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ARTIFICIAL INTELLIGENCE AS A DRIVER OF INNOVATION IN MODERN FINANCIAL SYSTEMS

Marijana Joksimović[1], Sanel Mehmedi[2], Dragana Trifunović[3]

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Abstract

Artificial intelligence (AI) has become an important driver of innovation and digital transformation in modern financial systems. This study empirically examines patterns of AI adoption across key banking functions and geographical regions using descriptive and comparative analysis of secondary quantitative data obtained from recent industry reports and market analyses. The findings indicate that AI adoption is highest in fraud detection (60–65%) and risk management (approximately 60%), while adoption in credit scoring remains comparatively lower (45–50%). The regional analysis reveals substantial disparities, with North America recording the highest adoption rate (65%) and Africa and the Middle East the lowest (40%). The results also highlight increasing investment and market growth, confirming the strategic importance of AI for financial innovation. The study contributes to understanding current patterns of AI-driven transformation while emphasizing the need for responsible implementation, regulatory adaptation, data protection, and transparent AI governance.

Key words: *artificial intelligence, financial systems, AI adoption, digital innovation, risk management*

JEL: O33, G21, C45

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Introduction

The accelerated development of digital technologies has fundamentally transformed modern economic and financial systems (Savić, 2025). Recent studies confirm that the integration of AI in financial services, including credit scoring, fraud detection, and risk management represents one of the most significant evolutions in financial research and practice (Vuković et al., 2025). Within this transformation, artificial intelligence (AI) has emerged as a crucial factor driving innovation and reshaping traditional financial practices. The increasing availability of large volumes of data, combined with advanced computational capabilities, has enabled the application of AI-based solutions across various segments of the financial sector (Ionescu & Diaconita, 2023).

Modern financial systems operate in an environment characterized by high uncertainty, complexity, and rapid change. In such conditions, artificial intelligence provides powerful tools for data processing, pattern recognition, and predictive analysis, allowing financial institutions to improve efficiency, accuracy, and responsiveness. AI technologies are increasingly used in areas such as credit scoring, risk assessment, fraud detection, algorithmic trading, and personalized financial services, contributing to more informed and timely decision-making (Oko-Odion, 2025).

Despite the significant benefits, the integration of artificial intelligence into financial systems also raises a number of challenges. Issues related to data privacy, cybersecurity, transparency of algorithms, and ethical considerations have become central topics in both academic and policy debates (Chevuri, 2025). Moreover, the rapid adoption of AI requires the development of appropriate regulatory frameworks and institutional capacities to ensure its responsible and sustainable use.

The aim of this paper is to empirically examine the patterns of artificial intelligence adoption in modern financial systems, with particular emphasis on its application in risk management, fraud detection, and credit scoring. The study also analyzes regional differences in AI adoption and recent investment and market trends in order to assess the role of artificial intelligence as a driver of innovation in the financial sector.

Accordingly, the study addresses the following research questions:

RQ1: What are the dominant patterns of AI adoption across key financial functions, particularly risk management, fraud detection, and credit scoring?

RQ2: What regional differences characterize the adoption of artificial intelligence in the banking sector?

Literature review

The role of artificial intelligence in modern financial systems has been extensively discussed in contemporary academic and professional literature. Early studies on digital transformation in finance emphasize the importance of information and communication technologies in improving the efficiency and competitiveness of financial institutions (Tebenko et al., 2024; Rashwan & Kassem, 2021; Dašić et al., 2024). With the advancement of machine learning and data analytics, recent research has increasingly focused on artificial intelligence as a key enabler of innovation in the financial sector (Gojković et al., 2025; Bučalina Matić et al., 2025).

Numerous authors highlight the application of AI in financial decision-making processes, particularly in credit scoring, risk management, and financial forecasting. According to several studies, machine learning models outperform traditional statistical methods in predicting credit risk and identifying complex patterns in large datasets (Bello, 2023). Recent systematic reviews further confirm that machine learning techniques significantly improve predictive performance in financial credit scoring and enhance model robustness compared to traditional approaches (Ayari et al., 2026). These findings suggest that artificial intelligence contributes to more accurate assessments and reduces information asymmetry in financial markets.

A significant body of literature also addresses the use of artificial intelligence in fraud detection and cybersecurity. Research indicates that AI-based systems are capable of real-time monitoring and detection of anomalous transactions, thereby enhancing the resilience and security of financial systems. In addition, the growing adoption of AI-powered algorithms in algorithmic trading and portfolio management has been analyzed as a factor influencing market efficiency and volatility (Olanrewaju, 2025).

Beyond technical and economic benefits, recent studies increasingly examine the ethical, legal, and regulatory implications of artificial intelligence in finance. Issues such as data privacy, algorithmic bias, transparency, and accountability are frequently discussed as major challenges accompanying the widespread implementation of AI technologies (Rustandi & Arifin, 2024). Scholars emphasize the need for appropriate regulatory frameworks and governance mechanisms to ensure trust and sustainability in AI-driven financial systems.

Overall, the existing literature confirms that artificial intelligence plays a transformative role in modern financial systems by fostering innovation and improving performance (Sargiotis, 2024). Recent systematic reviews further confirm the accelerating integration of artificial intelligence across financial services, highlighting its growing impact on risk management, fraud detection, and digital transformation processes in banking institutions (Limajatini et al., 2025). However, it also points to the necessity of balancing technological advancement with ethical standards and regulatory oversight, particularly in the context of the evolving information society.

Methodology

The research is based on an empirical, descriptive, and comparative analysis of secondary quantitative data on the adoption of artificial intelligence in the financial sector. The analysis focuses on three key areas of AI application in banking—risk management, fraud detection, and credit scoring—as well as on investment trends, market growth projections, and regional differences in AI adoption.

Secondary data were obtained from recent industry reports and market analyses covering AI applications in financial institutions. The selected indicators include the share of banks using AI in key financial functions, the level of investment in AI technologies, projected market values, and regional AI adoption rates.

Descriptive analysis was used to identify the main patterns of AI adoption, while comparative analysis was applied to examine differences between financial functions and geographical regions. The analysis provides the empirical basis for answering the research questions and assessing the role of AI as a driver of innovation in modern financial systems.

In addition to the quantitative indicators, the results are interpreted in relation to recent academic literature on AI-driven financial innovation, risk management, digital transformation, and regulatory challenges.

Data

The data used in this study were obtained from recent industry reports and market analyses, providing an overview of artificial intelligence (AI) adoption and its economic impact in the financial sector. The dataset focuses on several key dimensions of AI implementation, including its use in risk management, fraud detection, and credit scoring, as well as financial investments and market growth projections for AI and FinTech solutions.

Regarding AI adoption in operational processes, approximately 60 percent of financial institutions utilize AI to improve risk management, enabling predictive analytics, automated monitoring, and faster decision-making. In fraud detection, around 60–65 percent of banks employ AI models and real-time analytics to reduce false positives and enhance transaction monitoring. For credit scoring, AI integration in about 45–50 percent of banks allows for more objective, data-driven assessments of borrowers, improving efficiency while minimizing human bias.

In terms of financial investments, the sector has allocated significant resources toward AI development, with total investments reaching approximately USD 22.6 billion in 2023. Market projections indicate substantial growth, with the global AI in finance market expected to reach USD 99 billion by 2030, and the broader AI FinTech market projected to expand to around USD 60.63 billion by 2033. These figures reflect the strategic significance of AI for modern financial institutions and its potential to reshape the financial ecosystem.

The effectiveness of AI models in banking processes can be evaluated using Accuracy, which measures the proportion of correctly classified cases relative to the total number of observed cases:

$$\text{Accuracy}=(TP+TN)/(TP+TN+FP+FN)$$

Accuracy is calculated as a proportion and multiplied by 100 to obtain the percentage value.

Where:

- TP (True Positives) – the number of correctly identified positive cases (e.g., actual fraud detected by AI)
- TN (True Negatives) – the number of correctly classified negative cases (e.g., legitimate transactions identified as safe by AI)
- FP (False Positives) – the number of incorrectly classified positive cases (e.g., legitimate transactions mistakenly flagged as fraud)
- FN (False Negatives) – the number of incorrectly classified negative cases (e.g., actual fraud not detected by AI)

Accuracy represents an important performance measure for evaluating AI-based classification models in financial applications, particularly in fraud detection and risk assessment. However, the percentages presented in this study refer to AI adoption rates among financial institutions rather than to the predictive accuracy of individual AI models. The Accuracy formula is therefore presented as a methodological framework for understanding how the performance of AI-based classification systems can be evaluated in financial applications.

The dataset also includes a regional perspective on AI adoption, highlighting that AI technologies are most widely adopted in North America and Europe, moderately adopted in Asia-Pacific, and at earlier stages in Latin America and Africa & the Middle East. This regional data allows for the assessment of geographical disparities in technology adoption, which is critical for understanding opportunities for investment, regulatory support, and capacity-building initiatives.

The data were obtained from recent industry reports and market analyses (ElectroIQ, 2025; CoinLaw, 2025a; CoinLaw, 2025b; AIFreaksHQ, 2025). These sources provide quantitative indicators of AI adoption, investment trends, market projections, and regional differences in the financial sector. The selected data form the basis for the descriptive and comparative analysis conducted in this study and support the assessment of current patterns of AI-driven transformation in modern financial systems.

Results of the Research

The adoption of artificial intelligence (AI) in the financial sector is accelerating rapidly, impacting core banking functions and the broader FinTech market.

The economic value of AI investments can be expressed using the Return on Investment (ROI) formula:

$$ROI = \frac{Gains\ from\ AI\ Implementatiton\ -\ Cost\ of\ AI\ Implementation}{Cost\ of\ AI\ Implementation} X100$$

- ROI (%) – *Return on Investment*, expressed as a percentage. It measures the economic benefit obtained from implementing AI relative to the cost of the investment.
- Gains from AI Implementation – the total financial benefits, savings, or additional revenue generated by applying AI technologies in financial processes. For example, improved fraud detection, reduced credit losses, or efficiency gains in operations.
- Cost of AI Implementation – the total expenses required to develop, acquire, and integrate AI solutions, including software, hardware, training, and maintenance.
- Subtraction (Gains − Cost) – represents the net profit or net benefit generated from the AI investment.
- Division by Cost of AI Implementation – calculates the return relative to the initial investment.
- Multiplication by 100 – converts the ratio into a percentage, showing how much return is gained for each unit of investment.

In the context of AI adoption in the financial sector, the ROI framework provides a useful analytical basis for evaluating the potential economic efficiency of investments in AI technologies. Although the available aggregate market data do not allow for a direct calculation of ROI at the institutional level, the substantial investment volume of approximately USD 22.6 billion in 2023, together with projected market growth, indicates the increasing economic relevance of AI implementation. The ROI framework is therefore used in this study as a conceptual indicator for interpreting the relationship between AI investment, potential efficiency gains, and long-term economic benefits.

Table 1 summarizes the key metrics on AI usage, investment levels, and market projections in the financial industry based on recent industry reports and market analyses.

Table 1. AI Adoption and market data in the financial sector

Category	**Percentage / Value**
Banks using AI for risk management	60 %
Banks using AI for fraud detection	60–65 %
Banks using AI for credit scoring	45–50 %
AI investments in the financial sector (2023)	USD 22.6 billion
Projected global AI in finance market by 2030	USD 99 billion
Projected global AI FinTech market by 2033	USD 60.63 billion

Note: Percentages represent current industry adoption rates reported in the selected market sources, while investment values and market projections are drawn from global financial market analyses.

Source: Based on industry reports (ElectroIQ, 2025; CoinLaw, 2025a; CoinLaw, 2025b; AIFreaksHQ, 2025)

The data show that AI is becoming a central tool for improving efficiency and decision-making in financial institutions. Around 60% of banks employ AI in risk management, enabling predictive analytics and better assessment of operational and financial risks. Similarly, AI has proven valuable in fraud detection, with approximately 60–65% of banks adopting machine learning and real-time data analytics to detect fraudulent activities and reduce false positives.

In the credit scoring domain, about 45–50% of banks use AI models to improve accuracy, reduce bias, and enhance decision speed. These adoption rates indicate that AI is not limited to experimental or pilot projects; it has become integral to core financial operations.

Investment trends also highlight the strategic importance of AI: in 2023, financial institutions invested roughly USD 22.6 billion in AI technologies. The market for AI in finance is expected to grow to USD 99 billion by 2030, and the broader AI FinTech market is projected to reach USD 60.63 billion by 2033. These figures demonstrate the long-term economic potential of AI in both traditional banking and emerging FinTech sectors.

A comparative analysis of the adoption rates reveals differences in the intensity of AI implementation across financial functions. AI adoption is highest in fraud detection (60–65%) and risk management (approximately 60%), while credit scoring records a comparatively lower adoption rate of 45–50%. The difference between the highest and lowest observed adoption rates therefore ranges from approximately 10 to 20 percentage points. These findings suggest that financial institutions currently prioritize AI applications related to transaction security and risk control over its application in credit assessment.

Overall, these results suggest that AI is a major driver of innovation in modern financial systems, enabling enhanced operational efficiency, better risk management, and improved financial decision-making. The combination of high adoption rates and significant investments indicates that AI will continue to reshape the financial industry over the next decade.

