depth on radical and incremental innovation performance at the project level. *Res. Pol.*, 48 (1), 1-10.
39. Kochetkov, D. M. (2023). Innovation: a state-of-the-art review and typology. *Int. J. Innov. Stud.*, 7 (4), 263-272. <https://doi.org/10.1016/j.ijis.2023.05.004>.
40. Kuenne, C. W., Akenroye, T., Moeslein, K. M. (2013). Online Innovation Intermediaries in Healthcare. ECIS. Completed Research, 186. http://aisel.aisnet.org/ecis2013_cr/186.
41. Lutfihak, A., & Evrim, G. (2016). Disruption and ambidexterity: How innovation strategies evolve? *Soc. Behav. Sci.*, 235, 782-787.
42. Lee, K. R. (2001). From fragmentation to integration: Development process of innovation clusters in Korea. *Technol. Soc.*, 6, 305-327.
43. Lee, K., Woo, H., & Joshi, K. (2017). Pro-innovation culture, ambidexterity and new product development performance: Polynomial regression and response surface analysis. *Eur. Manag. J.*, 35, 249-260.
44. Martínez-Costa, M., Jiménez-Jiménez, D., & Dine Rabeh, H. A. (2019). The effect of organisational learning on interorganisational collaborations in innovation: An empirical study in SMEs. *Knowledge Management Research & Practice*, 17(2), 137-150.
45. McPhillips, M. (2020). Trouble in Paradise? Barriers to Open Innovation in Regional Clusters in the Era of the 4th Industrial Revolution. *J. Open Innov. Technol. Mark. Complex*, 6, 84.
46. Minson, J. A., & Mueller, J. S. (2012). The cost of collaboration: Why joint decision making exacerbates rejection of outside information. *Psychological Science*, 23(3), 219-224.
47. Nambisan, S., Wright, M., & Feldman, M. (2019). The digital transformation of innovation and entrepreneurship: progress, challenges and key themes. *Res. Pol.*, 48(8), 103773. <https://doi.org/10.1016/j.respol.2019.03.018>.
48. Neyens, I., Faems, D., & Sels, L. (2010). The impact of continuous and discontinuous alliance strategies on startup innovation performance. *International Journal of Technology Management*, 52(3/4), 392-410. Retrieved May 4, 2018, from <https://doi.org/10.1504/IJTM.2010.035982>.
49. Nuryakin, M. (2018). Competitive Advantage and Product Innovation: Key Success of Batik SMEs Marketing Performance in Indonesia. *Acad. Strat. Manag. J.*, 17, 1544-1458. Available online: <https://www.abacademies.org/articles/competitive-advantage-and-product-innovation-key-success-of-batik-smes-marketing-performance-in-indonesia-7164.html> (accessed on 1 January 2020).

50. Ng, D., & Law, K. (2015). Impacts of informal networks on innovation performance: Evidence in Shanghai. *Chinese Management Studies*, 9, 56–72. doi:10.1108/CMS-05-2013-0077.
51. Obradovic, T., Vlacic, B., Dabic, M. (2021). Open innovation in the manufacturing industry: a review and research agenda. *Technovation*, 102, 102221.
52. Oumlil, R., & Juiz, C. (2016). An Up-to-date Survey in Barriers to Open Innovation. *J. Technol. Manag. Innov.*, 11, 137-152.
53. Perry, M. (1996). Network intermediaries and their effectiveness. *Int. Small Bus. J.*, 14, 72-80.
54. Pierre, A., & Fernandez, A. S. (2018). Going Deeper into SMEs' Innovation Capacity: An Empirical Exploration of Innovation Capacity Factors. *J. Innov. Econ. Manag.*, 1, 139-181.
55. Rauter, R., Globocnik, D., Perl-Vorbach, E., & Baumgartner, R. (2018). Open innovation and its effects on economic and sustainability innovation performance. *J. Innov. Knowl.*, 4, 226-233, doi:10.1016/j.jik.2018.03.004.
56. Ringel, M., Taylor, A., & Zablitz, H. (2016). The Most Innovative Companies 2016: Getting “Not Invented Here.” The Boston Consulting Group (BCG). Retrieved May 4, 2018, from <https://media-publications.bcg.com/MIC/BCG-The-Most-Innovative-Companies-2016-Jan-2017.pdf>
57. Roper, S., Love, J. H., & Bonner, K. (2017). Firms' knowledge search and local knowledge externalities in innovation performance. *Res. Pol.*, 46 (1), 43-56.
58. Schättgen, N., & Mur, S. (2016). The age of collaboration. Retrieved May 4, 2018, from http://www.adlittle.com/downloads/tx_adlreports/ADL_MatchMaker_The_Age_of_Collaboration.pdf.
59. Schoenmakers, W., & Duysters, G. (2006). Learning in strategic technology alliances. *Technology Analysis & Strategic Management*, 18 (2), 245-264.
60. Schwab, K. (2017). *The Fourth Industrial Revolution*, Crown Business, New York, NY.
61. Stadler, C., Helfat, C. E., & Verona, G. (2022). Transferring knowledge by transferring individuals: innovative technology use and organizational performance in multiunit firms. *Organ. Sci.*, 33 (1), 253-274.
62. Felin, T., & Zenger, T. R. (2014). Closed or open innovation? Problem solving and the governance choice. *Res. Policy*, 43, 914-925.
63. Tseng, F. C., Huang, M. H., & Chen, D. Z. (2020). Factors of university-industry collaboration affecting university innovation performance. *The Journal of Technology Transfer*, 45(2), 560-577.
64. Ullrich, A., & Vladova, G. (2016). Weighing the Pros and Cons of Engaging in Open Innovation. *Technol. Innov. Manag. Rev.*, 6, 34-40.
65. Van de Ven, A.H. (1993). A community perspective on the emergence of innovations. *J. Eng. Technol. Manag.*, 10, 23-51.
66. Van der Voet, J., & Steijn, B. (2021). Team innovation through collaboration: How visionary leadership spurs innovation via team cohesion. *Public Management Review*, 23(9), 1275-1294.
67. Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J.Q., Fabian, N., & Haenlein, M. (2021). Digital transformation: a multidisciplinary reflection and

- research agenda. *J. Bus. Res.*, 122, 889-901.
<https://doi.org/10.1016/j.jbusres.2019.09.022>.
68. Vial, G. (2019). Understanding digital transformation: a review and a research agenda. *J. Strat. Inf. Syst.*, 28 (2), 118-144.
<https://doi.org/10.1016/j.jsis.2019.01.003>.
69. Wang, Z., & Zhong, X. (2022). Stimulative Coordination Models for Cooperative and Competitive Enterprise Alliances Based on Token Economy. *IEEE*, 10, 43454-43472.
70. Weiblen, T. & Chesbrough, H. W. (2015). Engaging with Startups to Enhance Corporate Innovation. *California Management Review*, 57(2), 66-90. Retrieved May 4, 2018, from <https://doi.org/10.1525/cmr.-2015.57.2.66>.
71. West, J., & Bogers, M. (2014). Leveraging external sources of innovation: a review of research on open innovation. *J. Prod. Innovat. Manag.*, 31, 814-831.
72. West, J., Salter, A., Vanhaverbeke, W., & Chesbrough, H. (2014a). Open innovation: the next decade. *Res. Pol.*, 43, 805-811.
73. Yun, J. J., Jeon, J., Park, K., & Zhao, X. (2018). Benefits and Costs of Closed Innovation Strategy: Analysis of Samsung's Galaxy Note 7 Explosion and Withdrawal Scandal. *J. Open Innov. Technol. Mark. Complex.*, 4, 20.
74. Zeng, S.X., Xie, X. M., & Tam, C. M. (2010). Relationship between cooperation networks and innovation performance of SMEs. *Technovation*, 30, 181-194.

Otvorene inovacije i kolaborativne mreže

Katarina Radovanović, Kristina Čubrilo

Apstrakt: Ovaj rad istražuje tranziciju sa tradicionalnih modela zatvorene inovacije, u kojima se preduzeća oslanjaju prvenstveno na interne resurse i znanja, ka paradigmama otvorene inovacije koje naglašavaju saradnju i spoljne veze. U visoko konkurentnim tržištima, brz tempo tehnoloških promena primorava organizacije da interne istraživačko-razvojne kapacitete dopunjuju spoljnim izvorima znanja kroz licenciranje, partnerstva i međufirmarsku saradnju. Projekti otvorene inovacije, kada su dobro upravljani, mogu doneti značajne ekonomske, društvene i ekološke koristi, iako empirijski podaci pokazuju da rezultati nisu uvek u skladu sa očekivanjima. Studija ističe rastući značaj kolaborativne inovacije između različitih sektora i organizacija, motivisan potrebom da se odgovori na složene socio-ekonomske izazove i podstakne održivost. Takođe se naglašava potreba za daljim istraživanjima o tome kako različite kombinacije znanja - uključujući univerzitete, dobavljače i kupce - mogu stvoriti komplementarnosti ili supstitucione efekte koji oblikuju strategije preduzeća u oblasti istraživanja i eksploatacije. Pružanjem sveobuhvatnog pregleda mogućnosti i ograničenja otvorene inovacije, rad doprinosi dubljem razumevanju načina na koji preduzeća prilagođavaju svoje inovacione modele u 21. veku.

Ključne reči: Otvorena inovacija, Zatvorena inovacija, Saradnja, Upravljanje znanjem, Tehnološka kompetencija, Održivost, Međufirmarski sporazumi, Inovacijski modeli, Konkurentska prednost, Digitalno doba.

EEMR

Economics, Entrepreneurship and Management Research

Vol. 4, No. 2, 2025.

e-ISSN:2955-9014 pp. 22-37

The article is withdrawn by the authors, after pages assigned, prior to online publication.

EEMR

Economics, Entrepreneurship and Management Research

Vol. 4, No. 2, 2025.

e-ISSN:2955-9014 pp. 38-47

Review Paper/Pregledni rad
Paper Submitted/Rad primljen: 12. 11. 2025.
Paper Accepted/Rad prihvaćen: 15. 12. 2025.

**UDC/UDK: 006.44:657.2
658.155**
COBISS.SR-ID 183374345
DOI: <https://doi.org/10.62907/eemr250402038b>

The impact of evolving business models on the transformation of revenue recognition standards

Jozefina Beke-Trivunac¹

Abstract: *The primary issue in accounting for revenue is the timing of its recognition. The first international accounting standard on revenue recognition was issued in 1982. The fundamental principle for revenue recognition was the transfer of economic benefits from the seller to the buyer. The emergence of the “Internet bubble” in the early 2000s, increasingly complex contracts with customers, and the rise of new business models involving combinations of goods and services, as well as multi-element arrangements, highlighted the need for significant improvements in financial reporting on revenue, tailored to the requirements of the modern business environment. This paper describes the main changes in accounting for revenue that are appropriate to new business models.*

Keywords: *Accounting standards, IFRS, IPSAS, Financial reporting.*

JEL Classification: M41, H83

1. Introduction

International Financial Reporting Standard (IFRS) 15 – Revenue from Contracts with Customers was adopted by the International Accounting Standards Board (IASB) in 2014 and became effective on January 1, 2018. With the adoption of this standard, two earlier standards ceased to be effective: IAS 18 *Revenue*, which had come into force two decades earlier in 1995 and was later revised in 2001, and IAS 11 *Construction Contracts*, which had been effective since 1980 and revised in 1993. The International Public Sector Accounting Standard (IPSAS) 47 *Revenue (Exchange Transactions)* was issued in May 2023 and will become effective on January 1, 2026. With the adoption of IPSAS 47, three

¹ALFA BK Univerzitet, Beograd, Srbija. E-mail: jozefina.beke@alfa.edu.rs, <https://orcid.org/0000-0002-7394-7006>.

standards will be superseded: IPSAS 9 *Revenue from Exchange Transactions* (issued in 2001), IPSAS 11 *Construction Contracts* (issued in 2001), and IPSAS 23 *Revenue from Non-Exchange Transactions (Taxes and Transfers)* (issued in 2006).

Although both IAS 18 and IFRS 15 regulate the accounting treatment of revenue, the differences between the two standards are primarily determined by changes in the business environment. IFRS 15 is the result of a joint project between the Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB). The project aimed to harmonize revenue reporting under U.S. GAAP and international standards, resulting in two new standards: U.S. GAAP *Accounting Standards Codification (ASC) 606 – Revenue from Contracts with Customers* and IFRS 15 under the same title. (FASB, 2014) This paper focuses only on the changes and differences between IAS 18 and IFRS 15. IPSAS 47 is based on IFRS 15 but is adapted to the nature of public sector operations. Understanding the mechanics of standard development remains relevant for the analysis of comparative financial data from prior periods.

2. Literature Review

The question of when and how revenue should be recognized represents one of the key research issues in accounting. Over time, a significant number of studies have been published that, in line with the development of standards, offered guidance on this problem. The emergence of the “Internet bubble” in the early 2000s, when numerous revenue manipulations were uncovered, together with increasingly complex contracts with customers and the rise of new business models involving combinations of goods and services as well as multi-element arrangements (Wagenhofer, 2025), highlighted the need for substantial improvements in revenue reporting, adapted to the requirements of the modern business environment.

The existing literature mainly addresses the actual impact of changes in accounting standards. A large number of studies analyzing the “real effects” of IFRS 15 conclude that the new standard not only changes accounting policies but also influences business practices through its impact on contractual arrangements, negotiations, and the structure of business models (Napier & Stadler, 2020). Wagenhofer (2014) emphasizes that IFRS 15 establishes a stronger link between economic events and accounting outcomes.

Another group of studies has pointed out that IFRS 15 enhances clarity, reduces revenue manipulation, and increases the reliability of financial statements (Hameed et al., 2019; Mattei & Paoloni, 2021; Altajia & Alokdeha, 2019; Oyedokun & Emmanuel, 2016), but requires additional training and adaptation (Hagos & Svensson, 2021; Ogunode & Salawu, 2021; Alhawtmeh et al., 2025).