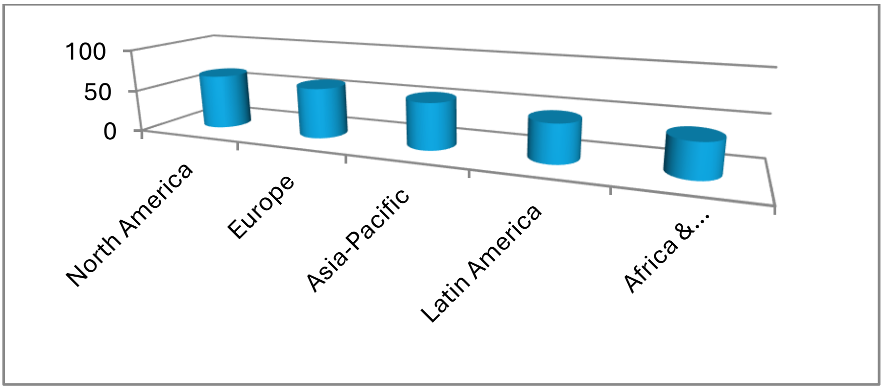
Table 2. Regional adoption of AI

Region	AI Adoption in Banks (approx.)
North America	65 %
Europe	60 %
Asia-Pacific	55 %
Latin America	45 %
Africa & Middle East	40 %

Source: Based on industry reports (ElectroIQ, 2025; CoinLaw, 2025a; CoinLaw, 2025b; AIFreaksHQ, 2025).

Table 2 and Chart 1 illustrate the regional distribution of artificial intelligence (AI) adoption in banks across the world. The data show that AI integration is most prevalent in North America and Europe, where a majority of financial institutions have incorporated AI into key processes such as risk management, fraud detection, and credit scoring.

Graph 1. Regional Adoption of AI



Source: Based on industry reports (ElectroIQ, 2025; CoinLaw, 2025a; CoinLaw, 2025b; AIFreaksHQ, 2025).

In the Asia-Pacific region, AI adoption is slightly lower, reflecting emerging implementation trends, while Latin America and Africa & the Middle East exhibit more moderate adoption rates, suggesting that these regions are still in earlier stages of AI integration.

The comparative analysis reveals a 25-percentage-point gap between North America, which records the highest observed AI adoption rate (65%), and Africa & the Middle East, which records the lowest rate (40%). The difference between North America and Europe is relatively small at 5 percentage points, while the gap between Europe and Latin America reaches 15 percentage points. These results indicate substantial geographical disparities in the diffusion of AI technologies across banking systems and suggest that AI adoption remains uneven across regions.

Overall, the table and chart highlight significant regional variations in AI utilization, providing a global perspective on how different markets are approaching the digital transformation of financial systems. These insights can help identify opportunities for growth and investment in regions with lower adoption rates and underscore the strategic importance of AI in modern banking worldwide**.**

Discussion

The findings from Table 1 clearly indicate that artificial intelligence (AI) is becoming a transformative force in the financial sector. The widespread adoption of AI in risk management, fraud detection, and credit scoring reflects a growing recognition among banks and financial institutions of its ability to improve operational efficiency, accuracy, and decision-making quality.

The use of AI in risk management (~60% adoption) enables financial institutions to predict potential risks, automate monitoring, and respond more quickly to market changes (Leo et al., 2019). This aligns with global trends showing that AI enhances the robustness of risk assessment frameworks, helping institutions mitigate both operational and financial exposure.

Similarly, AI's role in fraud detection (~60–65% adoption) demonstrates its effectiveness in real-time anomaly detection and predictive modeling (West & Bhattacharya, 2016). Financial institutions leveraging AI for fraud prevention report reduced false positives and faster identification of suspicious transactions, which not only minimizes losses but also improves customer trust and satisfaction.

In credit scoring, AI models (~45–50% adoption) provide more objective and data-driven evaluations of borrowers, reducing human bias and increasing the efficiency of lending decisions (Bussmann et al., 2021). This highlights AI's potential to promote financial inclusion, as automated models can consider alternative data sources that traditional scoring methods might overlook.

Investment and market projections underscore the economic importance of AI in finance. With AI investments totaling around USD 22.6 billion in 2023 and the global AI in finance market expected to reach USD 99 billion by 2030, it is evident that financial institutions view AI as a strategic priority rather than a supplementary technology. The projected growth of the AI FinTech market to USD 60.63 billion by 2033 further emphasizes the expansion of AI-driven innovations beyond traditional banking, opening new opportunities for digital financial services, personalized products, and fintech startups.

Regional differences, as illustrated in Table 2 and Chart 1, provide additional insights into the global landscape of AI adoption. North America and Europe show the highest levels of AI integration, with approximately 65% and 60% of banks implementing AI technologies, respectively. This reflects well-established digital infrastructures, regulatory support, and higher availability of AI expertise. The Asia-Pacific region shows moderate adoption (~55%), while Latin America (~45%) and Africa & the Middle East (~40%) are still in earlier stages of AI integration. These regional disparities highlight opportunities for growth and targeted investment in areas where AI adoption is lower, as well as the need for capacity-building initiatives and regulatory frameworks tailored to local market conditions.

These trends collectively suggest that AI is not merely a technological tool but a key driver of innovation and competitive advantage in modern financial systems. However, it is important to note that challenges remain, including data privacy concerns, regulatory compliance, and the need for explainable AI models to ensure transparency and accountability. Future research could explore the impact of regulatory frameworks on AI adoption, as well as the long-term economic effects of AI integration in both traditional and emerging financial markets.

The findings provide clear answers to the research questions formulated in this study. Regarding RQ1, the comparative analysis shows that AI adoption is most pronounced in fraud detection and risk management, with adoption rates of approximately 60–65% and 60%, respectively, while its application in credit scoring remains comparatively lower at 45–50%. This pattern indicates that financial institutions currently prioritize AI applications related to transaction security and risk control. Regarding RQ2, the results reveal substantial regional differences in AI adoption. North America and Europe record the highest adoption rates, while Latin America and Africa & the Middle East show considerably lower levels of AI integration. The observed 25-percentage-point gap between the highest and lowest regional adoption rates confirms that the diffusion of AI technologies across banking systems remains geographically uneven.

The findings confirm that AI adoption in finance is extensive and strategically significant, particularly in risk management, fraud detection, and credit evaluation. Regional differences indicate varying levels of adoption and demonstrate that the integration of AI technologies remains uneven across global financial markets, while their growing application reinforces the strategic importance of AI for innovation and competitiveness.

Conclusion

The analysis of secondary quantitative data, including both global adoption patterns (Table 1) and regional distribution (Table 2 and Chart 1), shows that AI is widely used in risk management, fraud detection, and credit scoring, with adoption rates ranging from approximately 45% to 65%. These applications enhance operational efficiency, decision-making accuracy, and customer trust, while mitigating risks and reducing human bias in critical financial processes.

Regional analysis reveals that North America and Europe lead in AI adoption, reflecting mature digital infrastructures, regulatory support, and access to AI expertise. The Asia-Pacific region shows moderate adoption, while Latin America and Africa & the Middle East are still in earlier stages of integration. These regional differences highlight opportunities for targeted investment, capacity-building, and regulatory guidance to accelerate AI adoption in underrepresented markets.

The financial sector has made substantial investments in AI, with around USD 22.6 billion invested in 2023, signaling strong commitment to digital transformation. Market projections indicate continued growth, with the global AI in finance market expected to reach USD 99 billion by 2030 and the broader AI FinTech market projected to reach USD 60.63 billion by 2033**,** emphasizing both the economic potential and strategic importance of AI technologies.

While AI offers significant advantages, challenges such as data privacy, regulatory compliance, and explainability of AI models remain critical considerations. Addressing these challenges is essential to ensure responsible and sustainable deployment of AI in finance.

The contribution of this study lies in the comparative analysis of recent secondary quantitative data on AI adoption across key financial functions and geographical regions. By integrating functional, investment, market, and regional indicators within a unified analytical framework, the study provides a structured perspective on current patterns of AI-driven transformation in modern financial systems. The findings contribute to a better understanding of differences in the intensity and geographical distribution of AI adoption in the financial sector.

The study is subject to certain limitations. The analysis relies on secondary data obtained from different industry and market sources, which may apply different methodologies, samples, and reporting periods. Therefore, the findings should primarily be interpreted as indicators of current AI adoption patterns rather than as evidence of causal relationships. Future research could extend the analysis by using longitudinal datasets, institution-level data, and additional quantitative methods to examine the determinants and economic effects of AI adoption in financial institutions.

AI integration in the financial sector is transformative**,** reshaping risk management, fraud detection, credit evaluation, and financial services. This study confirms that AI is a key driver of innovation and competitive advantage, with growing importance in the future development of global financial systems.

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VEŠTAČKA INTELIGENCIJA KAO POKRETAČ INOVACIJA U MODERNIM FINANSIJSKIM SISTEMIMA

Apstrakt

Veštačka inteligencija (AI) postala je značajan pokretač inovacija i digitalne transformacije savremenih finansijskih sistema. Cilj ovog rada je empirijsko ispitivanje obrazaca primene veštačke inteligencije u ključnim bankarskim funkcijama i različitim geografskim regionima, primenom deskriptivne i komparativne analize sekundarnih kvantitativnih podataka iz savremenih industrijskih izveštaja i tržišnih analiza. Rezultati pokazuju da je primena AI najzastupljenija u otkrivanju prevara (60–65%) i upravljanju rizikom (oko 60%), dok je u kreditnom skoringu relativno niža (45–50%). Regionalna analiza ukazuje na značajne razlike, pri čemu Severna Amerika beleži najvišu stopu primene (65%), a Afrika i Bliski istok najnižu (40%). Rezultati takođe ukazuju na rast investicija i tržišta, potvrđujući strateški značaj AI za finansijske inovacije. Rad doprinosi razumevanju savremenih obrazaca transformacije finansijskih sistema zasnovane na AI, uz naglašavanje potrebe za odgovornom primenom, regulatornim prilagođavanjem, zaštitom podataka i transparentnim upravljanjem AI.

Ključne reči: *veštačka inteligencija, finansijski sistemi, primena veštačke inteligencije, digitalne inovacije, upravljanje rizikom*

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STRUCTURAL TRANSFORMATION AND DEVELOPMENT TRENDS OF THE LIFE INSURANCE MARKET IN SERBIA

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Abstract

This paper analyzes the role and importance of life insurance in modern economic conditions, with special reference to the market of the Republic of Serbia in the period 2019-2024. The research focuses on different forms of life insurance, including classic life insurance, life annuity, supplementary life insurance and unit-linked life insurance, with an overview of their functional and structural characteristics. Empirical analysis indicates a stable growth of the overall market, manifested through a continuous increase in the number of policies and total premiums, with a simultaneous increase in the value of calculated claims. At the same time, divergent tendencies among individual segments were identified, whereby classic and supplementary models recorded moderate development, life annuity stagnated, while investment-oriented products achieved extremely dynamic growth. Life insurance is affirmed as a complex financial instrument with a significant protection, accumulation and investment function, with the need to improve risk management and the regulatory framework.

Keywords: *life insurance, life annuity, supplementary life insurance, unit-linked life insurance*

JEL: *G2, G22, G52*

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Introduction

Modern life insurance has an increasingly important role in ensuring the financial security of individuals and their families. The changes that characterizes the modern society, such as unstable economic conditions, extended lifespan and the rising living costs, emphasize the problem of the long-term financial protection (Adelmann et al., 2021). In this regard, life insurance emerges as one of the key solutions that can mitigate the consequences of unexpected or undesirable situations (Bhatia et al., 2021).

One of the most important function of life insurance is the protection of the family due to the death of the insured pearson and consequent financial pressure growth (Dobrilović, 2020). In these situations, payment of the sum insured have a crucial role because it enables the coverage of basic living expenses, the continuation of children's education and the financing of other obligations (Jovanović, 2021). This reduces the risk of a sudden drop of living standard as well as the long-term financial problems.

Besides the protective function, life insurance provides the possibility of planned and long-term funds accumulation. Through regular payment of insurance premiums, the insured pearson gradually creates a financial reserves that can be used at different life stages (Lehtonen, 2014). These funds can be used for capital investments, such as buying an apartment, financing education or providing additional income in later years (Mishra, 2016). This combination of safety and savings is one of the key advantages of this type of insurance compared to other forms of financial products. Modern pension systems faces serious challenges, primarily due to the population ageing and the decreasing number of the working age population (Siddiqui, 2020). That is why the individuals needs to take the responsibility for their future financial stability. In this context, life insurance can be an important support, as it enables additional income after retirement (Outreville, 2018).

The role of life insurance can also be analyzed from the economy perspective (Pjanić et al., 2016). Collected premiums funds are being invested in various economy sectors. These investments often have a long-term character and includes projects of wider social importance, such as infrastructure or state financial instruments. Thus, life insurance indirectly contributes to the economic development and stability of the financial system (Cheraga, 2024).

The development of the insurance market led to the appearance of various adapted products. Addition to basic protection, there are policies that includes investment components which provides the opportunity to generate additional income (Ahmeti, 2014). Although such products have a certain level of risk, they simultaneously increase the attractiveness of life insurance and make it more accessible to the general population (Dash & Sood, 2013).

However, despite all the advantages, life insurance is still not sufficiently represented in some countries, including Serbia. The reasons for this are multiple - from citizens' lack of information, through mistrust in financial institutions to the limited incomes (Eling & Kochanski, 2013; Zinyoro & Aziakpono, 2023). This is precisely why it is important to raise awareness of the importance of this type of protection, as well as to improve the legal and institutional framework that would further strengthen the people's trust.

Aforementioned indicates that life insurance has a complex and multifaceted role. It is not only a form of protection, but also an instrument of saving, planning for the future and supporting economic development. In the modern condition challenges, its importance will continue to grow, which will make it an indispensable part of every individual's financial planning (Kočović et al., 2024).

Classic life insurance

Classic life insurance is a traditional form of life insurance that covers the risk of death, survival, as well as its combination within the framework of mixed insurance (Ghosh, 2013). The main characteristic of this type of insurance is reflected in the pre-defined insured sum and relatively low level of risk, which makes it a stable instrument of financial protection and long-term savings (Arnejo & Sarsale, 2025). In this sense, classic life insurance plays a significant role in ensuring the financial security of the insured and its beneficiaries, especially in the context of long-term financial planning (Lledó et al., 2025). The following table presents some of its parameters in the period 2019-2024.

Table 1. Movement of selected parameters of classic life insurance in the period 2019-2024. (in thousands RSD)

	2019	2020	2021	2022	2023	2024
No. of insurance	687.117	676.321	702.491	715.881	746.838	768.205
No. of insured	1.748.523	1.885.180	1.855.623	2.345.101	2.198.652	1.954.148
Total premium	22.584.062	23.481.706	24.339.097	25.587.109	27.223.653	29.216.738
No. of reported damages	64.880	65.340	78.765	77.098	72.869	73.843
No. of claims denied	1.489	1.524	1.753	1.814	1.734	1.622

No. of calculated damages	63.069	63.365	76.519	74.870	70.336	71.325
Value of calculated damages	12.255.135	13.351.317	16.477.457	18.007.724	19.925.684	20.474.533

Source: Author's presentation based on the NBS reports (2019-2024)

Analysis of classic life insurance data in the period 2019–2024. shows interesting trends in the number of insurances, insured persons, premiums and claims. The number of concluded insurances in the observed period had stable growth, with the exception of 2020 (676,321), which can be explained with the economic consequences of the COVID-19 pandemic. In the following years, a continuous increase is registered up to a maximum of 768,205 policies in 2024. This trend indicates a stable demand growth.

Different from the number of insurances, the number of insured persons is characterized by more pronounced fluctuations. After growth in 2020 (1,885,180 insured pearson), there is a slight decline in 2021 (1,855,623), and then a significant jump in 2022 (2,345,101), which represents an increase of almost 26% compared to the previous year. In 2023 and 2024, the number of insured persons decreases, although the number of insurances continues to grow. Such a movement suggests that individual policies are used for a larger number of insured, as well as that there are changes in the structure of policies, whereby is recorded an increase in the number of individual policies with less coverage per insured person.

The total premium recorded continuous growth, from 22.58 million in 2019 to 29.22 million in 2024. This trend follows the growth of the number of policies and confirms the development of the life insurance market.

The analysis of claims shows that the number of reported and calculated claims fluctuates, but remains at a relatively stable level. The number of reported damages increases until 2021 (78,765), followed by a slight decline and minor fluctuation in the following years, while the number of rejected claims is consistently low (<3% of the total reported), which indicates the efficiency of the regulation process and consistency in the application of insurance criteria. On the other hand, the value of calculated claims recorded a strong growth, from 12.26 million in 2019 to 20.47 million in 2024, which indicates an increase in the amount of coverage but also the impact of inflation.

Taking into account all the indicators, it can be concluded that classisc life insurance is characterized by a stable growth in the number of policies and premiums, fluctuations in the number of insured persons and a significant increase in the value of claims, while the rate of denied claims remains low and stable.

Life annuity

Life annuity is a special form of life insurance which implies that the insured sum is not paid out once, but in the form of pre-agreed periodic annuity payments, usually after the expiration of the agreed term or the fulfillment of certain conditions (Low & Fekete-Farkas, 2021). Its main function is to provide a stable and continuous source of income, which is often used as an instrument of supplementary pension security (Buric et al., 2017). In this context, Life annuity plays a significant role in mitigating the financial risks associated with old age and contributes to the long-term financial security of the insured (Kjosevski, 2012). The following table presents some of its parameters in the period 2019-2024.

Table 2. Movement of selected parameters of life annuity in the period 2019-2024.
(in thousands RSD)

	2019	2020	2021	2022	2023	2024
No. of insurance	13.715	13.580	13.554	13.469	13.350	13.160
No. of insured	13.720	13.585	13.559	13.475	13.356	13.166
Total premium	598.122	555.532	510.814	565.938	475.057	491.795
No. of reported damages	2.085	2.275	2.427	2.956	2.539	2.578
No. of claims denied	2	4	2	6	28	12
No. of calculated damages	2.048	2.231	2.316	2.961	2.490	2.532
Value of calculated damages	423.194	496.412	481..872	647.712	647.978	708.047

Source: Author's presentation based on the NBS reports (2019-2024)

Analysis of data of life annuity in the period 2019–2024. indicates the specificity of this type of life insurance. The number of concluded insurances recorded a slight, gradual decrease, from 13,715 in 2019 up to 13,160 in 2024, which represents a decrease of approximately 4%. Similarly, the number of policyholders follows an almost identical trend, which is expected because each annuity insurance policy usually covers one policyholder. These data indicates stagnation or a slight decline of the life annuity insurance market, which is also one of the characteristics of long-term products with a stable portfolio and a limited influx of new clients. The analysis of total premiums shows fluctuations, whereby the value of premiums decreased in 2021 (510,814), then increased in 2022 (565,938), while in 2023 and 2024 a smaller decrease and increase were recorded. These trends suggest that premiums are not proportional to the number of policies due to different models of annuity policies and variability in the amount paid.

The number of reported claims is continuously increasing, from 2,085 in 2019 to 2,578 in 2024, which indicates an increased realization of rights based on the realization of annuity insurance. The number of rejected claims is very low, although a jump to 28 was recorded in 2023. The number of calculated claims follows the reported trend, while the value of calculated claims recorded a significant increase, from 423,194 in 2019 to 708,047 in 2024, which represents an increase of almost 67%. These data indicate an increase in the financial exposure of insurance companies, although the number of policies remains relatively stable.

Taking into account all indicators, it can be concluded that annuity insurance is characterized by a stable number of policies and insured persons, fluctuations in premiums, as well as a significant increase in the value of calculated claims, with a low rate of rejected claims.

Supplementary life insurance

Supplementary life insurance is an additional form of insurance protection that is contracted as an annex to the basic policy, with the aim to expand the scope of coverage and to improve the overall safety (Lee et al., 2013). This type of insurance most often covers risks such as accident, permanent disability, serious illness or temporary incapacity for work, thus providing a higher level of financial protection in various unforeseen circumstances (Msomi, 2023). In this sense, supplementary life insurance plays a significant role in the individualization of insurance protection and adaptation to the specific needs and risks of the insured. The following table presents some of its parameters in the period 2019-2024.

Table 3. Movement of selected parameters of supplementary life insurance in the period 2019-2024. (in thousands RSD)

	2019	2020	2021	2022	2023	2024
No. of insurance	555.471	575.984	661.716	686.687	707.001	730.998
No. of insured	983.988	987.832	1.052.900	1.167.582	1.085.211	1.106.558
Total premium	1.653.193	1.786.381	1.813.274	1.972.707	2.042.406	2.144.146
No. of reported damages	12.489	9.368	9.675	11.012	11.973	12.534
No. of claims denied	3.069	2.314	2.461	2.919	3.126	3.091

No. of calculated damages	9.574	7.109	7.141	7.992	8.813	9.401
Value of calculated damages	345.522	371.870	381.089	575.325	479.374	585.579

Source: Author's presentation based on the NBS reports (2019-2024)

Data analysis for the period 2019-2024. indicates significant trends in the number of insurances, insured persons, premiums and claims. The number of concluded insurances shows a continuous and stable growth throughout the observed period. In 2024, the number of insurances increased by almost 31% compared to 2019, with the most pronounced growth recorded between 2020 and 2021. This trend is a consequence of the development of insurance products, but also the growing awareness of the importance of insurance.

A similar trend can be noticed in the number of insured persons. In the observed period, it has recorded an increase from 983,988 in 2019 to 1,106,558 in 2024. However, unlike the number of insurances, the number of insured persons shows certain oscillations. After a gradual growth until 2022, when it reaches a maximum of 1,167,582 insured persons, in 2023 there is a decrease to 1,085,211, while a slight recovery is recorded in 2024. Such developments indicate changes in the policy structure, i.e. an increase in the number of individual insurances or changes in the scope of coverage per insured.

The total premium recorded a stable growth in the observed period. From 1,653,193 in 2019, the premium rises to 2,144,146 in 2024, which represents an increase of approximately 30%. The increase in premiums follows the increase in the number of insurances, but it is also the result of the increase in the prices of insurance products, inflationary trends and the expansion of the scope of insurance coverage.

The highest number of reported damages was recorded in 2024 (12,534), while the lowest level was recorded in 2020 (9,368). The number of rejected claims is relatively stable and ranges between 2,314 and 3,126 cases per year. The share of rejected claims in total reported claims remains relatively constant, which indicates the consistent application of criteria and the stability of the claims assessment process. The number of calculated claims declines in 2020 and 2021, after which there is a gradual increase, reaching 9,401 cases in 2024. This trend largely follows the movement of reported damages, but also indicates stability in the process of their processing and regulation. The movement in the value of calculated damages is particularly significant, which shows a marked increase in the observed period. From 345,522 in 2019, the value of claims increases to 585,579 in 2024, with a significant jump in 2022. Although a temporary decline was recorded in 2023, in 2024 there is a renewed growth and reaching the highest level in the analyzed period. This trend indicates an increase in financial pressure on insurance companies.

Taken as a whole, the analyzed data indicate a stable growth of supplementary insurance with life insurance, expressed through an increase in the number of policies and premiums, with a simultaneous increase in the value of calculated claims and a relatively stable ratio of reported, rejected and calculated claims.

Unit-linked life insurance

Unit-linked life insurance is a specific form of life insurance that integrates elements of insurance protection and investing on financial markets (Parkman et al., 2015). Within this model, part of the paid premium is intended to cover the insured risk, while the remaining part is invested in units of investment funds, whereby the amount of return depends on market trends and is not guaranteed in advance (Sadowski, 2024). It implies a higher degree of risk compared to traditional forms of life insurance, but at the same time it provides the possibility of achieving higher returns (Olević, 2016). Therefore, it is intended for policyholders with a strong inclination towards investing and long-term financial planning. The following table presents some of its parameters in the period 2019-2024.

Table 4. Movement of selected parameters of unit-linked life insurance in the period 2019-2024. (in thousands RSD)

	2019	2020	2021	2022	2023	2024
No. of insurance	3.510	5.115	6.588	8.362	11.056	14.351
No. of insured	3.510	5.115	6.588	8.362	11.056	14.351
Total premium	221.553	333.256	443.724	576.088	767.346	918.508
No. of reported damages	3	81	194	235	338	417
No. of claims denied	0	1	2	1	2	4
No. of calculated damages	2	74	190	233	334	411
Value of calculated damages	1.550	8.455	23.467	28.408	42.278	65.070

Source: Author's presentation based on the NBS reports (2019-2024)

Data analysis for the period 2019-2024. indicates a particularly dynamic development of the observed insurance segment, which is reflected in the strong growth in the number of policies, insured persons, premiums and the value of calculated claims. The number of concluded insurances recorded a continuous and very pronounced growth throughout the observed period. From 3,510 in 2019, the number of insured persons increases to 14,351 in 2024, which represents a more than fourfold increase. A particularly significant growth is observed from 2021. The continuous growth of the number of insured persons indicates the growing interest of the market in this type of life insurance.

The total premium also shows a strong upward trend. From 221,553 in 2019, the premium rises to 918,508 in 2024, which represents an increase of more than four times. The increase in premiums follows the increase in the number of policies and insured persons, but it can also be a consequence of the expansion of the scope of coverage and the increase in the value of the sum insured. Stable and accelerated premium growth indicates a significant strengthening of the financial capacity of this type of insurance.

The movement of reported damages also shows a marked increase. While only three cases of damage were reported in 2019, already in 2020 the number of reports increases to 81, and then continues to grow continuously up to 417 reported damages in 2024. This dynamic can be explained by the sudden increase in the number of insured persons, but also by the greater use of insurance protection by users. The number of rejected claims during the observed period remains very low and ranges between 0 and 4 cases per year. The share of rejected claims in the total number of reported claims is minimal, which indicates a high degree of realization of claims and relatively clear insurance conditions, as well as efficient processing of claims for compensation. The number of calculated claims follows the growing trend of reported claims. With only two calculated cases in 2019, the number of calculated claims increases to 411 in 2024. This trend indicates an increased activity in the regulation of damages and an increase in the number of users who exercise the right to compensation. The movement in the value of calculated damages is particularly significant, which shows a marked increase during the observed period. From 1,550 in 2019, the value of damages increases to 65,070 in 2024. This trend indicates an increase in the total financial exposure of insurance companies, which is a logical consequence of the growth in the number of insurances and the greater scope of insurance coverage.

Taken as a whole, the analyzed data indicate an extremely rapid development of this insurance segment, which is reflected in the strong growth in the number of policies, insured persons and premiums, as well as in the increase in the number and value of calculated claims. At the same time, the low level of denied claims indicates the stability of the claims regulation process and the high realization of the insured's rights. The following table presents some of the parameters of total life insurance in the period 2019-2024.