Napier & Stadler (2020) demonstrated how the direct accounting effects of applying the new standard can trigger additional effects, which they classified as informational effects, capital market effects, and real effects, noting that these additional effects may themselves generate indirect accounting effects.

The study by Rompotis & Balios (2025) provides a comprehensive literature review that can serve academics and researchers as a basis for further studies on the relationship between IFRS and IPSAS, including IFRS 15 and IPSAS 47. It highlights the benefits arising from the application of IPSAS and points to the main differences between IFRS and IPSAS.

3. Methodology

This paper presents the evolution of revenue reporting in connection with changes in the business environment and business models. This process also includes the pursuit of uniform regulation of revenue reporting across all areas of business activity, in both the private and public sectors. In this context, the continuity of the development of international standards for revenue reporting is examined, starting with IAS 18 Revenue, followed by IFRS 15 Revenue from Contracts with Customers, and culminating in IPSAS 47 Revenue (Exchange Transactions).

4. Evolution of revenue recognition principle

This section provides an overview of the evolution of revenue recognition principles from the issuance of the first international standard to the present day.

4.1 IAS 18 Revenue

The standard IAS 18 Revenue was issued in 1982 by the International Accounting Standards Committee (IASC). It was significantly revised in 1993, after which minor amendments were made, including alignments with other standards.

The definition of “income” has changed over time. In the 1989 *Conceptual Framework* (IASC, 1989), income was defined as “*increases in economic benefits during the accounting period in the form of inflows or enhancements of assets or decreases of liabilities that result in increases in equity, other than those relating to contributions from equity participants.*” The 2010 revision of the *Conceptual Framework* introduced a new definition of income: “*increases in assets, or decreases in liabilities, that result in increases in equity, other than those relating to contributions from holders of equity claims*” (IASB, 2010). This definition was retained in the 2018 *Conceptual Framework* (IASB, 2018).

The definition of revenue in IAS 18 (1982) was: “*Revenue is the gross inflow of cash, receivables or other consideration arising in the course of the ordinary activities of an entity, when those inflows result in increases in equity, other than increases relating to contributions from equity participants.*” According to the revised IAS 18 (1993): “*Revenue is the gross inflow of economic benefits during the period arising from the course of the ordinary activities of an entity when those inflows result in increases in equity, other than increases relating to contributions from equity participants*” (IASB, 1993). The previous definition was retained but expanded to cover different types of transactions: sale of goods, rendering of services, and the use of the entity’s assets (interest, royalties, dividends). The

basic definition of revenue did not change while the standard was in force, remaining focused on the gross inflows of economic benefits.

The objective of IAS 18 was to prescribe the accounting treatment for revenue arising from certain types of transactions and events (sale of goods, rendering of services, interest, royalties, and dividends). The primary issue in accounting for revenue was determining when revenue should be recognized. Under this standard, revenue was recognized when the inflow of future economic benefits into the entity was probable and those benefits could be measured reliably. The focus of IAS 18 was on the transfer of risks and rewards, a concept essential to its application across different types of transactions. IAS 18 identified the circumstances under which these criteria would be satisfied, i.e., when revenue should be recognized.

The established standards have five mandatory criteria that had to be met before an entity could recognize revenue from the sale of goods. Failure to meet even one criterion meant deferral of revenue recognition from the transaction.

- The first two criteria focused on the transfer of ownership from the seller's perspective. The entity had to transfer to the buyer the significant risks and rewards of ownership of the goods.
- The remaining criteria focused on the practical and financial measurability of the transaction. Revenue could only be recognized if the amount could be measured reliably. It also had to be probable that the economic benefits associated with the transaction would flow to the entity.
- The final condition required that the costs incurred or to be incurred could be measured reliably. This cost measurement rule ensured the application of the matching principle between revenue and expenses.

During the application of this standard, it became evident that its principles were sometimes difficult to understand and challenging to apply to complex transactions. Moreover, IFRS provided limited guidance on issues such as revenue recognition for multi-element arrangements. The disclosures required by IAS 18 often did not provide financial statement users with sufficient information to adequately understand revenue arising from contracts with customers (LegalClarity Team, 2025).

4.2 IAS 18 Revenue

The standard IAS 18 *Revenue* was issued in 1982 by the International Accounting Standards Committee (IASC). It was significantly revised in 1993, after which minor amendments were made, including alignments with other standards.

The definition of "income" evolved over time. In the 1989 *Conceptual Framework* (IASC, 1989), income was defined as "increases in economic benefits during the accounting period in the form of inflows or enhancements of assets or decreases of liabilities that result in increases in equity, other than those relating to contributions from equity participants." The 2010 revision of the *Conceptual Framework* introduced a new definition of income: "increases in assets, or decreases in liabilities, that result in increases in equity, other than

those relating to contributions from holders of equity claims” (IASB, 2010). This definition was retained in the 2018 *Conceptual Framework* (IASB, 2018).

The definition of revenue in IAS 18 (1982) was: “*Revenue is the gross inflow of cash, receivables or other consideration arising in the course of the ordinary activities of an entity, when those inflows result in increases in equity, other than increases relating to contributions from equity participants.*” According to the revised IAS 18 (1993): “*Revenue is the gross inflow of economic benefits during the period arising from the course of the ordinary activities of an entity when those inflows result in increases in equity, other than increases relating to contributions from equity participants*” (IASB, 1993). The previous definition was retained but expanded to cover different types of transactions: sale of goods, rendering of services, and the use of the entity’s assets (interest, royalties, dividends). The basic definition of revenue did not change while the standard was in force, remaining focused on the gross inflows of economic benefits.

The objective of IAS 18 was to prescribe the accounting treatment for revenue arising from certain types of transactions and events (sale of goods, rendering of services, interest, royalties, and dividends). The primary issue in accounting for revenue was determining when revenue should be recognized. Under this standard, revenue was recognized when the inflow of future economic benefits into the entity was probable and those benefits could be measured reliably. The focus of IAS 18 was on the transfer of risks and rewards, a concept essential to its application across different types of transactions. IAS 18 identified the circumstances under which these criteria would be satisfied, i.e., when revenue should be recognized.

The established standards have five mandatory criteria that had to be met before an entity could recognize revenue from the sale of goods. Failure to meet even one criterion meant deferral of revenue recognition from the transaction (MSFI Foundation, 2023).

- The first two criteria focused on the transfer of ownership from the seller’s perspective. The entity had to transfer to the buyer the significant risks and rewards of ownership of the goods.
- The remaining criteria focused on the practical and financial measurability of the transaction. Revenue could only be recognized if the amount that could be measured reliably. It also had to be probable that the economic benefits associated with the transaction would flow to the entity.
- The final condition required that the costs incurred or to be incurred could be measured reliably. This cost measurement rule ensured the application of the matching principle between revenue and expenses.

During the application of this standard, it became evident that its principles were sometimes difficult to understand and challenging to apply to complex transactions. Moreover, IFRS provided limited guidance on issues such as revenue recognition for multi-element arrangements. The disclosures required by IAS 18 often did not provide financial statement users with sufficient information to adequately understand revenue arising from contracts with customers.

4.3 Conceptual Transition from IAS 18 to the IFRS 15 Five-Step Model

The adoption of IFRS 15 (which replaced IAS 18) and U.S. GAAP Topic 605, which superseded a large number of individual interpretations, represents a significant shift toward a principles-based approach to revenue recognition. The definition of revenue in this standard is identical to that in IAS 18. The fundamental change lies in moving away from the previous concept of the transfer of risks and rewards. Under IFRS 15, revenue is the amount that reflects the consideration for goods or services transferred, recognized at the point when the customer obtains control.

The key elements of IFRS 15 are:

- Revenue is recognized when the customer obtains control of the goods or services, rather than merely when risks and rewards are transferred (the principle under IAS 18).
- Revenue is measured at the amount of consideration to which the entity expects to be entitled. (Beke-Trivunac, 2021).
- The standard applies only to revenue arising from contracts with customers.
- Scope: IFRS 15 addresses contracts with customers regardless of the type of goods or services involved.

IFRS 15 introduces a five-step model for revenue recognition:

1. Identify the contract with a customer.
2. Identify the performance obligations.
3. Determine the transaction price.
4. Allocate the transaction price to the performance obligations.
5. Recognize revenue when (or as) the performance obligations are satisfied.

The model requires entities to conduct a more detailed analysis of contracts, particularly with respect to multiple deliverables and variable considerations. This detailed analysis ensures that revenue is recognized when the entity fulfills its performance obligation by transferring the promised goods or services to the customer.

Stages of contract realization with customers in five steps

- Identification of the contract with a customer. A customer is a party that has entered into a contract with the entity for the purchase of goods or services resulting from the entity's ordinary activities in exchange for consideration. The contract is concluded between two or more parties and creates enforceable rights and obligations for each party. The contract must be approved, the rights of each party must be clearly specified, it must have commercial substance, and the collectability of consideration must be clearly stated.
- Identification of performance obligations in the contract. A performance obligation is any promise made by the seller in the contract with the customer to transfer to the customer: (a) a good or service (or a bundle of goods or services) that is distinct, or (b) a series of distinct goods or services that are substantially the same and have the same pattern of transfer from the seller to the customer. A performance

obligation may be stated explicitly or implicitly and may be given in written or oral form.

- Determination of the transaction price. The transaction price is the amount of consideration to which the entity expects to be entitled in exchange for transferring the promised goods or services to the customer. The transaction price does not include amounts collected on behalf of third parties (e.g., VAT).
- Allocation of the transaction price to performance obligations.
- Recognition of revenue when the performance obligation is satisfied. A performance obligation may be satisfied at a point in time (e.g., purchase of a license) or overtime (e.g., cloud data storage).

When examining structural differences, it becomes evident that under IAS 18 the model of revenue recognition was based on the type of transaction, whereas under IFRS 15 the model is based on contracts and performance obligations. In addition, IFRS 15 clearly defines performance obligations, variable consideration, the requirement to identify and allocate transaction prices in multi-component contracts and systematically defines the concepts of “over time” and “at a point in time.” There are also qualitative differences in disclosure requirements. IAS 18 provided basic guidance but left room for diverse interpretations. IFRS 15 requires detailed disclosure of estimates, methods, and risks—thereby increasing transparency and comparability of financial statements. (Giner & Pardo, 2020).

In the context of the public sector, IFRS 15 enables more precise monitoring of contracts related to subsidies, public procurement, and services, with clear recording of obligations.

4.4. IPSAS 47

IFRS 15 served as the basis for the development of IPSAS 47 *Revenue*, meaning that both standards are based on the same fundamental principles, which implies that the public sector applies the same theoretical framework as the private sector. Both standards recognize revenue upon the fulfillment of obligations to the customer through the five-step model (identification of the contract, identification of performance obligations, determination of the transaction price, allocation of the transaction price, and recognition of revenue). The focus in both standards is on control, as revenue is recognized when the customer obtains control of the goods or services. Both standards emphasize cautious recognition of variable consideration components (discounts, bonuses). Finally, both standards require detailed disclosures regarding nature, timing, and uncertainty of revenue. The difference between IFRS 15 and IPSAS 47 lies in their application. IFRS 15 was developed for the private sector (business entities), while IPSAS 47 adapts the same framework for the public sector (government institutions, municipalities, public services), with additional provisions for transactions involving public services, subsidies, and specific governmental arrangements. Consequently, IFRS 15 addresses commercial contracts, focuses on market price, and requires clear disclosures of financial risks and revenue recognition policies related to sales. IPSAS 47 emphasizes public accountability, transparency, and reporting on public services. IPSAS 47 strengthens transparency in the public sector, while IFRS 15 enhances investor confidence in the private sector.

The primary task of most entities in the public sector is to deliver goods or services to the public. As a result, a large number of transactions in the public sector relate to revenue. According to IPSAS 47, revenue encompasses gross inflows of economic benefits or service potential received by or due to the entity, representing increases in net assets/equity, other than increases related to contributions from owners. IPSAS 47 provides two models of accounting for revenue and includes comprehensive guidance for determining which model to apply. One model relates to revenue from transactions without a binding arrangement, and the other to revenue from transactions with a binding arrangement.

The concept of a binding arrangement is fundamental to revenue accounting in the public sector. A binding arrangement is one that confers enforceable rights and obligations on the parties, enforceable through legal or equivalent means. As such, the entity must have at least one enforceable right and one enforceable obligation. IPSAS 47 introduces the concept of enforceable rights and obligations in the context of contractual arrangements that generate revenue, particularly when there is a binding agreement between two parties. The existence of binding and non-binding arrangements is characteristic of the public sector, where revenue is derived either through exchange or non-exchange transactions. The existence of a binding arrangement determines whether the exchange model is applied. If no arrangement exists, the non-exchange model is used. A binding contract with a customer is the basic prerequisite for revenue recognition. The key feature of the binding arrangement model is that revenue is recognized according to the degree of fulfillment of obligations, following the five-step model. In the non-exchange model, revenue is recognized when the entity obtains control over resources. This non-exchange model is applied to taxes, grants, and transfer revenues.

5. Conclusion

Revenue is the first line item in the income statement, while the last line item is profit after tax. In this sense, the accounting treatment of revenue (recognition, measurement, presentation, and disclosure) has a significant impact on the final business result and, consequently, on investors' decisions.

The adoption of IFRS 15, which replaced IAS 18, represents a major shift in the approach to revenue recognition. The fundamental change lies in moving away from the concept of transferring risks and rewards. The old model often led to transactions structured solely to achieve a desired accounting outcome.

IFRS 15 does not merely replace the technique of revenue recognition—it changes the philosophy of reporting. From a static moment (IAS 18) to a dynamic process (IFRS 15), the standard becomes a tool for ethical, transparent, and user-oriented financial reporting. This is the reason why the International Public Sector Accounting Standards Board (IPSASB) adopted this standard as the basis for developing IPSAS 47 Revenue. IPSAS 47 uses the concept of a binding arrangement as the criterion for distinguishing between exchange and non-exchange revenue. IFRS 15 requires a binding contract for all revenue. The public sector (IPSAS) and the private sector (IFRS) apply a similar concept, but with different applications due to the nature of revenue.