Table 5. Movement of selected parameters of total life insurance in the period 2019-2024. (in thousands RSD)

	2019	2020	2021	2022	2023	2024
No. of insurance	1.261.112	1.272.218	1.385.506	1.425.456	1.479.200	1.527.585
No. of insured	2.751.063	2.892.952	2.929.849	3.535.595	3.309.247	3.089.109
Total premium	25.064.463	26.162.910	27.111.208	28.705.002	30.510.072	32.771.959
No. of reported damages	79.600	77.166	91.134	91.413	87.829	89.465
No. of claims denied	4.579	3.852	4.226	4.747	4901	4.736
No. of calculated damages	74.812	72.871	86.229	86.157	82.087	83.755
Value of calculated damages	13.046.057	14.245.860	17.378.493	19.281.794	21.118.245	21.859.972

Source: Author's presentation based on the NBS reports (2019-2024)

Analysis of data on total life insurance in the period 2019–2024. indicates a stable growth of the market, with some oscillations of certain indicators, especially the number of insured persons and claims. The number of concluded insurances recorded continuous growth during the observed period. Looking at the last and the first year of the analyzed period, there was an increase in the number of insurances by approximately 21%. The trend in the number of insured persons also shows growth, but with more pronounced fluctuations. The number of insured persons increases from 2,751,063 in 2019 to a maximum of 3,535,595 in 2022, after which there is a decline in 2023 and 2024. Such dynamics may indicate changes in the structure of insurance, especially with regard to the representation of collective and individual policies, as well as a possible reduction in the coverage of insured persons in the later period. The total premium recorded a stable and continuous growth by approximately 31%, looking at the last and the first year of the analyzed period. This growth follows the increase in the number of insurances, but it is also the result of inflationary trends, the increase in prices of insurance products as well as the scope of coverage. Certainly, the continuous growth of the premium indicates the strengthening of the financial potential of the total life insurance sector.

The number of reported damages shows moderate oscillations. After a slight decline in 2020, there is an increase in 2021 and 2022, when the highest values are recorded (over 91,000 applications). In 2023, there is a decline with a slight increase in 2024. The number of rejected claims is relatively stable. The share of rejected claims in the total number of claims remains low and stable, which indicates the consistent application of criteria and the stability of the claims assessment process. The number of calculated claims largely follows the trend of reported claims. After a slight decline in 2020, there is growth in 2021 and 2022, then a decline in 2023 and growth again in 2024. The movement in the value of calculated damages is particularly significant, showing a continuous and pronounced growth of approximately 67%. This trend indicates a significant increase in the financial exposure of insurance companies, as a result of the growth of sums insured, the growth of the value of claims and inflationary trends. Essentially, the total life insurance market in the analyzed period is characterized by a stable growth in the number of policies and premiums, with fluctuations in the number of insured persons and claims, as well as a marked increase in the value of calculated claims. These trends indicate the continuous development of the sector, but also the need for careful risk management and preservation of financial stability in conditions of growing exposure to damages. In addition to all types of life insurance considered in isolation, the following table presents their relative changes of selected parameters.

Table 6. Percentage changes of selected parameters of total life insurance and its types

	CLI[1]	**LA[2]**	**SLI[3]**	**ULI[4]**	**TLI[5]**
No. of insurance	+ 11,8	- 4,0	+ 31,6	+ 308,9	+ 21,1
No. of insured	+ 11,8	- 4,0	+ 12,5	+ 308,9	+ 12,29
Total premium	+ 29,4	- 17,8	+ 29,7	+ 314,6	+ 30,75
No. of reported damages	+ 13,8	+ 23,6	+ 0,4	irrelevant	+ 12,4
No. of claims denied	+ 8,9	+ 500,0	+ 0,7	irrelevant	+ 3,4
No. of calculated damages	+ 13,1	+ 0,7	- 1,8	irrelevant	+ 11,9
Value of calculated damages	+ 67,1	+ 67,3	+ 69,5	+ 4.098	+ 67,6

Source: Author's calculations

Analyzing the relative changes in the last compared to the initial year of the observed period, it is possible to observe the growth of almost all categories within all modalities of life insurance. Namely, when it comes to CLI (with the exception of the number of rejected claims), a double-digit percentage growth of all analyzed parameters is noticeable. The most intense is the growth of total premiums, i.e. the value of calculated claims, with a growth of 29.4 and 67.1%, respectively. It can be additionally noted that LA achieved the worst ratio of premiums and the value of calculated claims, since the total premiums based on

[1] Clasic life insurance
[2] Life annuity
[3] Supplementary life insurance
[4] Unit-linked life insurance
[5] Total life insurance

this type of life insurance decreased by 17.8%, while the value of calculated claims increased by 67.3%.

When it comes to SLI, a significant increase in the number of insurances of 31.6% can be observed, which does not follow the increase in the number of insurances. In 2024, it is 12.5% higher than in 2019. The characteristic of this type of insurance is a large increase in the premium of 29.7%, but also an extremely large increase in the value of calculated claims of 69.5%. It is interesting to note all the developments concerning damages, so very small deviations can be noted, ranging from -1.8 to 0.7%.

The greatest growth in the observed period was achieved by ULI, since the number of insurance policies, insured persons and total premiums increased by more than 300%. Changes regarding the number of reported, rejected and calculated claims were not measured since in 2019 these data were almost negligible. Also, it can noticed a huge growth in the value of calculated claims based on life insurance related to units of investment funds, since it is greater than 4000%, which is a record growth compared to other types of life insurance. The fact is that this type of insurance has achieved the greatest growth and will also be the biggest challenge for insurance companies in the following years.

When analyzing the TLI, there is a noticeable growth in all categories, especially premiums, but also the value of calculated claims. The growth in the value of calculated claims is more than twice as high as the growth in premiums, which highlights the potential liquidity problem of insurance companies. In this regard, in the future, additional attention will be focused on adequate investment activity on the financial markets as a necessary instrument for preserving confidence in the life insurance market.

Taken as a whole, the analysis points to structural changes within the life insurance market, where traditional products develop stably, annuity insurance stagnates, while segments related to investment funds record extremely dynamic growth. At the same time, the growth in the value of calculated claims in all segments indicates increased financial exposure of insurance companies, which imposes the need for careful risk management and adequate adjustment of business strategies.

Conclusion

The conducted analysis indicates that the life insurance market in the Republic of Serbia in the period 2019-2024. characterized by stable and continuous development, with pronounced structural changes within certain segments. The overall increase in the number of policies and premiums confirms the strengthening of this sector and its increasingly significant role in the financial system, while the simultaneous increase in the value of calculated claims indicates an increased financial exposure of insurance companies.

The results of the research shows that classic life insurance and supplementary life insurance are experiencing moderate but stable growth, thereby confirming their traditional role in providing financial security. In contrast, life annuity shows a tendency to stagnate, which may be a consequence of limited market interest and the specific nature of this product. On the other hand, life unit-linked life insurance recorded a very dynamic growth, indicating a change in user preferences towards products that integrate insurance and investment components.

Observed trends point to the need for further improvement of the regulatory framework, as well as the development of adequate risk management strategies, especially in the context of the growth in the value of claims and the growing presence of investment products. Also, it is important to work on raising financial literacy and user confidence, in order to further encourage market development. In the future, we can expect the continuation of product diversification and the strengthening of the role of life insurance as an important instrument of financial protection, savings and investment.

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STRUKTURNA TRANSFORMACIJA I RAZVOJNI TRENDOVI TRŽIŠTA ŽIVOTNOG OSIGURANJA U SRBIJI

Apstrakt

Rad analizira ulogu i značaj životnog osiguranja u savremenim ekonomskim uslovima, sa posebnim osvrtom na tržište Republike Srbije u periodu 2019–2024. godine. U fokusu istraživanja nalaze se različiti oblici životnog osiguranja, uključujući klasično, rentno, dopunsko i osiguranje vezano za jedinice investicionih fondova, uz sagledavanje njihovih funkcionalnih i strukturnih karakteristika. Empirijska analiza ukazuje na stabilan rast ukupnog tržišta, manifestovan kroz kontinuirano povećanje broja polisa i ukupnih premija, uz istovremeni rast vrednosti obračunatih šteta. Istovremeno, identifikovane su divergentne tendencije među pojedinim segmentima, pri čemu klasični i dopunski modeli beleže umeren razvoj, rentno osiguranje stagnira, dok investiciono orijentisani proizvodi ostvaruju izrazito dinamičan rast. Zaključno, životno osiguranje se afirmiše kao kompleksan finansijski instrument sa značajnom zaštitnom, akumulacionom i investicionom funkcijom, uz potrebu unapređenja upravljanja rizicima i regulatornog okvira.

Ključne reči: *životno osiguranje, rentno osiguranje, dopunsko osiguranje, ŽO vezano za jedinice investicionog fonda*

JEL: *G2, G22, G52*

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EMPLOYEES' PERCEPTION OF NON-FINANCIAL REPORTING IN TRANSPORT COMPANIES

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Abstract

Transport companies, by carrying out regular business activities in a modern and economical way, appear as extremely large consumers of fuel and energy with a high „non-green" footprint. Associated with corporate social responsibility, ESG reporting is becoming a settled direction toward sustainable business and planet protection from climate change. This paper aims to examine the perceptions of managers and persons responsible for reporting on ESG reports segments in transport companies in Serbia and determine the area in which more active actions must be taken to promote ESG reporting standards, under the green agenda auspices, i.e. European Green Deal. The study was conducted through a survey of 163 respondents in Serbian transport companies in the second half of 2025. Findings revealed that ESG training significantly predicts a higher likelihood of rating environmental inclusion as a relevant factor, as well as that education improves perceptual quality by increasing recognition of ESG activities.

Keywords: *non-financial reporting, ESG, transport companies*

JEL: *M21, M41, R49*

Introduction

Today's global market for goods requires modern supply models. We are witnessing a significant increase in the production of fast-moving consumer goods (FMCG) in geographically distant locations, along with the emergence of several global manufacturing superpowers. These geographically dispersed

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production sites require modern transportation channels to deliver goods to customers worldwide. For this reason, the transport industry plays a significant role in the global economy. Further, today, the global transport sector generates approximately 5% of global gross domestic product and employs around 10 million people, with a tendency toward accelerated growth. Fuel and energy consumption are significant in the transportation business, and renewable energy consumption and economic growth are increasingly important topics (Cvijović et al., 2020). There are fewer and fewer fuel resources in nature, and new requirements force energy producers to produce it in a green, i.e., sustainable, way, which has increased the price of fuel and energy in the world market. Pham et al. (2022) recognize the importance of the transport sector and emphasise the need to assess transport companies' overall performance as a basis for improving their operational efficiency. They also highlight the negative consequences of rapid development, which degrade the environment and adversely affect humans, plants, and animals. Referring to a 2011 Report by the International Energy Agency, they state that the transport industry ranks second in greenhouse gas emissions, generating 22% of global CO_2 emissions.

The globally proclaimed green agenda encompasses a broader concept of producing and using energy, services, and goods sustainably. Its objective is to encourage society to manage the planet’s limited resources rationally and efficiently, as alarming environmental impacts that hinder growth and sustainable development are already evident. Theorists and researchers agree that these negative consequences can be mitigated by promoting sustainable policies, gradually implemented alongside strengthening environmental awareness.

The ESG reporting concept has gained importance as policymakers have come to recognize the depth of the climate crisis and accept the knowledge regarding its threats and potential consequences. With increased awareness among politicians, businesses, and society as a whole about climate-related risks, the necessary conditions have been established for promoting and formally regulating political acts aimed at legally structuring the ESG concept and integrating it into national reporting frameworks.

The signing of the Paris Climate Agreement in 2015 and its ratification in national parliaments created the initial conditions for ESG reporting. Although many countries are still not fully prepared for complete implementation, the first steps in this direction have been taken. Under the Paris Agreement (French: *Accord de Paris*), member states of the United Nations Framework Convention on Climate Change agreed on a long-term temperature goal of limiting the increase in global average temperature to below 1,5°C, which would significantly reduce the risks and impacts of climate change. The signatories also committed to “making finance flows consistent with a pathway toward low greenhouse gas emissions and climate-resilient development." According to the Agreement, each signatory state must regularly report on its contributions to mitigating global warming (Article 3).

In China, the Shanghai Stock Exchange introduced the "Stock Listing Rules" in 2019, requiring listed companies to disclose ESG reporting data. The Hong Kong Stock Exchange revised its ESG reporting requirements in 2020. The U.S. Nasdaq Stock Market issued the "ESG Reporting Guide 1.0" in 2017 and the updated "ESG Reporting Guide 2.0" in 2019, providing guidelines for publishing ESG statistics (Ruan & Liu, 2021). The authors primarily refer to regulatory practices in these countries because the United States and China are the largest environmental polluters. Moreover, the United States has frequently failed to act in accordance with signed international environmental agreements or has not implemented them, citing non-ratification in the national parliament, even when such agreements were proposed by the United States itself. This practice continued in the case of the Paris Agreement, from which the United States withdrew after signing.

Directive (EU) 2022/2464 of the European Parliament and of the Council establishes mandatory reporting obligations within the framework of corporate social responsibility, which implies reporting according to ESG segments. Commonly referred to as the Corporate Sustainability Reporting Directive (CSRD), it introduces more specific reporting requirements regarding companies' environmental and social impacts. It mandates reporting according to standardized criteria based on EU climate objectives and indirectly requires alignment of corporate business strategies with environmental and social standards (Ferensztajn-Galardos et al., 2025).

ESG may be viewed as an evolution of the concept of Corporate Social Responsibility (CSR) and represents the result of implementing an increasing number of regulations promoting sustainable development within the European Union.

This paper defines the scope and specificities of green, i.e., non-financial reporting for transport companies, in the form that has become an EU partner requirement, and guides readers from the industry on aspects of this reporting obligation, which greatly affect transport companies' business performance.

The article is divided into five sections. It begins with a literature review, followed by a presentation of the research hypotheses. Section 3 presents the sample and methods. Section 4 presents the results. Finally, the study's results are interpreted, and practical conclusions are presented.