References

1. Alhawtmeh, O. M., Aladwan, M., Alsinglawi, O., & Awad, S. (2025). Comparison of the stability and presentation of revenues during the application of IAS 18 and after the application of IFRS 15: Evidence from Jordanian services and industries sectors. *International Journal of Innovative Research and Scientific Studies*, 8(3), 130–137. <https://www.researchgate.net/publication/391208415>.
2. Altajia, F. S., & Alokdeha, S. K. (2019). The impact of the implementation of international financial reporting standards no. 15 on improving the quality of accounting information. *Management Science Letters*, 9, 2369–2382. <https://doi.org/10.5267/j.msl.2019.7.018>.
3. Beke-Trivunac Jozefina. (2021). Vremenska vrednost novca i prihodi od ugovora sa kupcima, *Revizor*, 95-96, 2021, str. 111-117, DOI: 10.5937/Rev2196111B.
4. Ernst & Young. (2025, August). Revenue from contracts with customers (ASC 606). Ernst & Young Global Limited.
5. Financial Accounting Standards Board (FASB). (2014). *Background information and basis for conclusions: Accounting Standards Update (ASU) 2014-09 – Revenue from contracts with customers*. FASB.
6. Giner, B. & Pardo, F. (2020). The real effects of a new accounting standard: The case of IFRS 15. *Accounting and Business Research*, 50(7), 1–27. <https://doi.org/10.1080/00014788.2020.1770933>.
7. Hagos, A., & Svensson, M. (2021). How does IFRS 15 influence Swedish auditors and financial analysts' understanding of companies' revenue transactions? (Master's thesis). Uppsala University, Department of Business Studies.
8. Hameed, A. M., Al-taie, B. F. K., & Al-Mashhadani, B. N. A. (2019). The impact of IFRS 15 on earnings quality in businesses such as hotels: Critical evidence from the Iraqi environment. *African Journal of Hospitality, Tourism and Leisure*, 8(4), 1–11.
9. International Accounting Standards Board. (1993). *International Accounting Standard 18: Revenue*. London: IFRS Foundation.
10. International Accounting Standards Board. (2001). *MRS 18 Revenue*. In *International Financial Reporting Standards*. IFRS Foundation.
11. International Accounting Standards Board. (2010). *Conceptual Framework for Financial Reporting*. London: IFRS Foundation.
12. International Accounting Standards Board. (2014). *MSFI 15 Revenue from Contracts with Customers*. In *International Financial Reporting Standards*. IFRS Foundation.
13. International Accounting Standards Board. (2018). *Conceptual Framework for Financial Reporting*. London: IFRS Foundation.
14. International Accounting Standards Committee (IASC). (1989). *Framework for the Preparation and Presentation of Financial Statements*. IASC.
15. International Public Sector Accounting Standards Board (IPSASB). (2023). *IPSAS 47: Revenue*. IPSASB.
16. International Public Sector Accounting Standards Board. (2011). *IPSAS 9: Revenue from exchange transactions*. IPSASB.
17. International Public Sector Accounting Standards Board. (2011). *IPSAS 11: Construction contracts*. IPSASB.

18. LegalClarity Team. (November 29, 2025) IAS 18 Revenue Recognition: Illustrative Examples. Available at: <https://legalclarity.org/ias-18-revenue-recognition-illustrative-examples/>.
19. Mattei, G., & Paoloni, N. (2021). Understanding the potential impact of IFRS 15 on the telecommunication listed companies, by the disclosures' study. *International Journal of Business and Management*, 14(1), 169. DOI: 10.5539/ijbm.v14n1p169.
20. MSFI Foundation. (2023). *MSFI 15 Application Guidance and Illustrative Examples*. Available at: <https://www.MSFI.org>.
21. Napier, C. J., & Stadler, C. (2020). The real effects of a new accounting standard: the case of IFRS 15 *Revenue from Contracts with Customers*. *Accounting and Business Research*, 50(5), 474–503. <https://doi.org/10.1080/00014788.2020.1770933>.
22. Ogunode, O. A., & Salawu, R. O. (2021). Revenue recognition dilemma under international financial reporting standard (IFRS 15): Perspectives from key impacted firms in Nigeria. *Accounting and Finance*, 9(5), 916–926. <https://doi.org/10.13189/ujaf.2021.090503>.
23. Oyedokun, P., & Emmanuel, G. (2016). Revenue recognition paradox: A review of IAS 18 and IFRS 15. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2912250>.
24. Rompotis G, Balios D (2025), Benefits of IPSAS and their differences from IFRS: a discussion paper. *EuroMed Journal of Business*, Vol. 20 No. 1 pp. 94–113, doi: <https://doi.org/10.1108/EMJB-07-2022-0139>.
25. Wagenhofer, A. (2014). The role of revenue recognition in performance reporting, *Accounting and Business Research*, vol. 44, no. 4, pp. 349–379. <https://doi.org/10.1080/00014788.2014.897867>.

Uticaj promena poslovnih modela na računovodstvene standarde o priznavanju prihoda

Jozefina Beke-Trivunac

Apstrakt: Prvenstveno pitanje u računovodstvenom obuhvatanju prihoda je kada se prihod priznaje. Prvi međunarodni računovodstveni standard o priznavanju prihoda donet je 1982. godine. Osnovni princip za priznavanje prihoda bio je prenos ekonomskih koristi sa prodavca na kupca. Pojava „Internet balona“ početkom 2000-ih, sve složeniji ugovori sa kupcima i pojave novih poslovnih modela, koji obuhvataju kombinaciju dobara i usluga, kao i ugovore sa višestrukim elementima ukazali su na potrebu za značajnim unapređenjem finansijskog izveštavanja o prihodima, prilagođeno potrebama savremenog poslovnog okruženja. U radu su opisane glavne promene u računovodstvenom obuhvatanju prihoda primerene novim modelima poslovanja.

Ključne reči: Računovodstveni standardi, MSFI, MRS JS, Finansijsko izveštavanje.

Review Paper/Pregledni rad

Paper Submitted/Rad primljen: 29. 9. 2025.

Paper Accepted/Rad prihvaćen: 15. 12. 2025.

UDC/UDK: 330.131.5:711.61(497.11-21)

COBISS.SR-ID 183375113

DOI: <https://doi.org/10.62907/eemr250402048m>

The Economic Benefits of Parks in Urban Spaces - Global Evidence and Implications for Belgrade, Serbia

Olga Mašić¹

Abstract: *Urban parks are increasingly recognized as economic infrastructure that affect health, property markets, tourism and climate resilience, but transition-economy cities rarely assess these benefits systematically. This paper synthesizes international evidence on the economic benefits of urban parks and develops a research and policy framework for Belgrade, Serbia. Using a Total Economic Value and ecosystem-services lens, the paper distinguishes four benefit domains: (i) health and avoided healthcare costs; (ii) property values and municipal finance; (iii) tourism and local economic development; and (iv) ecosystem services and avoided infrastructure costs. Systematic reviews, hedonic pricing studies and cost-benefit analyses show consistent evidence that proximity to parks raises housing values, increases physical activity and reduces obesity, supports tourism and small and medium enterprises, and provides cooling, flood mitigation and air-quality improvements whose annual value often exceeds park operating budgets.*

The paper then applies this framework to Belgrade. Drawing on recent Serbian studies of urban green space and health, indicative real-estate statistics and observed visitor flows to flagship parks such as Kalemegdan and Ada Ciganlija, it outlines how hedonic pricing, health-impact valuation, tourism impact assessment and ecosystem-service benefits transfer could be combined into an integrated valuation of the city's park system. The contribution is conceptual and strategic rather than empirical: it fills a gap in Southeast European urban economics by articulating a coherent research agenda and policy framework that treat Belgrade's parks as productive assets and position them within economic development, health and climate strategies.

Keywords: *Urban parks, economic benefits, Belgrade, Serbia.*

1. Introduction

Cities worldwide face the simultaneous challenges of sustaining economic growth, controlling public expenditures, adapting to climate change, and addressing the rising burden of noncommunicable disease. Urban parks sit at the intersection of these challenges.

¹School of Engineering Management, Bulevar vojvode Mišića 43, Belgrade, E-mail: olga.masic@fim.rs.

They generate direct use benefits such as recreation and tourism, indirect benefits such as climate regulation and air-quality improvement, and non-market cultural benefits including identity, heritage and social cohesion. Nevertheless, in many municipal budgets, parks still appear primarily as cost centers vulnerable to cuts and land conversion when fiscal pressures mount.

Over the last two decades, empirical research has challenged this perception by estimating the economic value of urban parks using tools from environmental and urban economics. Systematic reviews commissioned by the International Federation of Parks and Recreation Administration (IFPRA) and others show that parks generate measurable economic benefits through multiple channels: increased residential property values, expanded municipal tax bases, health benefits that translate into avoided healthcare costs, tourism and visitor spending, and ecosystem services that replace or complement grey infrastructure. Hedonic pricing studies consistently find that proximity to parks is capitalized into housing prices, while regional economic impact studies demonstrate that park-related tourism sustains jobs and regional income.

Despite this growing international evidence, the economic role of parks is still under-analyzed in many transition-economy cities, including those in Southeast Europe. Belgrade, Serbia's capital, is a paradigmatic case. It is a rapidly growing metropolitan region with strong development pressures, pronounced socio-spatial inequalities and a highly uneven distribution of high-quality green space. Parks such as Kalemegdan, Tašmajdan, Košutnjak, Zvezdara Forest and the recreation complex of Ada Ciganlija already underpin tourism, local business activity and everyday physical activity for hundreds of thousands of residents. Yet there has been no systematic attempt to quantify their economic contributions or to treat them as formal economic assets in urban policy.

This paper addresses that gap in two ways. First, it synthesizes international empirical evidence on the economic benefits of urban parks, using a Total Economic Value and ecosystem-services framework and highlighting four main benefit domains: health, property values, tourism and ecosystem services. Second, it translates this evidence into a Belgrade-specific valuation and research agenda, drawing on recent Serbian studies of green space and health and on the city's rich real-estate data infrastructure. The contribution is deliberately framed as a research agenda and policy framework for Southeast European urban economics, rather than as a completed valuation exercise.

2. Conceptual Framework: Parks as Economic Assets

2.1 Total Economic Value and benefit categories

Within ecological economics, parks can be conceptualized as natural-capital assets that generate flows of ecosystem services and other benefits over time. The Total Economic Value (TEV) framework distinguishes between direct use values, indirect use values, option values and non-use values. Applying TEV to urban parks provides a structured view of their economic roles.

A systematic review for IFPRA by Konijnendijk et al. (2013) groups urban-park benefits into eight categories: biodiversity and habitat, house prices, physical health and wellbeing, local cooling, air quality and carbon sequestration, water regulation, tourism, and social cohesion. The authors conclude that the strongest and most consistent evidence exists for effects on nearby property prices, physical activity and obesity, and local cooling. Evidence for tourism, social cohesion, air quality and water regulation is positive but comparatively less developed or more context-specific. Tempesta (2015) complements this with a four-part categorization from the Trust for Public Land: revenue-producing factors for city government (e.g. tax receipts, tourism), cost savings for government (e.g. stormwater management, air-pollution mitigation), cost savings for citizens (health, community cohesion) and wealth-increasing factors, especially higher property values.

An important conceptual point is that higher property values near parks are not a separate benefit in themselves, but a revealed-preference signal of households' willingness to pay for the bundle of park-related benefits. Property-price premiums should therefore be interpreted as capitalization of the flow of recreational, environmental and aesthetic services provided by parks, rather than as an independent benefit category.

2.2 Health and ecohealth perspective

Recent literature explicitly links parks to health economics through an ecohealth lens. Wilson et al. (2023) develop a conceptual framework in which investments in park infrastructure and programs change exposure to green space, which in turn alters physical activity, mental health, social cohesion and environmental quality. These intermediate changes can be monetized as avoided healthcare expenditures, improved labor productivity and avoided premature mortality. The Urban Institute (2022) similarly structures evidence across four health dimensions, physical, mental, social and environmental, and argues that parks should be treated as critical civic infrastructure for promoting health equity.

This ecohealth framing is particularly relevant for cities with ageing populations and high burdens of cardiovascular and metabolic disease, such as Belgrade. It allows health ministries, social-insurance funds and labor ministries to see park investment not as a discretionary cultural expense but as a preventative health measure with measurable returns in reduced morbidity and higher productivity.

2.3 Public goods, externalities and environmental justice

From a microeconomic perspective, urban parks exhibit classic public-good characteristics and positive externalities. They are largely non-excludable and non-rival up to high levels of use, and generate spillover benefits in the form of cleaner air, lower temperatures, attractive neighborhoods and safer public spaces. Private markets therefore tend to underprovide parks relative to the social optimum, justifying public intervention in their provision and maintenance.

At the same time, the distribution of park-related benefits is often highly unequal. Wolch et al. (2014) show that in many cities, high-quality green spaces are disproportionately

located in already advantaged neighborhoods, while low-income communities have fewer and poorer-quality parks despite greater potential health gains. They introduce the notion of making cities ‘just green enough’ to improve health and environmental conditions without triggering large-scale displacement and ‘green gentrification’. For Belgrade, this implies that major investments in prominent riverfront and central parks must be matched by improvements in peripheral and lower-income districts if economic benefits are to be equitably shared.

3. Evidence from International Literature

3.1 Health benefits and avoided healthcare costs

Systematic reviews and epidemiological studies consistently show that park access is associated with higher levels of physical activity, lower obesity, improved self-reported health, reduced psychological distress and better cardiovascular outcomes. Konijnendijk et al. (2013) classify the evidence for increased physical activity and reduced obesity as strong, while evidence for stress reduction and mental-health benefits is moderate but growing. Wilson et al. (2023) operationalize these mechanisms in a case study of a small urban park. Using dose-response relationships for physical activity and air pollution, combined with cost-of-illness estimates, they estimate that the park generates annual health benefits of roughly CAD 133,000 for nearby residents, with physical activity accounting for the majority of quantified benefits. The Urban Institute (2022) arrives at similar conclusions: parks reduce risks of cardiovascular disease, diabetes and some cancers, improve mental health through stress relief and social interaction, and reduce exposure to heat and pollution.

Beyond general findings, several recent studies provide health evidence specific to Serbia and Belgrade. Vujčić et al. (2019) show that visits to urban green areas in central Belgrade are associated with higher levels of physical activity and improved mental wellbeing, including reduced nervousness and lower self-reported medication use. Gubić and Wolff (2022) document how public green spaces in Serbian cities, including Belgrade, became crucial for maintaining physical activity and psychological resilience during COVID-19 restrictions. Simović et al. (2023) find that larger and better-quality green areas in Belgrade are linked to improved self-reported health, primarily through increased physical activity and stress reduction. From an economic perspective, these health benefits can be monetized: fewer cases of cardiovascular disease, diabetes, depression and anxiety translate into reduced healthcare expenditures and productivity gains through lower absenteeism and presentism. While Belgrade-specific cost-of-illness estimates are still limited, international studies suggest that the aggregate value of park-related health benefits for a large city is likely to be in the order of millions of euros per year.

3.2 Property values, real-estate markets and municipal finance

Hedonic pricing has been one of the most widely used methods to value the economic benefits of parks. Crompton (2001), in a seminal review of 25 empirical studies, concludes that in the vast majority of cases parks have a positive impact on adjacent residential

property values, with premiums of up to about 20 percent for homes abutting passive parkland. This review established a robust empirical basis for the claim that property markets capitalize park amenities into sale prices.

Konijnendijk et al. (2013) classify the evidence for house-price effects as moderate to strong. Subsequent research has refined this picture by showing that not all park facilities affect property values equally. Lin et al. (2013), using hedonic models in Minneapolis, find that passive facilities such as water features and passive recreation spaces generally increase nearby property values, while certain active facilities – notably skate parks and some children’s play areas – can have negative effects due to noise and perceived nuisance. Their findings underscore that park design choices matter economically and that quiet promenades, tree-lined paths and scenic viewpoints typically generate higher real-estate premiums than noisy or disruptive facilities.

From a municipal-finance perspective, property-value premiums translate into higher assessed values and, where applied, higher property-tax revenues. Tempesta (2015) emphasizes that such tax receipts belong in the category of ‘revenue-producing factors for city government’, alongside tourism-related revenues. When aggregated across a large housing stock, even modest park-related premiums can yield a recurring revenue stream that offsets a non-trivial share of annual park operating costs.

3.3 Tourism, local economic development and regional impacts

Parks and green spaces also generate economic benefits through tourism and local recreation spending. Although only a limited number of studies focus directly on tourism, they generally conclude that parks are among the motivations for visiting specific cities and regions. Urban-park research likewise highlights parks as central elements in city attractiveness and urban ecotourism.

Regional impact studies of national parks provide a useful benchmark for understanding these mechanisms. Bennett et al. (1996) estimate that Dorrigo National Park in Australia, with around 160,000 annual visits, contributes almost 7 percent of gross regional output, 7.5 percent of household income, 7.4 percent of value added and 8.4 percent of regional employment, with visitor expenditure as the dominant driver of impact. Gibraltar Range National Park, with fewer visitors, still generates meaningful regional output, income and employment effects.

More recent work by Ijatuyi et al. (2025) synthesizes evidence on green spaces and sustainable tourism in Gauteng province, South Africa. They show how parks, botanical gardens and nature reserves drive local economies through entrance fees, guided tours, hospitality spending and small-enterprise development, and highlight the importance of green spaces in job creation and revenue generation. Although the institutional context differs from European cities, the underlying mechanisms, visitor spending and local multipliers – are directly relevant for urban park systems such as Belgrade’s fortress parks, riverfronts and large recreation areas like Ada Ciganlija.

3.4 Ecosystem services, climate adaptation and avoided infrastructure costs

A fourth major benefit domain concerns ecosystem services and avoided infrastructure costs. Parks and urban green spaces provide regulating services such as local cooling, flood mitigation, air-pollution removal and carbon sequestration, which can replace or complement grey infrastructure such as stormwater pipes, retention basins and cooling systems.

Baró et al. (2014) quantify the contribution of Barcelona’s urban forests to air quality and climate-policy targets. They estimate annual removal of key air pollutants and associated health benefits, as well as carbon storage and sequestration, and conclude that these ecosystem services are significant at city-policy scale. Sutton et al. (2019) adopt an ecological-economics perspective to value ecosystem services in U.S. national parks. Using benefits-transfer methods applied to land-cover data, they estimate annual ecosystem-service values of around USD 98 billion, compared to a National Park Service budget of about USD 3 billion, implying that a narrow focus on visitor revenue dramatically understates the value of parks.

Chelli et al. (2025), in a systematic review of cost-benefit analyses of urban nature-based solutions, find that most studies adopt a social cost-benefit perspective and report positive net present values for green interventions, even though many ecosystem services remain unvalued due to methodological challenges. Their review suggests that comprehensive valuations of park systems are conservative in the sense that they are likely to underestimate total benefits.

For urban climate adaptation, local cooling effects are particularly relevant. Reviews show that parks and tree-lined areas are often 1-3°C cooler than surrounding built-up areas during hot periods, contributing to reduced heat stress and energy demand for air conditioning. Micro-scale research from Belgrade reinforces this pattern: Kecman et al. (2025) measure climatic conditions in small green spaces and tree-lined streets and find differences of roughly 2-4°C in thermal-comfort indices between green and non-green reference sites. They conclude that a dense network of small green spaces can collectively mitigate urban overheating, which has direct implications for avoided cooling costs and heat-related morbidity in Belgrade.

Table 1. Summary of economic benefit domains of urban parks and illustrative evidence.

Benefit domain	Main economic mechanisms	International evidence (examples)	Belgrade Serbia evidence /	Indicative methods
Health	Avoided healthcare costs; higher productivity	Wilson et al. (2023); Urban Institute (2022)	Vujčić et al. (2019); Gubić & Wolff (2022); Simović et al. (2023)	Health-impact assessment; cost-of-illness modelling

Property values	Higher sale and rental prices; larger tax base	Crompton (2001); Lin et al. (2013)	To be estimated with Belgrade transaction and listing data	Hedonic pricing
Tourism & local development	Visitor spending; SME revenues; employment	Bennett et al. (1996); Ijatuyi et al. (2025)	Visitor flows to Kalemegdan, Ada Ciganlija and riverfronts	Visitor surveys; input-output analysis
Ecosystem services	Cooling; flood mitigation; air-quality improvement	Baró et al. (2014); Sutton et al. (2019); Chelli et al. (2025)	Kecman et al. (2025) on thermal comfort	Benefits transfer; social cost-benefit analysis

Conceptual is framework linking parks to economic outcomes and policy. Parks (stocks of natural capital) generate flows of ecosystem services and amenities (health, property, tourism, regulating services). These flows translate into economic outcomes (avoided costs, higher incomes, tax revenues, business opportunities), which in turn inform policy, management and entrepreneurial decisions. Feedback loops arise as investment decisions alter the quantity and quality of parks.

4. Belgrade, Serbia: Applying the Evidence

4.1 Urban context and park system

Belgrade is a metropolitan region at the confluence of the Sava and Danube rivers, characterized by sharp contrasts between the historic core, the modernist grids of New Belgrade and expanding suburban municipalities. The city’s park system is diverse but fragmented. It includes historic parks such as Kalemegdan, Tašmajdan, Pionirski Park and Karađorđev Park; large wooded recreation areas such as Košutnjak and Zvezdara Forest; the river island and recreation complex of Ada Ciganlija; riverfront promenades and embankments; and numerous small neighborhood parks and tree-lined streets.

These areas influence residential location choices, tourism patterns and health behaviors. Apartments overlooking Kalemegdan or the Sava riverfront command price premiums; Ada Ciganlija, often described as ‘Belgrade’s Sea’, records very high annual visitation with peak summer days attracting large crowds; and central parks serve as everyday spaces for walking, jogging and informal sport. Yet despite these clear economic functions, Belgrade’s parks have not been systematically valued in economic terms.

4.2 Health benefits and avoided costs in Belgrade

Recent Serbian research provides direct evidence of the health impacts of Belgrade’s green areas. Vujčić et al. (2019) show that visits to urban green areas in central Belgrade are associated with higher levels of physical activity and improved mental wellbeing, including

reduced nervousness and lower self-reported medication use. Gubić and Wolff (2022) document how public green spaces in Serbian cities, including Belgrade, became crucial for maintaining physical activity and psychological resilience during COVID-19 restrictions. Simović et al. (2023) find that larger and better-quality green areas in Belgrade are linked to improved self-reported health, primarily through increased physical activity and stress reduction.

These findings can be integrated into an ecohealth valuation framework. First, park accessibility and use can be mapped by municipality, using indicators such as the proportion of residents within a 10-15-minute walk of a park and self-reported visitation frequency. Second, dose-response relationships from the health literature can be applied; for example, studies suggesting that regular short visits to green space reduce population prevalence of depression and high blood pressure by several percentage points. Third, Serbian cost-of-illness data for cardiovascular disease, diabetes, depression and anxiety can be used to translate changes in disease incidence into monetary terms.

Although this paper does not conduct a full empirical valuation, the international evidence and local health studies together suggest that the avoided healthcare costs and productivity gains from Belgrade's parks are likely to be substantial. Given Serbia's ageing population and high burden of noncommunicable disease, park investment can reasonably be framed as a preventative health strategy with high economic returns.

4.3 Property values, real-estate data and urban regeneration

Belgrade's real-estate market has become increasingly transparent. Official statistics and market reports indicate that average apartment prices in the city are now roughly 2,300-2,500 EUR per square meter, with much higher prices in central municipalities such as Vračar, where recent figures exceed 2,900 EUR per square meter. Newly built apartments in Belgrade often have average prices above 3,000 EUR per square meter, while older stock trades at somewhat lower levels. These figures underscore both the economic significance of real-estate markets and the potential importance of amenities such as parks in shaping willingness to pay.

The portal CeneNekretnina provides spatially disaggregated statistics on realized apartment prices based on registered sales, including distinctions between new and old construction and detailed data for Belgrade neighborhoods. In parallel, large private platforms such as CityExpert, Halo oglasi, Nekretnine.rs, 4zida and Beocity publish geocoded listing data with detailed dwelling attributes and interactive maps. These data sources make Belgrade well suited to hedonic analysis of park-related property premiums.

A Belgrade-focused hedonic study could build on Crompton (2001) and Lin et al. (2013) by estimating price differences between dwellings located within specified distance bands from major parks (for example 0-200 m, 200-500 m, beyond 500 m), while controlling for dwelling size, age, building quality, distance to employment centers and public transport. The analysis could also differentiate between park types and facilities, following evidence

that passive facilities such as scenic views and quiet water features tend to produce higher premiums than noisy active facilities.

If Belgrade observed premiums similar to those reported in the international literature, for example five to fifteen percent for dwellings adjacent to or overlooking high-quality parks, the implied capitalized value, when multiplied across thousands of apartments, would likely dwarf annual park-maintenance costs. This would support the conclusion that, once property-value and ecosystem-service benefits are accounted for, the benefits of urban parks exceed their maintenance costs by a large margin. In regeneration areas such as brownfields along the Sava or underused inner-city parcels, new or improved parks could be leveraged as value-capture tools, with land-value-capture instruments and developer contributions recycling part of the incremental value into green infrastructure.

4.4 Tourism, place branding and local development in Belgrade

Parks and riverfronts are central to Belgrade's tourism image. Kalemegdan fortress and park offer panoramic views of the confluence of the Sava and Danube; river promenades host floating clubs, cafes and cultural venues; and Ada Ciganlija functions as a summer resort within the city. These spaces attract both domestic and foreign visitors and support a dense ecosystem of hospitality and leisure businesses, from cafes and restaurants to water-sports rentals and event services.

Adapting the approach of Bennett et al. (1996) and Ijatuyi et al. (2025), a Belgrade study could estimate the economic impact of park-related tourism by surveying visitors about their motivations and spending patterns and then applying local input-output tables to derive effects on output, value added and employment. Key questions would include the share of visitors who identify parks and riverfronts as primary or secondary motivations for their trip and the proportion of accommodation, food, transport and entertainment expenditure attributable to park visits. Such an analysis would likely show that fortress parks, riverfront promenades and Ada Ciganlija constitute a significant component of Belgrade's tourism export base and a platform for small and medium enterprises in tourism, recreation and wellness.

4.5 Ecosystem services for a river city

Belgrade's geography – built around two major rivers – makes regulating ecosystem services particularly important. Flood risk along the Sava and Danube, combined with an increasing frequency of heatwaves, means that cooling and water-regulation services from parks and green corridors have direct economic relevance. Riverbank parks, floodable meadows and forested slopes can absorb runoff and attenuate flood peaks, reducing the need for costly structural defenses and lowering expected flood damages. Treelined streets and small neighborhood parks, as demonstrated by Kecman et al. (2025), provide local cooling benefits that can reduce energy demand for air conditioning and mitigate heat-related health risks.

A Belgrade-specific ecosystem-service valuation could apply per-hectare values for cooling, air-pollution removal and flood regulation from international studies, adjusted for local conditions and climate scenarios. Even with conservative assumptions, such benefits-transfer exercises would demonstrate that Belgrade's park system contributes materially to climate adaptation and infrastructure cost savings.

5. Research Agenda: Towards an Empirical Valuation of Belgrade's Parks

The preceding sections have synthesized international evidence and outlined channels through which Belgrade's parks generate economic value. This section does not report completed empirical work; instead, it sets out a research agenda and empirical strategy for future studies seeking to quantify these benefits in a way that is rigorous enough for economics and management journals.