Literature Review

The importance of ESG reporting for transport companies

A large number of researchers have analyzed the effects of environmental, social, and governance factors on companies' productivity and financial performance. Numerous studies have examined the relationship between ESG factors and the business performance of transport companies (Pham et al., 2022); however, no single metric methodology has proven fully reliable. It applied a combination of techniques (DEA, OLS) and found that a significant proportion of transport companies (76%) operate inefficiently. They advise company managers to focus on ESG and to treat it as a necessary investment for transport companies, particularly given that transport is regarded as an environmentally sensitive industry. Also, cost management has been gaining increasing importance (Milojević et al., 2025). Environmental costs influence future strategic direction (Knežević et al., 2024, p. 64), and the particular role of environmental accounting in monitoring costs at the level of a business system is emphasized (Knežević, 2011).

Various researchers have linked companies' market value to ESG performance ratings by segment, using the Tobin's Q model, while Yoon et al. (2018) used the Feltham-Ohlson model to examine the impact of ESG segments on company market value. On the other hand, Tang et al. (2012) argue that findings regarding the relationship between ESG and financial performance are inconclusive, unreliable, ambiguous, and even contradictory.

In their study, Pham et al. (2022), analyzing current published research, suggest that ESG reporting positively affects company performance and increases market value. Miller et al. (2020) emphasize increased profitability among companies with a reputation for social responsibility, while Cho et al. (2019), examining Korean listed companies, identify a positive correlation between community contribution and total asset growth rate. Researchers Kong et al. (2014) in China and Yadav et al. (2016) in the United States, focusing on the environmental segment of ESG, conclude that environmental improvement activities lead to increased market value. Applying DEA, OLS, and linear regression in a study of 56 listed companies in China and the United States, regression models showed a positive correlation between ESG segments and examined business performance indicators of transport companies, strongly supporting ESG reporting as an investment.

Data from the Global Sustainable Investment Alliance (GSIA, 2018) indicate that more than USD 30 trillion in global assets under management are aligned with ESG principles (Pedro, 2020). Institutional investors in developed financial markets are increasingly attracted to companies implementing ESG reporting, as evidenced by the growth of such investments in capital markets. Datsii et al. (2021) further note that private investors are increasingly interested in companies offering segmented ESG reports, referring to such investments as "ESG investments." They analyzed results of the Morgan Stanley survey conducted in 2017 among 1.000 active private investment firms, which showed that 75% of respondents favored ESG investments motivated by participation in combating climate change caused by high CO_2 emissions. The strongest interest in ESG investments was shown by Generation Y (millennials), who believe that such investments contribute to environmental preservation for future generations. It should be emphasized that investments directed toward companies managed according to ESG principles are not merely marketing or trends, but a genuinely necessary direction of responsible investing (Matos, 2020).

Datsii et al. (2021) examined global ESG investment practices and observed numerous regulations and initiatives aimed at standardizing every process within ESG investing, from defining ESG principles to ranking results. They report the development of non-financial reporting standards promoted by the Global Reporting Initiative (GRI) and the International Integrated Reporting Council (IIRC). At the same time, transport companies have shown increasing willingness to join ESG initiatives and to provide comprehensive ESG reporting, particularly newer technology-based firms. In recent decades, climate change has affected the environment and international supply chains, resulting in decreased employee productivity and more severe business disruptions (Rissman et al., 2020). Other researchers (Mackevičius et al., 2018) observe a growing number of bankruptcies in transport companies and seek solutions for vulnerable firms. ESG initiatives are recognized as a potential solution for technology-based companies at risk.

To mitigate the consequences of climate change, researchers such as Vajjarapu et al. (2019), focusing on the transport industry, call for urgent strengthening of commitment to sustainable development within the sector. Banks have a significant role in implementing ESG standards and managing sustainable risks (Savić & Marjanović, 2025; Đokić et al., 2025). Khursheed et al. (2025), examining the impact of ESG factors on the profitability of transport companies, emphasize the importance of all ESG segments and propose green measures as a response to climate change, particularly in the transport sector due to its significant impact on both the economy and the environment. According to Kim & Li (2021) and Shakil (2021), several studies confirm a strong relationship between corporate financial risks and ESG performance indicators, highlighting the importance of investigating this relationship across different sectors. "Performance measurement is crucial for evaluating the organization's progress" (Dabetić et al., 2024, p. 167), especially considering that the modern business environment is characterized by constant changes (Bojić et al., 2025). Mohammad & Wasiuzzaman (2021), surveying 3.966 companies during the period 2012–2017, examined the impact of ESG values on organizational performance. They observed varying results regarding the relationship between ESG activities and profitability, leading them to further analysis. Research conducted by Lewandowski (2017) shows that increased CO_2 emissions are strongly associated with decreased profitability, underscoring the necessity of understanding the link between climate change and company profitability in order to improve business results. Naveed et al. (2021) examined gender equality in transport companies by tracking the percentage of women on corporate boards, identifying it as a key performance indicator, particularly given that the industry is traditionally male-dominated, with men prevailing in roles ranging from drivers, logistics operators, and mechanics to controllers, middle managers, and company directors.

Investigating ESG reporting in Poland in two industries crucial for sustainable development, transport and electricity generation, Wojciechowski et al. (2022) identified generally poor ESG reporting practices and overall weak performance. They observed low ESG awareness and limited engagement of professionals in this field. Qualified respondents were often unaware that their companies prepared ESG reports, and many noted the lack of appropriate information and formal ESG procedures. Limited management involvement in ESG initiatives was also observed, particularly in carbon footprint analysis.

Nevertheless, it is encouraging that most respondents recognize the importance of ESG reporting for corporate reputation and stakeholder trust, indicating a significant gap between perceived value and existing business practice. Additionally, a large number of technical staff expressed willingness to attend ESG training, which would undoubtedly contribute to improved reporting capacity and better satisfaction of internal and external stakeholders' transparency requirements.

Hypotheses

Based on the theoretical framework and prior empirical findings, the following hypotheses are formulated:

> H1: There is a statistically significant relationship between the level of understanding of non-financial reporting and the perceived usefulness of non-financial reporting in transport companies.

This hypothesis is grounded in the assumption that employees who possess a higher level of knowledge about ESG and non-financial reporting standards are more capable of recognizing their strategic importance, operational benefits, and contribution to long-term sustainability. Greater understanding is expected to positively influence perceived usefulness.

> H2: Employees in managerial positions have a significantly more positive perception of non-financial reporting compared to operational workers.

Managers are typically more involved in strategic planning, regulatory compliance, and stakeholder communication. Due to their broader perspective on corporate governance and risk management, they are expected to demonstrate a more favorable attitude toward ESG reporting than employees in operational roles.

> H3: Education on ESG standards positively affects the quality of perception of non-financial reporting.

Formal training and education programs related to ESG standards are expected to improve employees' awareness, comprehension, and evaluation of non-financial reporting practices. Enhanced knowledge should lead to more informed and constructive perceptions.

> H4: Transparency of non-financial reporting positively affects employees' trust in management.

Transparent disclosure of environmental, social, and governance activities reduces information asymmetry within the organization. Increased transparency is expected to strengthen employees' trust in management by demonstrating accountability, ethical conduct, and long-term strategic commitment.

Materials and methods

This study employed a quantitative, cross-sectional survey design to examine employees' perceptions of ESG reporting in Serbian transport companies. The target population comprised all employees working in passenger, cargo, or combined transport companies operating by road, rail, water, air, or multimodal routes. Data were collected using a structured online questionnaire developed in Google Forms. The instrument contained 20 closed-ended items divided into three sections: (1) socio-demographic and professional characteristics (5 items: gender, education, years in sector, current position, tenure); (2) company-level ESG context (8 items: transport type, route, ESG report preparation, training participation, internal standards, measurement of environmental indicators, electricity monitoring, customer information); and (3) perceptual and attitudinal measures (7 items: management and company engagement in ESG and Green Agenda goals, personal importance of environmental aspects, inclusion of electricity consumption and ESG topics in reporting/training, reputation benefits, and preferred ESG segment). Response formats included single-choice, multiple-choice, and 5-point Likert-type scales. Internal consistency of the two multi-item perceptual scales yielded acceptable Cronbach's α values (management engagement $\alpha = 0{,}82$; Green Agenda engagement $\alpha = 0{,}79$).

The survey link was distributed emphasizing voluntary participation, anonymity, and the scientific purpose. No incentives were offered. Upon closure, responses were exported to Microsoft Excel, cleaned, and imported into IBM SPSS Statistics version 27.0 (IBM, Armonk, NY, USA). Categorical variables were recoded numerically for analysis. Likert items were treated as ordinal. Missing values were minimal (<5 %) and handled by listwise deletion for regression models.

Statistical analyses proceeded in three stages. First, descriptive statistics (frequencies, percentages) summarized sample characteristics and response distributions. Second, bivariate associations were examined using Pearson's χ^2 test (with Fisher's exact test when expected cell counts <5) and Spearman's rank-order correlation (ρ) for ordinal variables. Third, inferential models tested the hypotheses: binary logistic regression for dichotomous outcomes and simple linear regression for ordinal perceptual scores. All models used the enter method. Model fit was evaluated via omnibus χ^2, Nagelkerke R^2, classification accuracy, and Hosmer-Lemeshow test (logistic models) or R^2, F-statistic, residual plots, and VIF (linear models). Regression diagnostics confirmed acceptable normality of residuals (Shapiro-Wilk $p > 0{,}05$), homoscedasticity (visual inspection of scatterplots), no multicollinearity (VIF < 2), and no influential outliers (Cook's distance < 1). The significance level was set at $p < 0{,}05$ (two-tailed) throughout. All procedures complied with the Declaration of Helsinki. Participation was voluntary and anonymous.

Results

The survey was conducted anonymously among 163 employees in transport companies. The sample was predominantly male (76,1%). Education levels varied, with participants with a high school education comprising 33,7% of the cohort. Experience in the transport sector was substantial, with 38,0% having over 20 years. Current positions were split between operational (48,5%) and managerial roles (51,5%), with tenure in the current position showing 41,7% at 1–3 years (Table 1).

Table 1. Key Sample Demographics (N = 163)

Variable	Category	n	%
Gender	Male	124	76,1
	Female	39	23,9
Position	Operational	79	48,5

	Managerial	84	51,5
ESG Training	Yes	91	55,8
	No	72	44,2
ESG Report Preparation	Yes	47	28,8
	No/Not Required	116	71,2

Source: Authors

Companies primarily transported combined passengers and cargo (51,5%, n = 84), followed by cargo only (35,0%, n = 57) and passengers only (13,5%, n = 22). Routes included water (28,2%, n = 46), land (25,2%, n = 41), rail and air (14,7% each, n = 24), and combined (17,2%, n = 28). Only 28,8% (n = 47) of companies prepared ESG reports, while 50,9% (n = 83) were not required but prepared them for partners, and 20,2% (n = 33) did not prepare them (Table 1). Over half had participated in ESG training (Table 1), but 79,8% (n = 130) reported no internal ESG standards or guidelines.

Perceptions of management engagement in ESG goals were positive: 25,2% (n = 41) rated it excellent, 39,3% (n = 64) very good, 11,0% (n = 18) good, 9,8% (n = 16) satisfactory, and 14,7% (n = 24) insufficient. Company engagement in the Green Agenda was similarly rated: 27,0% (n = 44) excellent, 38,7% (n = 63) very good, 9,2% (n = 15) good, 10,4% (n = 17) satisfactory, and 14,7% (n = 24) insufficient. Personal importance of environmental aspects in ESG reports was high, with 71,2% (n = 116) deeming it very important and 28,8% (n = 47) important.

Among respondents answering environmental measurement questions (n = 109), 90,8% (n = 99) did not measure indicators like CO_2 emissions, while 9,2% (n = 10) did. Customer awareness of ESG activities (n = 88) was low, with 87,5% (n = 77) believing customers were not sufficiently informed. Electricity consumption monitoring (n = 103) occurred always in 54,4% (n = 56), sometimes in 29,1% (n = 30), and never in 16,5% (n = 17). Most (95,7%, n = 66 of 69) felt electricity consumption should be included in ESG reports. Nearly all (99,4%, n = 162) supported ESG topics in employee training, and 97,5% (n = 153 of 157) believed ESG reporting improved company reputation. The environmental ESG segment was deemed most important (74,8%, n = 122), followed by social (14,7%, n = 24) and governance (10,4%, n = 17).

Chi-square tests revealed several significant associations. Managerial employees rated the personal importance of including environmental protection in ESG reports as very important more frequently (78,6%) than operational employees (63,3%; $\chi^2 = 4{,}632$, df = 1, p = 0,031). However, no significant associations were found between position and opinions on including electricity consumption in ESG reports ($\chi^2 = 0,330$, $p = 0,566$), belief in ESG reporting's reputation benefits ($\chi^2 = 1,162$, $p = 0,281$), customer information on ESG activities ($\chi^2 = 0,924$, $p = 0,337$), or inclusion of ESG in training ($\chi^2 = 1,068$, $p = 0,301$) (Table 2).

ESG training participation was associated with higher reports of electricity consumption monitoring (89.8% among trained vs. 75.0% among untrained; $\chi^2 = 4,023$, df = 1, $p = 0,045$), but not with measuring environmental indicators like CO_2 emissions ($\chi^2 = 0.001$, $p = 0.980$). The presence of internal ESG standards is strongly associated with measuring environmental indicators (33.3% with standards vs. 2,4% without; $\chi^2 = 21,557$, df = 1, $p < 0,001$), though not with electricity monitoring ($\chi^2 = 0,051$, $p = 0,821$) or ESG report preparation ($\chi^2 = 1,111$, $p = 0,292$) (Table 2).