First, a systematic literature and policy review should be undertaken to map existing knowledge and gaps. Building on international reviews and Serbian-language planning documents, this review would identify which benefit categories – health, property, tourism, ecosystem services – have sufficient data for near-term quantitative analysis and where new primary data collection is required. Second, a spatial analysis of park access and socio-economic indicators should be conducted using geographic information systems. The distribution of parks, population density, income, age structure and health indicators can be mapped at neighborhood level to identify park-poor and health-vulnerable areas. This provides the basis for equity-sensitive valuation and for targeting future investments. Third, hedonic pricing models should be estimated using realized transaction data from CeneNekretnina and asking-price data from major listing portals. Following the international literature, models would regress price per square meter on structural dwelling characteristics, neighborhood attributes and measures of park proximity and quality. Results would yield estimates of marginal willingness to pay for park access and for specific park features.

Fourth, health-impact and avoided-cost models should be developed that link park accessibility and usage to changes in physical activity, mental health and exposure to heat and air pollution. Building on local health surveys and the ecohealth framework, these models would translate changes in disease incidence into avoided healthcare costs and productivity gains. Fifth, tourism impact assessment should combine visitor surveys in key parks with regional input-output tables to estimate the contribution of park-related spending to output, value added and employment, with a particular focus on small and medium enterprises in hospitality, leisure and wellness. Finally, an ecosystem-service valuation should be carried out using benefits-transfer methods informed by international studies of cooling, air-pollution removal and flood regulation, adjusted to Belgrade's climate, land-use patterns and infrastructure costs. The resulting values can be integrated into a social cost-benefit analysis of alternative park investment and management scenarios.

Together, these steps constitute a coherent research agenda that would move the discussion of Belgrade's parks from qualitative assertions towards quantified, policy-relevant economic evidence.

6. Implications for Policy, Management and Entrepreneurship

6.1 Policy: parks as health, climate and fiscal tools

For policy-makers, the evidence reviewed here supports treating parks as preventative health infrastructure, climate-adaptation assets and fiscal instruments rather than discretionary amenities. Health ministries and social-insurance funds can view park investments as cost-effective measures to reduce the incidence of chronic disease and mental-health problems. Climate and water authorities can recognize parks and green corridors as nature-based solutions that lower the costs of stormwater management and heat-risk mitigation. Finance ministries and city treasuries can account for park-induced property-value premiums and tourism revenues when evaluating public-investment portfolios.

6.2 Management: value capture and equitable distribution

For urban managers, the key implication is that park planning and maintenance should be integrated into municipal finance and land-use strategies. In regeneration areas, where new or upgraded parks are expected to raise nearby property values, value-capture instruments such as developer contributions, betterment levies and tax-increment financing can be used to recycle part of the uplift back into green infrastructure. At the same time, management strategies must explicitly address equity. Spatial equity metrics should be used to prioritize investment in park-poor and health-vulnerable neighborhoods, ensuring that benefits are not concentrated only in already advantaged districts. Transparent performance indicators, such as park-access rates, visitor numbers and user satisfaction, can help local governments monitor whether parks are delivering expected economic and social returns.

6.3 Entrepreneurship: SMEs and green innovation opportunities

For entrepreneurs and small and medium enterprises, parks are both a market and a platform for innovation. Tourism and recreation businesses, cafes, restaurants, sports-equipment rentals, guided tours, cultural events, wellness services, depend on attractive, well-managed parks and riverfronts. Clear evidence on visitor flows and spending can support business planning, concession policies and targeted support programs for park-related SMEs. In addition, parks offer opportunities for green innovation, from nature-based wellness products and outdoor co-working concepts to digital services that enhance visitors' experiences.

Recognizing parks as productive assets can therefore align the incentives of public authorities and private actors. Well-designed governance arrangements, including transparent concession contracts, public-private partnerships and community-based

management models, can harness entrepreneurial energy while safeguarding the public-good nature of parks.

7. Conclusion

Urban parks are economically productive assets that affect health, property markets, tourism and climate resilience. International evidence shows that they raise nearby property values, expand municipal tax bases, improve physical and mental health, support tourism and local business ecosystems, and provide ecosystem services that can substitute for or complement grey infrastructure. Cost-benefit analyses of urban nature-based solutions indicate that when these benefits are monetized, green interventions almost always exhibit positive net present values.

Belgrade exemplifies both the potential and the current undervaluation of urban parks. Local studies confirm that green areas improve residents' physical and mental health; micro-climate research shows that even small parks and tree-lined streets materially reduce heat stress; and the city's real-estate market displays clear sensitivity to amenity differences. Yet parks are still rarely evaluated as economic infrastructure in urban planning and budgeting.

By synthesizing international literature, highlighting Belgrade-specific evidence and outlining a concrete research agenda, this paper provides a foundation for more rigorous economic analysis of urban parks in Serbia and similar transition-economy cities. Its contribution is explicitly to set out a research and policy framework for future empirical work, rather than to present completed valuations. For journals such as *Economics, Entrepreneurship and Management Research*, such analysis lies at the intersection of urban economics, public finance, health economics, entrepreneurship and strategic management. Future empirical work implementing the proposed agenda will be essential to quantify the full economic contribution of Belgrade's parks and to support more informed, equitable and growth-oriented urban policies.

References

1. Baró, F., Chaparro, L., Gómez-Baggethun, E., Langemeyer, J., Nowak, D. J., & Terradas, J. (2014). Contribution of ecosystem services to air quality and climate change mitigation policies: The case of urban forests in Barcelona, Spain. *Ambio*, 43(4), 466-479.
2. Bennett, J., Gillespie, R., Powell, R., & Chalmers, L. (1996). The economic value and regional economic impact of national parks. *Australian Journal of Environmental Management*, 3(4), 229-239.
3. Chelli, A., Brander, L., & Geneletti, D. (2025). Cost-benefit analysis of urban nature-based solutions: A systematic review of approaches and scales with a focus on benefit valuation. *Ecosystem Services*, 71, 101684.
4. Crompton, J. L. (2001). The impact of parks on property values: A review of the empirical evidence. *Journal of Leisure Research*, 33(1), 1-31.

5. Gubić, I., & Wolff, M. (2022). Use and design of public green spaces in Serbian cities during the COVID-19 pandemic. *Habitat International*, 128, 102651.
6. Ijatuyi, E. J., et al. (2025). Sustainable tourism and green space: Exploring how green spaces and natural attractions contribute to local tourism economies and revenue generation in Gauteng province. *Discover Sustainability*, 6, 236.
7. Kecman, S., et al. (2025). The impact of small urban green space on the urban thermal environment: The Belgrade case study (Serbia). *Forests*, 16(2), 321.
8. Konijnendijk, C. C., Annerstedt, M., Busse Nielsen, A., & Maruthaveeran, S. (2013). Benefits of urban parks: A systematic review. Report for the *International Federation of Parks and Recreation Administration (IFPRA)*.
9. Lin, I.-H., Wu, C., & De Sousa, C. (2013). Examining the economic impact of park facilities on neighboring residential property values. *Applied Geography*, 45, 322-331.
10. Simović, I., et al. (2023). Underlying mechanisms of urban green areas' influence on residents' health: A case study from Belgrade, Serbia. *Forests*, 14(5), 765.
11. Sutton, P. C., Duncan, S. L., & Anderson, S. J. (2019). Valuing our national parks: An ecological economics perspective. *Land*, 8(54).
12. Tempesta, T. (2015). Benefits and costs of urban parks: A review. *Aestimum*, 67, 127-143.
13. Urban Institute. (2022). *The health benefits of parks and their economic impacts*. Urban Institute, Washington, DC.
14. Vujčić, M., Tomić, I., Grbić, M., Stojić, S., & Vuković, D. (2019). Connection between urban green areas and visitors' physical and mental well-being in Belgrade (Serbia). *Urban Forestry & Urban Greening*, 40, 1-8.
15. Wilson, J., et al. (2023). The economic value of health benefits associated with urban park investment. *International Journal of Environmental Research and Public Health*, 20(9), 4815.
16. Wolch, J. R., Byrne, J., & Newell, J. P. (2014). Urban green space, public health, and environmental justice: The challenge of making cities 'just green enough'. *Landscape and Urban Planning*, 125, 234-244.
17. CeneNekretnina. (n.d.). Statistika cena stanova. Retrieved from <https://www.cenenekretnina.rs/>
18. CityExpert. (n.d.). Real-estate prices in Belgrade: Average apartment price by municipality. Retrieved from <https://cityexpert.rs/>
19. Halo oglasi. (n.d.). Real-estate listings for Belgrade. Retrieved from <https://www.halooglasi.com/>
20. Nekretnine.rs. (n.d.). Real-estate listings for Belgrade. Retrieved from <https://www.nekretnine.rs/>
21. 4zida. (n.d.). Real-estate listings for Belgrade. Retrieved from <https://www.4zida.rs/>
22. Beocity. (n.d.). Real-estate listings for Belgrade. Retrieved from <https://www.beocitynekretnine.rs/>

Ekonomске koristi parkova u urbanim prostorima - globalni dokazi i implikacije za Beograd, Srbija

Olga Mašić

Apstrakt: *Urbani parkovi se sve češće posmatraju kao ključna ekonomska infrastruktura koja generiše višestruke koristi u oblastima zdravlja, tržišta nekretnina, turizma i klimatske otpornosti. Ipak, gradovi u tranzicionim ekonomijama retko sistematski procenjuju ove efekte. Ovaj rad sintetizuje međunarodne dokaze o ekonomskim koristima urbanih parkova i predlaže istraživački i politički okvir za Beograd, Srbiju. Polazeći od koncepta ukupne ekonomske vrednosti i ekosistemskih usluga, identifikovane su četiri glavne domene koristi: (i) unapređenje zdravlja i smanjenje troškova zdravstvene zaštite; (ii) rast vrednosti nekretnina i povećanje fiskalnih prihoda; (iii) podsticaj turizmu i lokalnom ekonomskom razvoju; i (iv) ekosistemске usluge koje smanjuju infrastrukturne troškove. Empirijski nalazi iz sistematskih pregleda, hedonističkih studija i analiza troškova i koristi ukazuju na konzistentne efekte: blizina parkova povećava vrednost stanova, podstiče fizičku aktivnost i smanjuje gojaznost, doprinosi razvoju turizma i sektora malih i srednjih preduzeća, te obezbeđuje hlađenje, ublažavanje poplavnih rizika i poboljšanje kvaliteta vazduha, pri čemu godišnja vrednost ovih koristi često prevazilazi budžete za održavanje parkova.*

Primena ovog okvira na Beograd oslanja se na dostupne srpske studije o urbanom zelenilu i zdravlju, indikativne podatke o nekretninama i posmatrane tokove posetilaca u reprezentativnim parkovima poput Kalemegdana i Ade Ciganlije. Rad pokazuje kako se hedonističko određivanje cena, procena zdravstvenih efekata, analiza turističkog doprinosa i transfer vrednosti ekosistemskih usluga mogu integrisati u sveobuhvatnu procenu vrednosti gradskog sistema parkova. Doprinos je pre svega konceptualan i strateški: artikuliše koherentan istraživački program i politički okvir koji tretira beogradske parkove kao produktivnu imovinu i pozicionira ih u šire strategije ekonomskog razvoja, javnog zdravlja i klimatske otpornosti.

Ključne reči: *Urbani parkovi, ekonomske koristi, Beograd, Srbija*

EEMR

Economics, Entrepreneurship and Management Research

Vol. 4, No. 2, 2025.

e-ISSN:2955-9014 pp. 62-71

Review Paper/Pregledni rad
Paper Submitted/Rad primljen: 8. 12. 2025.
Paper Accepted/Rad prihvaćen: 22. 12. 2025.

UDC/UDK: 338.124.4:622.324(497.11)"2025"
COBISS.SR-ID 183375625
DOI: <https://doi.org/10.62907/eemr250402062k>

Sanctions on NIS and the Transformation of Serbia's Energy Sector: Challenges and Strategic Opportunities

Andela Kostić¹

Abstract: *This paper focuses on the current situation in the Republic of Serbia as a consequence of the imposition of sanctions on the Oil Industry of Serbia (NIS). Since the 10th of January 2025, the imposed sanctions have intensified the potential energy crisis and consequences for the economy of the Republic of Serbia. In this article, using the method of descriptive analysis, challenges are described as the result of the current geopolitical, economic, and international relations. The focus is placed on the consequences of energy supply and the functioning of the refining sector, with a comparison to the sanctions imposed on Yugoslavia from 1991 to 1996. The article examines the possibilities of source diversification and source supply routes, as well as changes in ownership structure, as potential future development scenarios.*

Keywords: *Energy crisis, Serbia's energy dependence, sanctions.*

1. Introduction

The Russia-Ukraine war represents the most significant geopolitical conflict of our time, with consequences extending across the globe. The effects of the war are present in international politics, the economy, security and the energy sector, and we are witnessing the far-reaching and profound changes in international relations. The far-reaching nature of the conflict between Russia and the West has fallen on the Balkan Peninsula, where the Republic of Serbia is situated at the center of a key regional gas distribution route-the Balkan Stream (Gajić A., 2023).

¹Faculty of Economics and finance, University "Union - Nikola Tesla", Belgrade, Serbia, E-mail: andjela.kostic10@gmail.com

Serbia faces a historic challenge in the energy sector due to the consequences of sanctions imposed on the Oil Industry of Serbia (NIS), which implies the necessity of restructuring the energy sector and redefining strategic development directions. The key question that arises is in which direction the energy policy of the Republic of Serbia is headed, and what are its strategic options under the new circumstances?

2. Theoretical and Methodological Framework

The sanctions imposed on the Oil Industry of Serbia are a consequence of the Russia-Ukraine war, which puts Serbia in a position to make key decisions on the energy field and strategic possibilities. The paper employs the method of descriptive analysis, aimed at examining relevant studies, documents, and available data, thereby providing an overview of the current situation and potential outcomes for overcoming the challenges. The objective of this study is to analyze the current position of the Oil Industry of Serbia in the context of the sanctions, identify key challenges, and explore potential strategic options for addressing the crisis.

2.1. Sanctions on NIS - characteristics, reasons and mechanisms

Since 2014, the European Union (EU) has been imposing intensive packages of sanctions on the Russian Federation due to the Russia-Ukraine war. The EU strongly condemned Russia's attack because of the illegal annexation of Crimea (2014), the full-scale invasion of Ukraine by Russian forces (2022), and the illegal annexation of Donetsk, Luhansk, Zaporizhzhia, and Kherson (2022) (European Council., 2024).