Table 2. Selected Chi-Square Associations

Variables Compared	χ^2	df	p	Key Finding
Position vs. Environmental Importance	4,632	1	0,031	Managers higher (78.6% very important)
Training vs. Electricity Monitoring	4,023	1	0,045	Trained report more monitoring (89.8%)
Internal Standards vs. Measuring Indicators	21,56	1	<0,001	Standards linked to measurement (33.3%)
ESG Report Prep vs. Electricity Monitoring	1,111	1	0,292	No association

Source: Authors

Spearman's correlations indicated weak but significant positive relationships between current position (ordinal) and management engagement in ESG goals ($\rho = 0,40$, $p < 0,01$), as well as Green Agenda engagement ($\rho = 0,191$, $p < 0,05$). Electricity monitoring (ordinal) correlated moderately with both management engagement ($\rho = 0,319$, $p < 0.01$) and Green Agenda engagement ($\rho = 0,310$, $p < 0,01$), and strongly between the two engagement variables ($\rho = 0,838$, $p < 0,01$). Position showed a non-significant negative correlation with monitoring ($\rho = -0,072$, $p > 0,05$) (Table 3).

Table 3. Spearman's Correlations

Variable Pair	ρ	p
Position vs. Management Engagement	0,24	<0,01
Position vs. Green Agenda Engagement	0,19	<0,05
Monitoring vs. Management Engagement	0,32	<0,01
Monitoring vs. Green Agenda Engagement	0,31	<0,01
Management vs. Green Agenda Engagement	0,84	<0,01

Source: Authors

Logistic regression models examined predictors of the perceived importance of environmental aspects. ESG training significantly predicted higher odds of rating environmental inclusion as very important ($B = 2,506$, $SE = 0,439$, Wald $= 32,552$, $Exp(B) = 12,261$, $p < 0,001$, 95% CI 5,183-29,005), with the model explaining 22,9%–32,7% variance (Cox & Snell $R^2 = 0,229$, Nagelkerke $R^2 = 0,327$; $\chi^2 = 42,325$, $p < 0,001$). Similarly, managerial position increased odds ($B = 0,755$, $SE = 0,354$, Wald $= 4,548$, $Exp(B) = 2,127$, $p = 0,033$, 95% CI 1,063-4,255), though with lower explanatory power (Cox & Snell $R^2 = 0,028$, Nagelkerke $R^2 = 0,040$; $\chi^2 = 4,659$, $p = 0,031$) (Table 4).

Table 4. Logistic Regression Results

Dependent Variable	Predictor	B	Exp(B)	p	95% CI
Environmental Importance	Training	2,506	12,261	<0,001	5,183–29,005
Environmental Importance	Position	0,755	2,127	0,033	1,063–4,255
Electricity Monitoring	Training	1,28	3,597	0,013	1,306–9,908

Source: Authors

Linear regression models assessed predictors of engagement perceptions. Electricity monitoring positively predicted management engagement in ESG goals ($B = 0,532$, $SE = 0,156$, $\beta = 0,322$, $t = 3,420$, $p = 0,001$, 95% CI 0,223-0,841), explaining 10,4% variance ($R^2 = 0,104$, $F = 11,694$, $p = 0,001$). It also predicted Green Agenda engagement ($B = 0,469$, $SE = 0,150$, $\beta = 0,297$, $t = 3,127$, $p = 0,002$, 95% CI 0,172-0,767; $R^2 = 0,088$, $F = 9,779$, $p = 0,002$). Position predicted management engagement ($B = 0,359$, $SE = 0,118$, $\beta = 0,233$, $t = 3,036$, $p = 0,003$, 95% CI 0,125-0,592; $R^2 = 0,054$, $F = 9,218$, $p = 0,003$) and

Green Agenda engagement (B = 0,301, SE = 0,121, β = 0,193, t = 2,495, p = 0,014, 95% CI 0,063-0,540; R^2 = 0,037, F = 6,226, p = 0,014). Training predicted electricity monitoring in a separate logistic model (B = 1,280, SE = 0,517, Wald = 6,125, Exp(B) = 3,597, p = 0,013, 95% CI 1,306-9,908; Cox & Snell R^2 = 0,057, Nagelkerke R^2 = 0,083; χ^2 = 6,217, p = 0,013) (Table 5).

Table 5. Linear Regression Results

Dependent Variable	Predictor	B	β	t	p	R²	95% CI
Management Engagement	Monitoring	0,532	0,322	3,42	0,001	0,104	0,223–0,841
Green Agenda Engagement	Monitoring	0,469	0,297	3,127	0,002	0,088	0,172–0,767
Management Engagement	Position	0,359	0,233	3,036	0,003	0,054	0,125–0,592
Green Agenda Engagement	Position	0,301	0,193	2,495	0,014	0,037	0,063–0,540

Source: Authors

In addition to the primary regression results, diagnostic tests were conducted to verify model assumptions. For linear models, residuals were normally distributed (Shapiro-Wilk p > 0,05), with no evidence of heteroscedasticity in scatterplots. VIF values indicated no multicollinearity. For logistic models, the Hosmer-Lemeshow test supported a good fit (p > 0,05), and no outliers were detected (Table 6).

Table 6. Summary of Key Diagnostics

Model Type	Model	Normality (Shapiro-Wilk p)	Homoscedasticity (Visual)	Hosmer-Lemeshow p	VIF	Outliers Detected
Linear	Management Engagement ~ Monitoring	>0,05	No pattern	N/A	1	None
Linear	Green Agenda ~ Position	>0,05	No pattern	N/A	1	None
Logistic	Environmental Importance ~ Training	N/A	N/A	>0,05	N/A	None
Logistic	Environmental Importance ~ Position	N/A	N/A	>0,05	N/A	None

Source: Authors

Discussion

The first hypothesis, positing a statistically significant relationship between employees' level of understanding of ESG reporting and their perception of its usefulness, was supported by the data. Understanding was operationalized through proxies such as participation in ESG training and the presence of internal ESG standards, while usefulness perception was measured via items like the personal importance of including environmental aspects in ESG reports, beliefs about including electricity consumption in reports, and the perceived contribution of ESG reporting to company reputation. Logistic regression analysis revealed that ESG training significantly predicted a higher likelihood of rating environmental inclusion as "very important", with trained employees 12 times more likely to hold this view than untrained employees. This model accounted for 22,9% to 32,7% of the variance, indicating a strong link between these variables.

Chi-square tests further corroborated this association. For instance, training was significantly related to reports of electricity consumption monitoring, with 89,8% of trained employees affirming monitoring, compared with 75,0% of untrained employees, suggesting that greater understanding fosters recognition of practical ESG applications. Similarly, internal standards were strongly associated with measuring environmental indicators like CO_2 emissions, where 33,3% of those with standards reported measurement compared to only 2,4% without, highlighting how comprehension enhances appreciation of ESG's operational utility.

Spearman's correlations provided additional evidence, showing positive relationships between monitoring (as a marker of understanding) and perceptions of management engagement in ESG goals and Green Agenda engagement. These findings imply that as employees' grasp of non-financial reporting deepens (through training or standards), they perceive it as more useful for environmental stewardship and overall business value. However, non-significant associations, such as between training and CO_2 measurement, suggest the relationship may be context-specific.

Hypothesis regarding the perception of non-financial reporting of managers and operational workers was partially accepted. Position was dichotomized into managerial versus operational, with perceptions assessed through ratings of management engagement in ESG goals, company engagement in the Green Agenda, personal importance of environmental aspects, and beliefs in ESG's reputation benefits.

Chi-square tests showed a significant association between position and the importance of environmental inclusion, with 78,6% of managers rating it "very important" compared to 63,3% of operational staff, indicating managers view ESG as more integral to reporting usefulness. Logistic regression reinforced this, with managerial position increasing the odds of a "very important" rating. Linear regressions further supported positivity in perceptions: position positively predicted higher ratings of management engagement and Green Agenda engagement, implying managers perceive greater organizational commitment to ESG. Spearman's correlations aligned, showing weak positive links between position and these engagement ratings.

However, the hypothesis is only partially accepted due to non-significant findings in other areas. For example, no differences emerged in beliefs about electricity inclusion in reports, reputation benefits, customer ESG awareness, or ESG training. Additionally, position negatively but non-significantly correlated with monitoring, suggesting operational staff may be more attuned to practical implementations.

The hypothesis that education on ESG standards positively influences the quality of perception regarding non-financial reporting was accepted based on robust evidence. Education was proxied by ESG training participation, with perception quality evaluated through informed responses on practices like measuring environmental indicators, electricity monitoring, internal standards, and overall engagement ratings.

Chi-square analyses demonstrated significant positive effects: trained employees were more likely to report electricity monitoring, indicating education improves awareness and quality of ESG practice perceptions. Internal standards, often linked to educational initiatives, were strongly associated with indicator measurement, suggesting training fosters deeper, more accurate perceptions of ESG implementation. Logistic regression provided causal insight, with training predicting higher odds of affirmative monitoring reports, explaining 5,7% to 8,3% of variance. This implies that education enhances perceptual quality by increasing recognition of ESG activities. Spearman's correlations indirectly supported this, as monitoring was positively related to high-quality perceptions of management and Green Agenda engagement, reflecting educated employees' more nuanced views.

Non-significant results, like no association between training and CO2 measurement or report preparation, do not undermine acceptance, as they may indicate education's stronger impact on accessible practices rather than all metrics. Overall, the data consistently show that education elevates perception quality.

The acceptance of the fourth hypothesis was supported by empirical links between transparency proxies and trust indicators. Transparency was measured via ESG report preparation, internal standards, and practices like indicator measurement and electricity monitoring. Trust was assessed through ratings of management engagement in ESG goals and the Green Agenda.

Linear regressions confirmed positive effects: electricity monitoring significantly predicted higher trust in management engagement and Green Agenda engagement, and Spearman's correlations reinforced this, with monitoring strongly associating with both trust measures, and a high intercorrelation between engagement variables. Internal standards enhanced the link between transparency and measurement, implying that visible reporting mechanisms foster trust. However, no direct association between report preparation and monitoring suggests transparency's impact is practice-driven rather than mere reporting. The analysis demonstrated that training indirectly boosts trust via monitoring.

Conclusion

External stakeholders (governments, regulatory bodies, investors, customers, etc.) are interested in ESG reporting not merely to "keep pace with global trends," but because they recognize it as a key mechanism for protecting the planet and its limited resources, as well as for promoting broader responsible policies aimed at sustainable growth and development. Climate change affects the business performance of transport companies, compelling governments and their institutions to respond. Among the proposed solutions to challenges caused by climate change, governments identify corporate social responsibility in transport companies and management aligned with ESG initiatives as essential approaches.

ESG reporting represents a logical response of the profession toward enabling long-term and sustainable business operations of transport companies. Although it is currently perceived as an additional obligation imposed on local transport operators, through education and the provision of adequate information, company managers will recognize the full benefits of ESG reporting. This leads to the broader shift in awareness that all stakeholders jointly pursue - companies, academia, and regulators, based on the understanding that there is no alternative planet or environment.

Climate change, increased public awareness, and stronger regulatory frameworks require sustainable business strategies. ESG statistical practices have become an integral part of economic growth and sustainable development plans for transport companies. They contribute to the recognition of high-quality corporate governance and to increased investor confidence. Orientation toward ESG has become a source of competitive advantage, as an increasing number of consumers focus on sustainability, fully aware of the future consequences of failing to implement sustainable corporate practices.

In Serbia, sustainability reporting is currently implemented only by large enterprises (those employing more than 500 employees). This is a particularly important issue for transport companies. However, given that the European Union is the largest partner of the national economy, it is reasonable to expect that European partners will increasingly require ESG reporting from Serbian companies as a condition for strengthening mutual cooperation. Although ESG reporting in the Republic of Serbia is still in its early stages of development, it is necessary to intensify efforts to promote full-capacity ESG implementation across all sectors of the economy. Responsible persons within companies should be directed toward clearer communication across all organizational sectors, as this ensures sustainable operations, a strong business reputation, and market recognition.

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PERCEPCIJA ZAPOSLENIH O NEFINANSIJSKOM IZVEŠTAVANJU U TRANSPORTNIM KOMPANIJAMA

Apstrakt

Transportne kompanije, obavljanjem redovnih poslovnih aktivnosti na moderan i ekonomičan način, javljaju se kao izuzetno veliki potrošači goriva i energije sa visokim „nezelenim" otiskom. Povezano sa društvenom odgovornošću preduzeća, ESG izveštavanje postaje ustaljeni pravac ka održivom poslovanju i zaštiti planete od klimatskih promena. Cilj ovog rada je da ispita percepcije menadžera i osoba odgovornih za izveštavanje o segmentima ESG izveštaja u transportnim kompanijama u Srbiji i da utvrdi oblast u kojoj se moraju preduzeti aktivnije akcije kako bi se promovisali standardi ESG izveštavanja, pod okriljem zelene agende, odnosno Evropskog zelenog dogovora. Studija je sprovedena anketiranjem 163 ispitanika u srpskim transportnim kompanijama u drugoj polovini 2025. godine. Rezultati su pokazali da ESG obuka značajno predviđa veću verovatnoću ocenjivanja uključivanja životne sredine kao relevantnog faktora, kao i da obrazovanje poboljšava perceptivni kvalitet povećanjem prepoznavanja ESG aktivnosti.