The sanctions against Russia include a ban on entry to the EU for sanctioned Russian citizens, the freezing of all assets in the EU belonging to sanctioned individuals, a prohibition for EU citizens to provide any funds to sanctioned individuals, and the immobilization of the Russian Central Bank's assets in the EU, amounting to 210 billion euros. Previous sanctions imposed on Russia due to the Russia-Ukraine war also imply that any third party interacting with Russia may itself become subject to sanctions.

NIS AD Novi Sad is the main supplier of oil and petroleum products in the Republic of Serbia, but its activities are not limited to a single sector. In addition to distribution, the company is involved in the exploration and extraction of oil and gas from underground sources, production of products, including retail to end consumers.

According to data obtained from the official NIS website, the company's ownership shares are as follows: Russian ownership 56.15%, the Republic of Serbia 29.87%, and other minority shareholders 13.98% (Naftna Industrija Srbije, 2023). Due to the majority Russian ownership, the company has been included on the U.S. OFAC (Office of Foreign Assets Control) list of sanctioned entities since January 10, 2025.

The primary consequences of the sanctions threatening the Republic of Serbia include a shortage of raw materials for processing at the Pančevo refinery, which is directly supplied by NIS, risks related to banking transactions, as well as challenges in the logistics of

alternative supply sources. This implies that the current regime of „hot circulation“ remains in effect, with a potential risk of a complete shutdown that could occur at any moment (Anufrijević, Mišić, 2025).

The secondary consequences of placing a company on the sanctions list include a ban on financial transactions, the freezing of assets, and restrictions on doing business with U.S. companies and individuals, as well as with any international organizations that already operate with or are linked to the United States. In practical terms, these measures threaten the continued operation of NIS AD Novi Sad due to the difficulties in maintaining regular and continuous business relations with both existing and potential partners (Partners, JPM, 2024).

2.2. Sanctions in the Federal Republic of Yugoslavia in the 1990's and a comparison with the current situation

Modern history records the most dramatic economy collapse of the Federal Republic of Yugoslavia during the period from 1991 to 1996. The period of the most severe sanctions lasted from 1991 to 1993, during which GDP declined by more than 50%, representing the most dramatic recorded drop in gross domestic product. During this time, the economy lost over 60% of its value. Industrial production fell by more than 70%, both as a result of the trade blockade and due to a lack of resources, the inability to invest and modernize production, the outflow of skilled labor, and the collapse of the financial system.

The most dangerous economic phenomenon of that period was hyperinflation, which reached extremely high levels. Inflation rates followed the trajectory below:

1. January 1993: 100% per month (Statistical Yearbook of the FRY, 1993);
2. December 1993: 3,130% per month (Statistical Yearbook of the FRY, 1993);
3. January 1994: 313,000,000% per month (Statistical Yearbook of FRY, 1994).

At its peak, hyperinflation led to a doubling of prices every 34 hours. It was the result of a combination of factors, including the monetization of the budget deficit due to the lack of foreign investment and external financing, a drastic decline in production that limited the supply of goods, psychological factors and the loss of confidence in the domestic currency, as well as the development of a black market with extremely high margins.

The unemployment rate increased from 13% in 1991 to as much as 30% in 1993. However, official statistical data do not provide a complete picture, as a large number of employees did not receive regular wages, enterprises operated at minimal capacity, and an additional 20–30% of the labor force fell into the category of “hidden unemployment.” Unemployment was unevenly distributed, accompanied by the phenomenon of a “mass exodus,” that is, brain drain among the highly educated population (Tutić et al., 2025).

By comparing the sanctions imposed on the Oil Industry of Serbia with those imposed during the period of the Federal Republic of Yugoslavia, certain segments that pose similar threats can be identified. In the case of sanctions on NIS, a reduction or complete absence of raw materials may lead to the shutdown of production at the Pančevo refinery, which

would seriously endanger the national economy. This could result in increased unemployment, inflation, rising production costs, and a decline in overall economic activity. A similar cause-and-effect relationship was present during the severe sanctions imposed on the FRY from 1991 to 1996, with the most significant decline in economic activity occurring during the first three years of sanctions. It is evident that sanctions primarily affect key economic parameters, namely production, transportation, and distribution.

3. Economic, Market, and Geopolitical Consequences of Sanctions

3.1. Consequences for the Republic of Serbia

According to M. Kovačević (Peljto, 2025), the current situation involving NIS will cause serious consequences for Serbia's economy, particularly in terms of the supply and import of petroleum products, which will increase costs and lead to a reduction in economic activity in certain sectors. He also emphasizes the rise in other domestic prices, which further increases pressure on the Serbian economy and requires more intensive state involvement in addressing this issue. NIS has played a significant role in the formation of the state budget through excise duties and value-added tax (VAT) on fuel, which implies that the current situation will result in a decline in public revenues.

Similarly, Đogović argues that the closure of the Pančevo refinery would have the greatest impact on employees in related companies and district heating systems, as well as on consumers and the economy as a whole (Peljto, 2025). A likely consequence is an increase in demand for gasoline and diesel, which, under conditions of limited resources, may lead to higher prices and potential shortages. Due to the temporary shutdown of refineries, further production has been suspended, indicating that current reserves and production from domestic gas sources will not be sufficient to meet the long-term needs of the state and the population, which implies the necessity for urgent solutions to overcome this problem.

Agriculture, which is highly dependent on the Oil Industry of Serbia, is in an unfavorable position, further contributing to rising food prices. Increases in diesel prices lead to higher production and transportation costs, which directly affects the competitiveness of Serbian products on the European market. According to available sources, these consequences are still considered hypothetical, and NIS currently possesses reserves sufficient to meet the needs of the state and citizens during the current winter period.

3.2. Consequences for Energy Security

The gas supply route serving the Republic of Serbia is connected to the TurkStream pipeline and enters Serbia through Bulgaria at the Zaječar entry point. From this point, the flow continues northward toward Hungary or westward for domestic consumption. This gas route has represented a key element in ensuring gas supply to Serbia; however, following the imposition of sanctions, it has become evident that the existing strategy requires reorganization due to the emerging crisis situation.

The gas shortage threatening the Republic of Serbia arises from the limited ability to control domestic reserves and gas availability. This issue stems from the ownership structure of the Banatski Dvor gas storage facility, which is under Russian ownership, forcing Serbia to lease additional storage capacity in Hungary for 500 million cubic meters of gas. The Republic of Serbia has demonstrated an inadequate response speed in addressing this issue and in securing new storage capacities that would be under national ownership (Lazarevic, 2025).

This directly implies Serbia's dependence on other countries for the use of gas. In this way, the country becomes vulnerable during times of sanctions and crises. In the long term, this situation affects the competitiveness and production capacity of the industrial sector. Data from recent years indicate that the Republic of Serbia relies on imported gas for nearly three-quarters of its consumption.

The main suppliers include Iraq, Russia, Kazakhstan, Romania, and Croatia, via terminals or pipelines. In 2023, crude oil imports to Serbia amounted to 611 million U.S. dollars, with the largest shares coming from Hungary, Romania, Bulgaria, Belgium, and other countries. This figure shows that oil and fuels account for approximately 5% of Serbia's total imports, highlighting a significant share of the overall import structure.

These data indicate Serbia's dependence and create pressure to diversify sources of raw materials in order to reduce vulnerability, both due to geopolitical relations and logistical limitations. One of the alternative gas distribution routes, Serbia–North Macedonia, remains in the discussion phase, as does a route via the Black Sea.

3.3. Diversification

The diversification process can be viewed in three dimensions:

1. Source of raw materials;
2. Logistics and transportation;
3. Refining, distribution processes, and reserve capacities (Lazarević, 2025).

1. Source of Raw Materials

In terms of raw material sources, certain alternatives have been considered, such as importing resources from Kazakhstan via tankers to the Croatian pipeline. Resources from the Middle East and North Africa are also being explored as potential alternatives. A change in the composition of raw materials would require technological adaptation at the Pančevo refinery, which can be considered one of the upcoming challenges. Long-term cooperation and securing raw materials could be ensured through contracts based on competitive conditions.

2. Logistics and Transportation

Pipeline imports are particularly effective for transporting large volumes, which places Serbia in a challenging position due to the limited number of operational pipelines on its

territory and the capacity of the Pančevo refinery in terms of supply infrastructure. Construction of new infrastructure represents a significant investment in terms of finances, regulations, coordination, and reserve capacities.

3. Refining, Distribution Processes, and Reserve Capacities

Import distribution of raw materials requires adequate refining capacity, product storage, and a distribution network to maintain security of reserves, especially during the winter period. Diversification represents a strategy to mitigate potential risks related to oil and petroleum product shortages, sudden price spikes, and reduced industrial activity, which in turn has direct consequences on political relations.

Experts argue that Serbia requires an energy transition, as its current vulnerability stems from the reliance of the energy system on fossil fuels. Serbia possesses significant developmental energy potential in terms of sustainable, local energy sources, which could positively impact the domestic industry.

4. Geopolitical Context

The Russia-Ukraine war has led to the introduction of a unilateral sanctions package against the Russian Federation by Western countries, including the United States, Australia, Japan, Canada, the United Kingdom, and the European Union. The sanctions package included restrictions in the financial sector (limitations on the Central Bank), exclusion of Russia from SWIFT international transactions, new rules on goods and services, and new regulations in strategic sectors (energy, aviation, and transport).

Sanctions serve two main purposes and function as an instrument of foreign policy. The first dimension relates to disrupting trade flows and weakening the Russian economy (GDP decline), while the second dimension is political, aiming to stop the war and support Ukraine. As a political tool, sanctions are intended to create pressure on the target state and encourage a change in behavior. The sanctions imposed on Russia do not only target the state itself but also its residents and third parties closely connected to the sanctioned country.

The United States possesses the most far-reaching authority in imposing sanctions and uses them as an instrument of foreign-trade relations. In December 2023, U.S. President Joseph Biden signed an executive order expanding OFAC's authority to impose sanctions on other financial institutions involved in transactions with Russia's military-industrial base (Szyszczak, 2025).

The consequences affected foreign financial institutions through the threat of secondary sanctions and imposed certain restrictions on the import of Russian products. Non-compliance with this order could result in the direct exclusion of a foreign financial institution from the global financial system, which is based on the U.S. dollar.

On the other hand, the European Union applied its common foreign and security policy as the basis for sanctions. Member states expressed different positions regarding the measures to be imposed on the Russian Federation due to their previous bilateral relations.

4.1. Geopolitical Position of Serbia

Strategies of small states facing great powers can be classified into two categories:

1. Bandwagoning strategy, which involves aligning with great powers to prevent security threats or forming alliances of smaller states to neutralize the power of a threatening great power;
2. Hedging strategy, which involves maintaining a neutral stance and developing ad hoc mutually beneficial relations to minimize confrontation with any great power.

Serbia applies a “hedging” strategy, balancing its relations with neighboring Western countries and with the Russian Federation, with which it shares historical, cultural, and political interests. Deviating from good relations with Russia could place the Republic of Serbia in a severe energy crisis. Serbia’s stance on sanctions imposed on Russia due to the war is a refusal to implement punitive measures, which further strengthens political allies regarding territorial independence and sovereignty. Although exposed to external pressures, this approach allows Serbia to protect national interests and develop regional relations while expecting the most favorable political outcome at the end of the war (Gajić, 2023).

5. Possible Future Development Scenarios

This section discusses potential development strategies to overcome the high-risk situation resulting from the imposition of sanctions on the Oil Industry of Serbia (NIS).

5.1. Partial Diversification and Adaptation

Serbia’s energy security depends on international relations and the economy, clearly affecting the country’s potential for sustainable development. Key domestic and international actors, such as Russia, China, and the European Union, along with factors like the green transition and geopolitical situation, play a significant role in energy stability. One possible scenario involves the process of diversification, aiming to maintain Serbia’s energy stability and mitigate potential risks associated with dependence on imported energy sources (Životić, 2025).

The current geopolitical situation indicates that Serbia strives to preserve energy stability. One potential solution includes gas interconnections with Bulgaria, North Macedonia, and Romania, which could reduce dependence on a single source. However, Serbia lags behind other countries in terms of diversification.

Obstacles to accelerating this process include limited financial resources, infrastructure challenges, and political difficulties. In addition to maintaining stability, diversification

could potentially influence price regulation and support the further development of the industrial sector.

5.2. Change in Ownership Structure

Another potential development scenario involves a change in the ownership structure of the Oil Industry of Serbia. One of the conditions set by the United States for lifting sanctions on NIS is the complete removal of Russian ownership from the company. In response, Belgrade and Moscow have initiated negotiations regarding potential solutions to meet the U.S. requirement. Two approaches are mentioned in literature and reports:

1. Transitioning the company from majority Russian ownership to full ownership by the Republic of Serbia;
2. Purchasing the Russian stake from the foreign investor (Velebit, Ivić, Jovanović, 2025).

Potential buyers reportedly include British company Shell, Hungarian company MOL, and some Arab countries. A key question debated by critics is whether nationalization can genuinely ensure NIS's success and guarantee the country's energy stability, or whether it could lead to failure.

Both scenarios provide a framework for considering possible development paths for Serbia's energy sector and NIS, but the final outcome depends on economic, political, and international factors.

6. Conclusion

This paper has described the current situation in the Republic of Serbia, the challenges the country faces, and the potential risks to the economy and population. To better understand the impact of sanctions on the economy, a comparison was made with the sanctions imposed on Yugoslavia between 1991 and 1996.

Sanctions have macroeconomic consequences for a country's economy, demonstrating the power of sanctions as a foreign policy tool employed by great powers. Given the current geopolitical positions of countries and international relations, it is evident that the sanctions on NIS are not primarily aimed at Serbia but result from the presence of Russian ownership in the company's structure.

Dependence on a single source of gas, oil, and petroleum products places Serbia in a vulnerable position, necessitating the development of alternative solutions. The diversification process described represents one way to ensure reserves and sufficient energy supplies, mitigating potential long-term risks.

Serbia's geopolitical strategy largely enables energy transition and diversification processes. However, due to limitations in financial capital, the complexity of infrastructure, and political challenges, diversification as a potential development strategy remains a topic of discussion. Similarly, changing the ownership structure, as a second potential strategy,

is also under debate, as this paper was written before the final outcome of the situation was known.

References

1. Gajić, A. (2023). Geopolitički Položaj Srbije Nakon Otpočinjanja Rata U Ukrajini: Neutralnost Strateško Odvratanje U Kriznom Kontekstu. *Srpska Politička Misao*, vol. 80, pp. 53-74, <https://doi.org/10.5937/spm80-44267>.
2. Anufrijević, A. & Mišić J. (2025). Geopolitičke implikacije energetske krize izazvane ratom u Ukrajini. Zbornik Univerziteta "Union - Nikola Tesla".
3. Lazarević, D. (8 Dec. 2025) Serbia's Gas Future: Supply Routes, Market Fragility, Pricing Exposure and the Transition toward a New Regional Gas Order | Serbia SEE Energy Mining News. *Serbia SEE Energy Mining News*, <https://serbia-energy.eu/serbias-gas-future-supply-routes-market-fragility-pricing-exposure-and-the-transition-toward-a-new-regional-gas-order/>.
4. Đurović, B. (8 Aug. 2023). Družba via Hungary – the Impact of the Construction of a New Oil Pipeline on Serbia's Energy Security - Beogradski Centar Za Bezbednosnu Politiku. *Beogradski Centar Za Bezbednosnu Politiku*, <https://bezbednost.org/en/publication/druzba-via-hungary-the-impact-of-the-construction-of-a-new-oil-pipeline-on-serbia-s-energy-security/>.
5. Velebit, V., Ivić, P., Jovanović A. (2025). Energy Resilience in the New Era: Serbia's Path to Diversification| My Framer Site. *Pupin.org*, <https://www.pupin.org/analysis/energy-resilience-in-the-new-era-serbia-s-path-to-diversification>.
6. Partners, JPM. (11 Sept. 2024). Oil & Gas Laws and Regulations in Serbia (2024). *CEE Legal Matters*, <https://ceelegalmatters.com/oil-gas-2024/oil-gas-serbia-2024>.
7. Peljto, S. (1 Dec. 2025). Utorak je dan d: kako bi eventualno gašenje rafinerije u Pančevu i petrohemije uticalo na srpsku privredu?" *Dnevni List Danas*, www.danas.rs/vesti/ekonomija/utorak-je-dan-d-kako-bi-eventualno-gasenje-rafinerije-u-pancevu-i-petrohemije-uticalo-na-srpsku-privredu/.
8. Zhyhal, I. (20 Nov. 2025). Sanctions against Serbia's Petroleum Industry Pose a Challenge for Vučić. *New Eastern Europe*, <https://neweasterneurope.eu/2025/11/20/sanctions-against-serbias-petroleum-industry-pose-a-challenge-for-vucic/>.
9. Naftna Industrija Srbije. (16 Aug. 2023). Akcije i vlasnička struktura - NIS Investitori." *NIS Investitori*, ir.nis.rs/sr/akcie-i-dividenda/akcie-i-vlasnicka-struktura/.
10. European Council. (2024). EU Sanctions against Russia. *Consilium*, www.consilium.europa.eu/en/policies/sanctions-against-russia/.
11. Tutić, A., & Derdemez, I. (2025). Pravni okvir ekonomskih sankcija UN protiv SFRJ (1991-1996): analiza dugoročnih posledica na privredni razvoj država naslednica 2. *Defendologija*, vol. 56, <https://doi.org/10.7251/DEFSR5625119T>.
12. Internation Institute for Middle East and Balkan Studies. (3 Dec. 2025). What Are the Consequences of the Shutdown of Oil Refineries in Serbia? – Serbian Monitor. *Serbian Monitor*, www.serbianmonitor.com/en/what-are-the-consequences-of-the-shutdown-of-oil-refineries-in-serbia/.

13. Szyszczak, E. (10 Feb.2025). Sanctions Effectiveness: What Lessons Three Years into the War on Ukraine? - Economics Observatory. *Economics Observatory*, www.economicsobservatory.com/sanctions-effectiveness-what-lessons-three-years-into-the-war-on-ukraine.
14. Đukić, P., & Slaviša Đukanović. (2023). Konfuzija u energetske tranziciji – svet i Srbija danas. *Energija, Ekonomija, Ekologija*, vol. XXV, no. 3, pp. 17–23, <https://doi.org/10.46793/eee22-3.17d>.
15. Životić, I. (2025). *Energetska bezbednost pod lupom Srbija i Zapadni Balkan. Energy security under the spotlight Serbia and the Western Balkans*. Centar za stratešku analizu.
16. “Statistički Godišnjak Jugoslavije 1993.” ISBN 86-7479-021-6, Savezni zavod za statistiku, 1994, publikacije.stat.gov.rs/G1993/Pdf/G19932004.pdf.
17. “Statistički Godišnjak Jugoslavije 1994.” Savezni zavod za statistiku, 1994, tom 41.
18. Lazarević, D. (25 Nov. 2025). Serbia’s Oil Market: Navigating Supply Diversification, Major Players, and What New Investors Need to Know - Doing Business in Serbia - Serbia Business Country Gateway, Companies Industry Sectors. *Doing Business in Serbia - Serbia Business Country Gateway, Companies Industry Sectors*, serbia-business.eu/serbias-oil-market-navigating-supply-diversification-major-players-and-what-new-investors-need-to-know/?utm_source=.

Sankcije protiv NIS-a i transformacija energetske sektora Srbije: izazovi i strateške mogućnosti

Andela Kostić

Apstrakt: Ovaj rad se fokusira na trenutnu situaciju u Republici Srbiji kao posledicu uvođenja sankcija protiv Naftne industrije Srbije (NIS). Od 10. januara 2025. godine uvedene sankcije su intenzivirale potencijalnu energetske krizu i posledice po privredu Republike Srbije. U ovom članku, korišćenjem metode deskriptivne analize, opisani su izazovi koji proizilaze iz aktuelnih geopolitičkih, ekonomskih i međunarodnih odnosa. Poseban akcenat stavljen je na posledice po snabdevanje energijom i funkcionisanje rafinerijskog sektora, uz poređenje sa sankcijama koje su bile uvedene Jugoslaviji u periodu od 1991. do 1996. godine. Članak razmatra mogućnosti diverzifikacije izvora i pravaca snabdevanja, kao i promene u vlasničkoj strukturi, kao potencijalne scenarije budućeg razvoja.

Ključne reči: Energetska kriza, energetska zavisnost Srbije, sankcije.

Instructions for the authors

Papers should be written and prepared as follows:

1. Manuscript should be prepared with 1.5 spacing, before and after spacing 0, font Times Roman in Latin script. Text size should be 12, text size for Abstract and keywords should be 11 in italic.
2. Manuscript length should be up to 10.000 words, including Abstract, tables, notes, appendixes, and references.
3. The text should be prepared, proofread, and technically edited.
4. The citation should be according to APA style:
 - a) In-text – (Marković, 2017. without stated page/s), or (Marković, 2017:53 with stated pages);
 - b) Reference list – Marković, D. (2017). Etička dimenzija ekonomske krize u svetu 2008-2009. *Ekonomski anali*. Beograd, Vol. 65. No. 3 (Journal article). For electronic issues doi number should be provided.
 - c) Marković, D. (2015). *Liberalni kapitalizam na izdisaju*. Novi Sad: Naučna knjiga. (monograph, book)
 - d) Pejsnović, R., Vujić, V. (2020) *Metodologija ekonomskih istraživanja*. Novi Sad: Akademska knjiga. (monograph or book with two or more authors).
5. Manuscripts are submitted through the submission [page](#).

Submitted manuscripts must be in English.

Structure of the paper

- Abstract
- Introduction
- Materials and Methods
- Discussion
- Limitations and scope for further research
- Conclusion

- References
- Appendix

Authors' Data

- Authors should state their names, affiliations, E-mails of all authors or only corresponding author and the ORCID number.
- This data won't be available to the prospective reviewers.

Main editorial policies

The journal *Economics, Entrepreneurship and Management Research (EEMR)* publishes original papers that have not been published previously: **scientific articles, review papers, research notes.**

Economics, Entrepreneurship and Management Research (EEMR) is an Open Access journal.

Contributions to the journal shall be submitted in English **language**, with summaries in English **and Serbian language.**

The Journal is issued **2** times a year.

Editorial Responsibilities

The Editor-in-Chief is responsible for deciding which articles submitted to *Economics, Entrepreneurship and Management Research (EEMR)* will be published. The Editor-in-Chief is guided by the Editorial Policy and constrained by legal requirements in force regarding libel, copyright infringement and plagiarism.

The Editorial Board reserves the right to decide not to publish submitted manuscripts in case it is found that they do not meet relevant standards concerning the content and formal aspects. The Editorial Staff will inform the authors whether the manuscript is accepted for publication within at most six months from the date of the manuscript submission.

Editor-in-Chief must hold no conflict of interest with regard to the articles they consider for publication. If an Editor feels that there is likely to be a perception of a conflict of interest in relation to their handling of a submission, the selection of reviewers and all decisions on the manuscript shall be made by the Editorial Board.

Editor-in-Chief shall evaluate manuscripts for their scientific content free from any racial, gender, sexual, religious, ethnic, or political bias.

The Editor and the Editorial Staff must not use unpublished materials disclosed in submitted manuscripts without the express written consent of the authors. The information

and ideas presented in submitted manuscripts shall be kept confidential and must not be used for personal gain.

Double-blind peer review process is implemented. Editors and the Editorial Staff shall take all reasonable measures to ensure that the reviewers remain anonymous to the authors before, during and after the evaluation process and the authors remain anonymous to reviewers until the end of the review procedure.

Authors' Responsibilities

Authors warrant that their manuscript is their original work, that it has not been published before and is not under consideration for publication elsewhere. Parallel submission of the same manuscript to another journal constitutes misconduct and eliminates the manuscript from consideration by *Economics, Entrepreneurship and Management Research (EEMR)*. Please note that posting of preprints on preprint servers or repositories is not considered prior publication. Authors should disclose details of preprint posting upon submission of the manuscript. This must include a link to the location of the preprint. Should the submission be published, the authors are expected to update the information associated with the preprint version on the preprint server/repository to show that a final version has been published in the journal, including the DOI linking directly to the publication.

If a manuscript has previously been submitted elsewhere, authors should provide information about the previous reviewing process and its outcome. This provides an opportunity for authors to detail how subsequent revisions have taken into account previous reviews, and why certain reviewer comments were not taken into account. Information about the author's previous reviewing experience is to the author's advantage: it often helps the editors select more appropriate reviewers.

In case a submitted manuscript is a result of a research project, or its previous version has been presented at a conference in the form of an oral presentation (under the same or similar title), detailed information about the project, the conference, etc. shall be provided in the Acknowledgements.

It is the responsibility of each author to ensure that manuscripts submitted to *Economics, Entrepreneurship and Management Research (EEMR)* are written with ethical standards in mind. Authors affirm that the manuscript contains no unfounded or unlawful statements and does not violate the rights of third parties. The Publisher will not be held legally responsible should there be any claims for compensation.

Reporting standards

Economics, Entrepreneurship and Management Research (EEMR) is committed to serving the research community by ensuring that all articles include enough information to allow others to reproduce the work. A submitted manuscript should contain sufficient detail and references to permit reviewers and, subsequently, readers to verify the claims presented in it - e.g. provide complete details of the methods used, including time frames, etc. Authors are required to review the standards available for many research applications from Equator Network and use those that are relevant for the reported research applications. The deliberate presentation of false claims is a violation of ethical standards.

Authors are exclusively responsible for the contents of their submissions and must make sure that they have permission from all involved parties to make the content public. Authors are also exclusively responsible for the contents of their data/supplementary files. Authors affirm that data protection regulations, ethical standards, third party copyright and other rights have been respected in the process of collecting, processing and sharing data.

Authors wishing to include figures, tables or other materials that have already been published elsewhere are required to obtain permission from the copyright holder(s). Any material received without such evidence will be assumed to originate from the authors.

Authorship

Authors must make sure that only contributors who have significantly contributed to the submission are listed as authors and, conversely, that all contributors who have significantly contributed to the submission are listed as authors. If persons other than authors were involved in important aspects of the research project and the preparation of

the manuscript, their contribution should be acknowledged in a footnote or the Acknowledgements section.

As a guide, authors should refer to the criteria for authorship that have been developed by the International Committee of Medical Journal Editors (ICMJE). In order to be named on the author list one must have:

- made substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
- contributed to the drafting the work, or revising it critically for important intellectual content; AND
- provided final approval of the version to be published; AND
- agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved; AND
- agreed to be named on the author list, and approved of the full author list.

Acknowledgment of sources

Authors are required to properly cite sources that have significantly influenced their research and their manuscript. Information received in a private conversation or correspondence with third parties, in reviewing project applications, manuscripts and similar materials, must not be used without the express written consent of the information source.

When citing or making claims based on data, authors should provide the reference to data in the same way as they cite publications.

Plagiarism

Plagiarism, where someone assumes another's ideas, words, or other creative expression as one's own, is a clear violation of scientific ethics. Plagiarism may also involve a violation of copyright law, punishable by legal action.

Plagiarism includes the following:

- Word for word, or almost word for word copying, or purposely paraphrasing portions of another author's work without clearly indicating the source or marking the copied fragment (for example, using quotation marks);
- Copying equations, figures or tables from someone else's paper without properly citing the source and/or without permission from the original author or the copyright holder.

Please note that all submissions are thoroughly checked for plagiarism.

Any manuscript that shows obvious signs of plagiarism will be automatically rejected and **no other submissions from the same author/s will be considered in the future.**

In case plagiarism is discovered in a paper that has already been published by the journal, it will be retracted in accordance with the procedure described below under Retraction policy, and authors will **not be able to submit other papers in the future.**

Conflict of interest

Authors should disclose in their manuscript any financial or other substantive conflict of interest that might have influenced the presented results or their interpretation. If there is no conflict of interest to declare, the following standard statement should be added: 'No competing interests were disclosed'.