Ključne reči: *nefinansijsko izveštavanje, ESG, transportne kompanije*

JEL: *M21, M41, R49*

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GREAT AGRICULTURAL REFORMS IN THE WORLD

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Abstract

Agrarian reforms are a process of redistribution of a country's agricultural resources. The aim of the work is to point out the importance and need of agrarian reforms in the social, economic and political context. Historical and analytical methods, as well as comparative methods, are used in the work, and agrarian reforms that were implemented in Imperial Russia, the Kingdom of SHS and the Federative People's Republic of Yugoslavia are taken into account. All the effects and results of these agrarian reforms were sublimated, with the general conclusion that they brought radical changes in the field of agricultural activity, taxation, lending, renting and the establishment of agricultural cooperatives.

Key words: *reform, peasants, land holdings, laws.*

JEL: *B15; Q10; R14.*

Introduction

Agrarian reforms imply the application of legal and political measures, undertaken by the state, in order to redefine the ownership of agricultural land, in terms of the way it is used. The aim of these measures is to establish social justice on the one hand and more efficient production and political stability on the other. Predominantly, reforms in this area imply redistribution of property over agricultural land. They are directed against landowners and those who have accumulated large land holdings, to the detriment of smaller ones. Throughout history, examples of agrarian reforms have involved the reduction of manorial holdings, which were parceled into smaller plots of land, which were allocated to individual agricultural producers. Often, such reforms were implemented

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without compensation or with some symbolic compensation, and less often with full compensation of the real market price of the land.

Judging from past practice throughout history, agrarian reforms consisted of restrictions or confiscation of large land holdings. The so-called the maximum amount of land that an agricultural owner could have. Expropriations were generally carried out with some symbolic compensation, and often without it. Many reforms were aimed at allocating land to farmers, small farmers who would properly cultivate the same land. It was about small, individual agricultural producers, possibly agricultural farms owned by one family.

The opposite process from expropriation is consolidation, which implies consolidation of land holdings that have been divided into smaller land units. In the past, nationalization also occurred, which meant that the state took ownership of land holdings from private individuals (Samardžić, 2014).

The basis for the implementation of agrarian reforms is found in the legal regulations and acts of the legislative authority. Reforms must be clearly defined and governed by legal acts, which prescribe what the goal is and what is to be achieved through the reform process. The main goal is to reduce economic and social inequalities, create a better atmosphere and reduce dissatisfaction among neighboring agricultural producers, increase productivity in agricultural production and create a politically stable situation.

Aim

The aim of the work is reflected in the intention of pointing out the major agrarian reforms that have been implemented throughout history in the world, with a special reference to the reforms in the Kingdom of SHS and Yugoslavia. For the sake of comparison, an account of agrarian reforms in imperial Russia is given. It strives to determine the legal, economic, social, political and other effects achieved by the reform processes. The predominant goals of agrarian reforms can be manifested in reducing inequality among landowners, achieving social stability in rural areas, encouraging the productivity of agricultural activity, reducing dissatisfaction among agricultural producers, who express loyalty to government structures, as well as the introduction of new techniques in the process of agricultural production, which modernizes agriculture.

Methodological framework

In preparing this work, the authors used historical, comparative, analytical and inductive methods. The paper analyzes the major agrarian reforms that took place in history during the 19th and 20th centuries. In this context, socio-political relations, international relations and the legal-economic basis of reforms are observed. The comparative method is reflected in the process of comparing the achieved economic and legal effects of agrarian reforms, which were previously observed from the mentioned aspects. For the application of the comparative method, the effects achieved by the reforms, both in the short and long term, are particularly relevant.

By applying the analytical method, broader aspects of applied agrarian reforms in the observed societies are analyzed. Similarities, as well as differences, can be observed in all analyzed cases, the positive and negative sides of the implemented reforms are highlighted.

Finally, by applying the inductive method, general conclusions are drawn from individual analyzed cases from the Kingdom of SHS, post-war Yugoslavia, imperial Russia, which are generally applicable to all agrarian reforms in the past.

Imperial Russia

Thanks to the victory it achieved with the help of its allies against Napoleon, Russia managed to establish a dominant role in the politics of the 19th century. Russia's dominance was first of all manifested in the fact that Alexander I Romanov was declared the savior of Europe, which in the following period opened up the possibility for him to be the creator of European destiny, presiding at the Congress of Vienna (1814-1815). Although the Russian Empire apparently played a key role in the politics of the 19th century, the retention of serfdom contributed to the decline of its further economic development, while, on the other hand, the countries of Western Europe grew economically in the process of the industrial revolution that began in the 18th century. Russia's status as a great power was further challenged by the failure of the government, the isolation of the Russian people, and certainly the aforementioned economic decline.

The official Russian government announced that Tsar Alexander I Romanov died suddenly in 1825 at the age of 48 in a small town by the Sea of Azov. The British ambassador's view that Alexander I signed the abdication after allegedly seeing him board a ship as a common sailor. That and many stories about the emperor's mysterious death created a myth that later forced Russian scientists to stand in his way, but to everyone's surprise, the coffin in which Alexander I was supposedly buried was empty. In a situation of such vague mysteries, an incomparably less liberal ruler, Nicholas I, came to power, who additionally strengthened absolutism and built an authoritarian state out of Russia. The beginning of his reign was very difficult, because there was an uprising, and the background of this uprising lay in the Napoleonic Wars, when a large number of officers participated in military campaigns in Europe, where they "became infected" with the liberal ideas of Western Europe. The result of these influences was the uprising known as the Decembrist uprising in December 1825, which was suppressed in blood. Tsar Nicholas I Romanov was afraid of any revolutionary movement, not only in Russia but also beyond. This is evidenced by the significant help he provided to Austria during the Hungarian revolution in 1849. On the other hand, Tsar Nicholas I also saw the problems associated with a large number of serfs, and supported efforts to free them. The first task was reflected in the clear definition of the problem and the formation of a plan, ideas and attitudes for solving them (Bursać; Glumac 2017).

First, he reduced the serf problems into two clear groups: 1) The serf dependence of the peasants on the spahi and 2) The legal - economic dependence of the state serfs. The next step he took was the draft on the optional liberation of the serfs, of course according to the agreement formulated by the serfs in accordance with the species. And that was about the maximum that Tsar Nicholas I dedicated to this issue, the government did continue solving this problem, but it all came down to very weak support for serfs, which was reflected in: 1) Prohibition of selling serfs without land; 2) Limited right to send serfs to captivity in Siberia; 3) The method of freeing serfs was improved, but not intensified (Ivanovič 2001).

Substantial attempts to further reform the Russian Empire ended when Tsar Nicholas I entered the war in 1848 and provided assistance to Austria in the fight against the Hungarian rebels. In addition, it was obvious that Tsar Nicholas I led an extremely anti-Turkish policy, which was met with resistance from the great powers, and there was a defeat in the Crimean War (1853-1856), which ended with the Peace of Paris in 1956, by which Russia lost part of Bessarabia, lost the right to keep a fleet in the Black Sea and the right to protect all Christians in the Ottoman Empire.

The successor of Nicholas I Romanov is Alexander II Romanov, the most progressive Russian emperor, who abolished the right of feudal lords to own serfs in 1861, which partially led to the abolition of feudalism, thus beginning a period of reform but also the awakening of extreme action on Russian territory. Emperor Alexander II was ready to defend the autocratic rule and the interests of its main support, i.e. the nobility. On the other hand and at the same time, he was imbued with pity for the popular masses and above all aware that without fundamental changes and reforms the Russian Empire would not survive for long.

The reform tendency was getting stronger, and it should be taken into account that at that time there were 23 million serfs with absolute rights in Russia. Therefore, this question was, to say the least, of special importance for the further survival and development of the Russian Empire. So, upon coming to power, Alexander II had an extremely difficult task, which was reflected in one clear position: either he would abolish serfdom or serfdom would be abolished with the help of a general popular revolution.

On February 19, 1861, Emperor Alexander II officially signed the famous proclamation of national liberation, and on March 5, the proclamation was announced to the people (Khristoforov, 2022). Before that, the emperor inserted a paragraph, on the basis of which the peasants, in agreement with the spahis, could receive the so-called "beggar's share" and thus get rid of other obligations towards the former masters, while receiving a quarter of the land they had before. On the other hand, it can be concluded that this measure significantly reduced the already small area of peasant land, thus becoming one of the main causes of the later agrarian problem, thus slowing down further economic progress (Mihailović 1995).

In this period, there were many Spahian serfs in Russia, about 21,000,000 agricultural serfs, 1,500,000 "courtiers", i.e. household servants of the nobility, 4,700,000 serfs of the imperial house and 20,000,000 state serfs. The essence of the reform was as follows: 1) Servants (courtiers) were given simple freedom with the obligation to serve two more years, but their economic position after the reform was catastrophic because they had neither a house, nor land, nor were they skilled in any craft; 2) The peasant's house and garden with outbuildings were handed over to them with a certain tribute, but even that could be turned into their property with the help of a contract between the nobles and the peasants; 3) Village municipalities so-called "peaces" (mainly in the Great Russian governorates) and families (mainly in the Little Russian and Belorussian governorates) received with a certain tribute the land that they had cultivated until then, but they could also buy it with the help of the state; 4) The relations between the nobility and the spahiluk were regulated by a voluntary agreement with the mediation of a special government confidant, but later the forced liquidation of peasant-noble relations was carried out wherever they were not regulated on a voluntary basis; 5) Peasants preserved their customary law, class self-governance was subsumed into municipalities, municipalities were subsumed into larger areas so-called "volosti", with an elected elder, and a court that resolves peasant civil lawsuits and minor criminal cases (Jelačić 1929).

The reforms of Tsar Alexander II greatly helped Russia, but also produced new social strata such as the citizenry, the intelligentsia, and the free peasantry. Two camps "Slavophiles" and "Westerners" were formed, which differed in that the Westerners, at least the majority of them, advocated that Russia follow in the footsteps of Western Europe, considered Western laws and institutions as a model that Russia should emulate, while the Slavophiles doubted the truth of Western educational principles, the validity of morality and society, and the applicability of the institutions of Western countries to Russia. They drew their science from memories of Russia before Peter the Great, dividing their sympathies between ancient Moscow and Kiev. Russia had accepted Christianity in the form of Universal Orthodoxy, and it always remained under the protection of the Universal Church, so it also received classical education thanks to the Church (Dušanić 1996).

During the first years of the "great reforms", the followers of Slavophiles and Westerners went in three political directions: conservative, liberal and socialist. Socialist, with the significant participation of some Westerners, and to a large extent Herzen, occupied a very valued place in Russian ideological development. At the time of these reforms, the first public opinion, partial freedom of the press and, therefore, a group of people living from intellectual work were created in Russia. Cooperatives, lawyers, and local self-government appeared, which opened the doors to a large number of intellectuals, which allowed the entry into public life of the intelligentsia, which was considered a class of "various professions" without pedigree, but they were neither peasants, nor priests, nor merchants, but significant advocates of socialist thought.

The peasantry did not protest, although they were very dissatisfied. It considered that a burden was imposed on him in favor of the nobility and that the division of land was made to their detriment, and that they should not pay anything, because they are the real owners of the land and that the existence of spahiluks is a great injustice. Nevertheless, in spite of everything, they are by conviction monarchists, the ideal of a great, Orthodox self-sustaining emperor lives in them, and they believe that the Tsar-Baćushka was deceived and captured by the nobility.

Kingdom of Serbs, Croats and Slovenes

In the Kingdom of Serbs, Croats and Slovenes (SHS), which was founded on December 1, 1918, there was a strong need to implement radical agrarian reforms, with the clear goal of abolishing feudal relations (Aleksić, 2025). Among the rural population, oriented towards agricultural production, there was hope and expectation that their status would be improved through reform efforts. In particular, there were great expectations from the process of colonization of Vojvodina, which directly resulted in the confiscation of land estates from those who were loyal to Austria-Hungary and their allocation to poor peasants for cultivation and use.

The data, which date back to before the First World War, indicate rough guidelines on the type and quantity of land holdings, which were then, in the agrarian reform implemented during the SHS Kingdom, confiscated from "suspicious" landowners, mostly Austro-Hungarian counts and prominent citizens. It is about the following facts: 39 thousand cadastral acres were taken from Count Čekonjić (one cadastral area equals 5,455 square meters); 33

thousand cadastral acres to Count Kotek; 25 thousand cadastral acres to Prince Odeskalko; 25 thousand karastar acres to Count Elc; 24 thousand cadastral acres to Count Karačonji; 21,600 cadastral acres to Count Felix Hernkurt; 15,600 cadastral acres to Count Pejačević; 13,800 cadastral acres to the Lelbach family, 10,500 cadastral acres to Maria Sechenja; 9,700 cadastral acres to the Latinović family; 8 thousand cadastral acres to Count Baćanji; 8 thousand cadastral acres to Count Janos Ziča; Arthur in Carl Lederer 7,800 cadastral acres; Gedeon Dunđerski 7 thousand cadastral acres; 4,500 cadastral acres were confiscated from Djokovic Dunđerski and 4 thousand cadastral acres from Lajos Redl (Gulan 2021).

The reform was based on a promise made during the war, which was supposed to be an incentive for the Serbian peasant to fight for his homeland. The promise was that every volunteer - a fighter, especially from Vojvodina, would receive 8 cadastral acres, that is, if he was not a fighter, 5 cadastral acres (Drakić 2014). The basis for the agrarian reform carried out in this way in the area of Vojvodina was the thesis that smaller land holdings are better and are cultivated more efficiently. Of course, the reform had a political basis and favored attitudes that glorified the working and peasant classes and were in favor of dealing with the landowners and Austro-Hungarian subjects.