A competing interest may be of non-financial or financial nature. Examples of competing interests include (but are not limited to):

- individuals receiving funding, salary or other forms of payment from an organization, or holding stocks or shares from a company, that might benefit (or lose) financially from the publication of the findings;
- individuals or their funding organization or employer holding (or applying for) related patents;
- official affiliations and memberships with interest groups relating to the content of the publication;
- political, religious, or ideological competing interests.

Authors from pharmaceutical companies, or other commercial organizations that sponsor clinical or field trials or other research studies, should declare these as competing interests on submission. The relationship of each author to such an organization should be explained in the ‘Competing interests’ section. Publications in the journal must not contain content advertising any commercial products.

Fundamental errors in published works

When an author discovers a significant error or inaccuracy in their own published work, it is the author’s obligation to promptly notify the journal Editor or publisher and cooperate with the Editor to retract or correct the paper.

By submitting a manuscript the authors agree to abide by the *Economics, Entrepreneurship and Management Research (EEMR)*’s Editorial Policies.

Reviewers’ Responsibilities

Reviewers are required to provide written, competent and unbiased feedback in a timely manner on the scholarly merits and the scientific value of the manuscript.

The reviewers assess manuscript for the compliance with the profile of the journal, the relevance of the investigated topic and applied methods, the originality and scientific relevance of information presented in the manuscript, the presentation style and scholarly apparatus.

Reviewers should alert the Editor to any well-founded suspicions or the knowledge of possible violations of ethical standards by the authors. Reviewers should recognize relevant published works that have not been cited by the authors and alert the Editor to substantial similarities between a reviewed manuscript and any manuscript published or under consideration for publication elsewhere, in the event they are aware of such. Reviewers should also alert the Editor to a parallel submission of the same manuscript to another journal, in the event they are aware of such.

Reviewers must not have conflict of interest with respect to the research, the authors and/or the funding sources for the research. If such conflicts exist, the reviewers must report them to the Editor without delay.

Any selected reviewer who feels unqualified to review the research reported in a manuscript or knows that its prompt review will be impossible should notify the Editor without delay.

Reviews must be conducted objectively. Personal criticism of the author is inappropriate. Reviewers should express their views clearly with supporting arguments.

Any manuscripts received for review must be treated as confidential documents. Reviewers must not use unpublished materials disclosed in submitted manuscripts without the express written consent of the authors. The information and ideas presented in submitted manuscripts shall be kept confidential and must not be used for personal gain.

Peer Review

The submitted manuscripts are subject to a peer review process. The purpose of peer review is to assist the Editor-in-Chief in making editorial decisions and through the editorial communication with the author it may also assist the author in improving the manuscript.

Double blind peer review will be implemented. The number of peer reviewers is two. The Journal is going to implement procedures to try to provide that the peer review procedure is completed in at most three months!

The choice of reviewers is at the discretion of the Editor-in-Chief or Section Editor. The reviewers must be knowledgeable about the subject area of the manuscript; they must not be from the authors' own institution and they should not have recent joint publications with any of the authors.

Describing the peer review process in greater detail:¹

All of the reviewers of a manuscript act independently and they are not aware of each other's identities. If the decisions of the two reviewers are not the same (accept/reject), the Editor-in-Chief or Section Editor may assign additional reviewers.

During the review process, the Editor-in-Chief or Section Editor may require authors to provide additional information (including raw data) if they are necessary for the evaluation of the scholarly merit of the manuscript. These materials shall be kept confidential and must not be used for personal gain.

The editorial team shall ensure reasonable quality control for the reviews. With respect to reviewers whose reviews are convincingly questioned by authors, special attention will be paid to ensure that the reviews are objective and high in academic standard. When there is any doubt with regard to the objectivity of the reviews or quality of the review, additional reviewers will be assigned.

Members of the editorial team/board/guest editors are permitted to submit their own papers to the Journal. In cases where an author is associated with the Journal, they will be removed from all editorial tasks for that paper and another member of the team will be assigned responsibility for overseeing peer review.

Post-Publication Discussions

Economics, Entrepreneurship and Management Research (EEMR) encourages post-publication debate either through letters to the editor, or on an external moderated site, such as [PubPeer](#).

¹In the main review phase, the Editor-in-Chief or Section Editor sends submitted manuscripts to the of reviewers - experts in the field. The reviewers' evaluation form contains a checklist in order to help reviewers cover all aspects that can decide the fate of a submission. In the final section of the evaluation form, the reviewers must include observations and suggestions aimed at improving the submitted manuscript; these are sent to authors, without the names of the reviewers. **Double-blind peer review:** All of the reviewers of a manuscript remain anonymous to the authors before, during and after the evaluation process and the authors remain anonymous to reviewers until the end of the review procedure.

Use of Large Language Models and generative Artificial Intelligence (AI) tools

Economics, Entrepreneurship and Management Research (EEMR) conforms to the [World Association of Medical Editors \(WAME\) recommendations on chat bots, ChatGPT and scholarly manuscripts](#) and the [Committee on Publication Ethics \(COPE\)'s position statement on Authorship and AI tools](#).

AI bots such as ChatGPT cannot be listed as authors on your submission.

Authors must clearly indicate the use of tools based on large language models and generative AI in the manuscript (which tool was used and for what purpose), preferably in the methods or acknowledgements sections.

Authors are responsible for the accuracy, validity, and appropriateness of any content generated by tools based on large language models and generative AI and they must ensure that the cited references are correct and that the submission is free from plagiarism.

Editors and Reviewers must ensure the confidentiality of the peer review process. Editors must not share information about submitted manuscripts or peer review reports with any tools based on large language models and generative AI. Reviewers must not use any tools based on large language models and generative AI to generate review reports.

Procedures for dealing with complaints and appeals

Anyone may inform the editors and/or Editorial Staff at any time of suspected unethical behavior or any type of misconduct by giving the necessary information/evidence to start an investigation.

Investigation

Editor-in-Chief will consult with the Section Editors or Editorial Board on decisions regarding the initiation of an investigation.

During an investigation, any evidence should be treated as strictly confidential and only made available to those strictly involved in investigating.

The respondent will always be given the chance to respond to any charges made against them.

If it is judged at the end of the investigation that misconduct has occurred, then it will be classified as either minor or serious.

Minor Misconduct

Minor misconduct will be dealt directly with those involved without involving any other parties, e.g.:

- Communicating to authors/reviewers whenever a minor issue involving misunderstanding or misapplication of academic standards has occurred.
- A warning letter to an author or reviewer regarding fairly minor misconduct.

Major Misconduct

The Editor-in-Chief, in consultation with the Section Editors or Editorial Board, and, when appropriate, further consultation with a small group of experts should make any decision regarding the course of action to be taken using the evidence available. The possible outcomes are as follows (these can be used separately or jointly):

- Publication of a formal announcement or editorial describing the misconduct.
- Informing the author's (or reviewer's) head of department or employer of any misconduct by means of a formal letter.
- The formal, announced retraction of publications from the journal in accordance with the Retraction Policy (see below).
- A ban on submissions from an individual for a defined period.
- Referring a case to a professional organization or legal authority for further investigation and action.

When dealing with complaints and appeals, the editorial team will rely on the guidelines and recommendations provided by the Committee on Publication Ethics (COPE): <https://publicationethics.org/guidance/Flowcharts>.

Retraction Policy

The infringement of the legal limitations of the publisher, copyright holder or author(s), the violation of professional ethical codes and research misconduct, such as multiple submissions, duplicate or overlapping publication, bogus claims of authorship, plagiarism, fraudulent use of data and data fabrication, undisclosed use of tools based on large language models and generative AI, honest errors reported by the authors (for example, errors due to the mixing up of samples or use of a scientific tool or equipment that is found subsequently to be faulty), unethical research or any major misconduct require retraction of an article. Occasionally a retraction can be used to correct errors in submission or publication.

For any retracted article, the reason for retraction and who is instigating the retraction will be clearly stated in the Retraction notice. Standards for dealing with retractions have been developed by a number of library and scholarly bodies, and this practice has been adopted for article retraction by *Economics, Entrepreneurship and Management Research (EEMR)*: in the electronic version of the retraction note, a link is made to the original article. In the electronic version of the original article, a link is made to the retraction note where it is clearly stated that the article has been retracted. The original article is retained unchanged, save for a watermark on the PDF indicating on each page that it is “retracted.”

Research data policy

Journal encourages authors to share research data that are required for confirming the results published in the manuscript and/or enhance the published manuscript under the principle ‘as open as possible, as closed as necessary. We accept supporting software applications, high-resolution images, background datasets, sound or video clips, large appendices, data tables and other relevant items that cannot be included in the article.

Exceptions: We recognize that openly sharing data may not always be feasible. Exceptions to open access to research data underlying publications include the following: obligation to protect results, confidentiality obligations, security obligations, the obligation

to protect personal data and other legitimate constraints. Where open access is not provided to the data needed to validate the conclusions of a publication that reports original results, authors should provide the relevant access needed to validate the conclusions to the extent their legitimate interests or constraints are safeguarded.

Ethical and security considerations

If data access is restricted for ethical or security reasons, the manuscript must include:

- a description of the restrictions on the data;
- what, if anything, the relevant Institutional Review Board (IRB) or equivalent said about the data sharing; and
- all necessary information required for a reader or reviewer to apply for access to the data and the conditions under which access will be granted.

Data protection issues

Where human data cannot be effectively de-identified, data must not be shared in order to protect participant privacy unless the individuals have given explicit written consent that their identifiable data can be made publicly available.

In instances where the data cannot be made available, the manuscript must include:

- an explanation of the data protection concern;
- any intermediary data that can be de-identified without compromising anonymity;
- what, if anything, the relevant Institutional Review Board (IRB) or equivalent said about data sharing; and
- where applicable, all necessary information required for a reader or peer reviewer to apply for access to the data and the conditions under which access will be granted.

In addition, data should be linked to from a Data Accessibility Statement within the submitted paper, which will be made public upon publication. If data is not being made

available within the journal publication, a statement from the author should be provided to explain why. When depositing data for a submission, the below should be considered:

- The repository the data is deposited in must be suitable for this subject and have a sustainability model.
- The data must be deposited under an open license that permits unrestricted access (e.g., CC0, CC-BY). More restrictive licenses should only be used if a valid reason (e.g., legal) is present.
- The deposited data must include a version that is in an open, non-proprietary format.
- The deposited data must have been labeled in such a way that a 3rd party can make sense of it (e.g., sensible column headers, descriptions in a readme text file).

Research involving human subjects, human material, or human data, must have been performed in accordance with the [Declaration of Helsinki](#). Where applicable, the studies must have been approved by an appropriate Ethics Committee. The identity of the research subject should be anonymized whenever possible. For research involving human subjects, informed consent to participate in the study must be obtained from participants (or their legal guardian).

A 'Data Accessibility Statement' should be added to the submission, prior to the reference list, providing the details of the data accessibility, including the DOI linking to it. If the data is restricted in any way, the reasoning should be given.

Open Access policy

Economics, Entrepreneurship and Management Research (EEMR) is an Open Access journal. All its content is available free of charge. Users can read, download, copy, distribute, print, search the full text of articles, as well as to establish HTML links to them, without having to seek the consent of the author or publisher.

The journal does not charge any fees at submission, reviewing, and production stages.

Self-archiving policy

Authors can deposit author's preprint, author's postprint (accepted version) and publisher's version (PDF) of their work in an institutional repository, subject-based and general-purpose repository, author's personal website (including social networking sites, such as ResearchGate, Academia.edu, etc.), and/or departmental website at any time after the acceptance of the manuscript and at any time after publication.

Full bibliographic information (authors, article title, journal title, volume, issue, pages) about the original publication must be provided and links must be made to the article's DOI and the license.

Copyright and licensing

Authors retain copyright of the published papers and grant to the publisher the non-exclusive right to publish the article, to be cited as its original publisher in case of reuse, and to distribute it in all forms and media. Articles will be distributed under the Creative Commons [Attribution 4.0 International \(CC BY 4.0\)](#) licence.

Authors can enter the separate, additional contractual arrangements for non-exclusive distribution of the published paper (e.g., post it to an institutional repository or publish it in a book), with an acknowledgement of its initial publication in this journal.

Metadata policy

The journal metadata are freely accessible to all, and freely reusable by all, under the terms of the Creative Commons [Universal \(CC0 1.0\) Public Domain Dedication license](#).

Disclaimer

The views expressed in the published works do not express the views of the Editors and Editorial Staff. The authors take legal and moral responsibility for the ideas expressed in the articles. The publisher shall have no liability in the event of issuance of any claims for damages. The Publisher will not be held legally responsible should there be any claims for compensation.

The list of reviewers

1. Prof. Dr. Srđan Tomić, School of Engineering Management, “University Union – Nikola Tesla”, Belgrade, Serbia;
2. Prof. Dr. Brankica Pažun, The Academy Of Applied Studies Polytechnic, Belgrade, Serbia;
3. Prof. Dr. Duško Tomić, American University in the Emirates, Dubai, United Arab Emirates;
4. Prof. Dr. Stanko Bulajić, School of Engineering Management, “University Union – Nikola Tesla”, Belgrade, Serbia;
5. Prof. Dr. Ana Anufrijević, Faculty of Economics, “University Union – Nikola Tesla”, Belgrade, Serbia;
6. Prof. Dr. Slobodan Živković, School of Engineering Management, “University Union – Nikola Tesla”, Belgrade, Serbia;
7. Prof. Dr. Eldar Šaljić, American University in the Emirates, Dubai, United Arab Emirates;
8. Prof. Dr. Nevena Krasulja, “University Union – Nikola Tesla”. Belgrade, Serbia;
9. Prof. Dr. Marija Najdić, The College of Tourism, Academy of Applied studies Belgrade, Serbia;
10. Prof. Dr. Damir Ilić, School of Engineering Management, “University Union – Nikola Tesla”, Belgrade, Serbia.