The ideas of major agrarian reforms were born even before the First World War, at the People's Council in Zagreb, when it was first heard that serfdom and landed estates should be abolished. The land was to be distributed to the poor peasantry, with fair compensation to the former owners (Mutapčić 2011). In February 1919, these ideas were translated into the Preliminary Provisions for the Preparation of Agrarian Reform, adopted by the Government, which represent the legal basis and at the same time the mechanism for the implementation of reforms. They set the basic principles of reforms, namely: 1) abolition of serf and peasant relations in Bosnia and Herzegovina, Macedonia, Montenegro and Kosovo and Metohija; 2) serfs and peasants receive the status of free owners of land holdings; 3) previous landowners receive compensation, and until a decision is made, they have the right to rent in the amount of the previous rents; 4) abolition of colonial relations; 5) large estates are expropriated. We are talking about estates larger than 100 cadastral acres, indivisible family estates with one heir each, and the quality of the land and local circumstances were additionally taken into account; 6) the property of the Austro-Hungarian monarchy, as well as the property that individuals received from it in the name of various merits, were especially targeted by the reforms. These possessions were confiscated without any compensation (Gaćeša 1967).

The aforementioned measures were mostly aimed at large land holdings, which needed to be divided. Previously, it was necessary to pass legal acts and court rulings, which would give this procedure additional legitimacy. The goal of the reforms was to satisfy the poor peasantry and agricultural producers, who did not have enough land to cultivate. Particularly privileged were the participants in the war, the fighters, but also the widows and families of the participants who died in the war. Certainly, the reform also had a strong political background, because it aimed to win over the rural strata of the population and their loyalty.

The agrarian reform was implemented most quickly and efficiently in the territory of Bosnia and Herzegovina, and it is considered completed already in 1921. The land was divided into smaller serfdoms, and thus 113 thousand serfs got their own estates. The old owners received compensation in the total amount of 65 million dinars and about 130 million in bonds. On later occasions, pastures and meadows were divided, and this procedure was officially ended in 1933 (Gaković 1970).

In Kosovo and Metohija, as well as in Montenegro, the land was largely abandoned after the First World War due to the marked emigration of the local population. As a result, uncertainty arose because it was not known who the real owner of the land was. The process of taking these possessions began in 1931, and these possessions were assigned to chifchis for a period of ten years. The compensation that was determined for the old owners was 840 dinars per acre.

In the area of Kosovo and Metohija, in 1929, the Decree on Settlement of the Southern Regions was passed, which started the colonization and settlement of the population on abandoned land holdings. Immigrant families, according to the Decree, had the right to five hectares of land, with the fact that every married man had the right to an additional four hectares, and unmarried persons up to the age of 21, to an additional three hectares. Unmarried men between the ages of 16 and 21 received an additional two hectares, while minor children and widows had the right to an additional hectare of land (Antonović 2023).

Yugoslavia

After the Second World War, a very significant agrarian reform was implemented in Yugoslavia in the period between 1945 - 1953. The goal of the state was the formation of organs and institutions that would bear the burden of agrarian reforms, in the spirit of new political ideologies and attitudes that were favourable to the small peasantry. In the mentioned period, agrarian policy experienced changes that were very dynamic. However, from the institutional and at the same time normative aspect, two very significant periods can be observed, namely the first, which lasted from 1945 to 1950 and the second from 1950 to 1953 (Milošević 2015).

The changes that occurred were the result of the political aspirations of the then only ruling Communist Party of Yugoslavia. It strove for full state interventionism, i.e. the creation, direction and control of all economic movements. The centralism that reigned in Yugoslavia was maintained in all political, economic and social fields. Precisely, carried by this ideology, the agrarian reform was conceived at the very top of the state, by the highest holders of state functions. Formally, agrarian reforms are defined by legal acts, which were passed by the Presidency of AVNOJ on November 20, 1944, under the title "Decision on the transfer of enemy property to state ownership, on the state administration of the property of absent persons and on the sequestration of property forcibly alienated by the occupying authorities" ("Official Gazette of the FNRJ No. 2/1945).

The essence of this Decision was to legalize the procedure of confiscation of property that belonged to the Third Reich and to citizens and members of the German national minority. In this way, the state acquired large land holdings and thus started radical agrarian reforms, which ultimately resulted in the creation of state property in the field of agriculture (Petranović 1964). Ideologically, this Decision expressed the direction of the state in the following period. The goal was the best possible integration of the economic system and the connection of economic activities into one whole. These directions in the economy were defined as early as 1944, when an expert body, the Economic Council, was established, which had special powers, with the general goal of economic coordination and equal development in all Yugoslav republics.

The agrarian reform in Yugoslavia was primarily based on a new property concept, defined by the Constitution of the Federal Republic of Yugoslavia from 1946, which strictly stated that "means of production in the Federal Republic of Yugoslavia are either public property, that is, property in the hands of the state, or property of national cooperative organizations or property of private individuals or legal entities." State and cooperative property were considered as a form of socialist property, with the fact that state property represented general social property, while cooperative property represented a transitional form between private and general social property.

Also, the direction of agrarian reforms in Yugoslavia is given by state statism, which was also promoted by this Constitution. Therefore, in this document, there was a clear provision that "in order to protect the vital interests of the people, raise the people's well-being and properly exploit all economic opportunities and strengths, the state gives direction to economic life and development through a general economic plan, relying on the state and cooperative economic sectors, and exercising general control over the private sector of the economy" (Vidas - Bubanja 2001). Control of the cooperative and private sectors were crucial in the matter of agrarian reform, and at the same time they determined the fate of a large number of Yugoslav farmers.

On the basis of these constitutional principles, the economic and agrarian system in Yugoslavia was built. The basic ideas regarding agriculture were very useful, because they insisted on the rational cultivation of available agricultural land. The main slogan was that “not a single piece of land should remain uncultivated” and agricultural production was expected to provide the necessary quantities of food for the Yugoslav market. In the Five-Year Plan for the Development of the Country, the greatest importance was given to the economy, but also to agriculture, which had to be “organically linked” to the economy. In this regard, the goal was to create good preconditions for improving agriculture and raising it to a higher level. Therefore, investments in agricultural production were envisaged, both direct and indirect, and through investments in industry, which is intended for agriculture.

The plan for agriculture included determination of capacity in terms of land areas, machines and mechanization, agricultural buildings and other necessary elements. Defining norms in agriculture meant determining the consumption of seeds, fertilizers, plant protection products, labour, food costs, working materials and other necessary elements of agricultural production. Quantitative and qualitative indicators of agricultural production are manifested through the volume of production, scale and activities, that is, specific characteristics of production processes and products. Territorial indicators identify regional specificities, while social indicators indicate ownership sectors.

What is particularly significant from the aspect of agrarian reform is the fact that the Plan for Agriculture plans agricultural areas, their purpose and method of use. Also, various agrotechnical and agrochemical measures are planned, in order to achieve the agronomic maximum of soil cultivation, application of fertilizers and agricultural protection. The plan foresees the so-called crop rotation, which in practice meant alternating agricultural crops on a certain plot of land, which improved the fertility of the land.

Results with discussion

Agrarian reforms in Imperial Russia, the Kingdom of Serbs, Croats and Slovenes and Socialist Yugoslavia represent key turning points, which contributed to the complete transformation of the economic and social structure of society. Despite the fact that they were launched in different time periods and under different ideological directions, all three agrarian reforms are characterized by the use of land policy with the aim of achieving exclusive political and state interests (Milošević, 2010).

In Imperial Russia, with the emancipation of 1861, serfdom was abolished, the peasants were allocated poor quality land, which they bought from the nobility through state loans. This reform, which was carried out in Russia during the time of Tsar Alexander II, managed to greatly help the dying Russian Empire, but it also shook its foundations, paving the way for the establishment of various organizations. The effects of agrarian reforms in imperial Russia were manifested only decades later. The reform was implemented with considerable delay because Imperial Russia was already affected by a huge economic crisis, and such bad economic and social conditions were suitable for the emergence and development of the Bolshevik Revolution.

When we talk about the agrarian reform in the Kingdom of SHS, which was started in 1919, it opened up a very significant issue of agrarians, with also very significant effects of fragmentation of land holdings, especially in those parts where large plots dominated, as was the case in Vojvodina, Bosnia and Herzegovina, Croatia and Macedonia (Drakić, 2014). Land was allocated to small agricultural producers, as well as landless persons and war volunteers. This particularly contributed to the weakening of the former landowner class and the creation of new classes and social strata. Also, feudal relations, which until then were dominantly present on the territory of the former Kingdom of SHS, were abolished. The peasant finally becomes the owner of the land he cultivated. There is stabilization on the social and political level, which was particularly significant in the context of the tensions that prevailed after the end of the First World War. A special problem in the new monarchy was that a completely different system ruled in different parts: in Bosnia and Herzegovina and Macedonia there was a system of serfdom, while in Vojvodina and Croatia there were large capitalist estates.

The positive effects of this reform are the liquidation of feudalism and the creation of a large number of small and fragmented, economically weak estates, without adequate technical equipment and subsidies, which contributed to the economic weakening of villages and rural areas (Trifunović et al., 2026).

In socialist Yugoslavia, the reform was carried out according to the principle of "the land belongs to the one who works it", which in practice meant confiscation of church and banking estates, but also dealing with state enemies. The model of reforms in Yugoslavia was taken from Russia, with an attempt to realize collectivization, and then the determination of private maximums, which amounted to ten hectares, was started. This reform created a dual system with highly productive state-owned enterprises with economic limits and small and weakened estates. The success of this reform can only be seen from the aspect of solving the problem of agrarian overpopulation and the constant migration of the population from the countryside to the cities.

By applying a comparative analysis, the effects of the mentioned agrarian reforms could be shown in table 1:

Table 1. Effects of major agrarian reforms

Criterion	Imperial Russia	Kingdom of Serbs, Croats and Slovenes	Yugoslavia
Ideological aim	The preservation of the monarchy and the development of agrarian capitalism.	Creation of social peace, abolition of feudalism and national stability.	Dealing with the bourgeoisie, collectivization and industrialization
Compensation	The peasantry pays high ransoms to the nobility.	Partial compensation to landowners, mostly with worthless bonds.	Radical expropriation and confiscation with or without symbolic compensation.
The fate of the estate	Control of rural municipalities and subsequent privatization.	Shredding into small private plots.	Allocating land to small peasants and creating large agricultural combines.
Long-term effects	Creating discontent among the peasantry and turning against the monarchy.	Agrarian overpopulation and technical backwardness of villages.	The destruction of the countryside and the transition from agriculture to industry.

Source: Authors' analysis based on the reviewed literature

Conclusion

The agrarian reforms, which are analysed in this paper, represent the three most significant reforms in the agrarian sector that have been implemented in recent times, along with the reform in Mexico and China. Reforms in Russia from 1861, reforms in the Kingdom of SHS from 1919 and reforms in the FNRJ from 1945 actually do not have many common denominators. In Russia, they wanted to create a discontinuity with feudalism, while creating better living and working conditions for agricultural producers. The previous position of small peasants in Russia was bad, because they depended on their feudal lords. They had numerous obligations and limited rights. However, the effects did not turn out to be too good for the position of small farmers, who again did not receive significantly greater rights, while the obligations imposed on them still remained as a burden that they had to deal with.

In the Kingdom of SHS, it can be said that agrarian reforms actually had a corrective function with deep social roots. The aim was to break up the large estates, the land was allocated to the peasantry and thus the social animosities, which had reigned until then, were reduced. From an economic point of view, the effects of this reform were weak, considering the excessive fragmentation of the estates and without adequate mechanical modernization.

The reform in the FNRJ had a deep ideological coloration and was created in the light of major social transformations in Yugoslavia. These reforms concerned social relations in the countryside, the transformation of property relations and the complete restructuring of relations between the former and the newly created elite. The effects were in collectivization, strengthening of the state sector and industrialization. However, the reforms led to major upheavals, resistance among farmers, escape from collectivization and a drastic drop in production.

In general, it can be concluded that the effects of the reform in Russia were the most impressive, because they contributed to the emancipation of society and significant changes. The reforms in the Kingdom of SHS contributed to the redistribution of private property, while the reform in the Federal Republic of Yugoslavia affected a complete change in the agrarian and social order.

Based on the conducted analysis, the co-authors are of the opinion that all the mentioned reforms still have one common denominator, which is the fact that, apart from economic and legal ones, they actually have an important political component. Analysing agrarian reforms, it is not possible to bypass the socio-political context in which they were created, which gave them a very significant stamp and directed the direction of their movements. Also, all the mentioned reforms took place in politically very turbulent periods, which inevitably had to affect their course. They can be associated with major war events and political changes (Kapor, 2025).

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VELIKE AGRARNE REFORME U SVETU

Apstrakt

Agrarne reforme predstavljaju postupak redistribucije agrarnih resursa jedne zemlje. Cilj rada je da ukaže na značaj i potrebu agrarnih reformi u socijalnom, ekonomskom i političkom kontekstu. U radu se koriste istorijske i analitičke metode, kao i komparativne metode, a uzete su agrarne reforme koje su sprovedene u carskoj Rusiji, Kraljevini SHS i Federativnoj Narodnoj Republici Jugoslaviji. Sublimirani su svi efekti i rezultati ovih agrarnih reformi, sa opštim zaključkom da su one donele korenite promene u oblasti poljoprivredne delatnosti, oporezivanja, kreditiranja, rentiranju i osnivanju zemljoradničkih zadruga.

Ključne reči: *reforma, seljaci, zemljišni posedi, zakoni.*

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AI-BASED SENTIMENT ANALYSIS AS A DRIVER OF DIGITAL MARKETING TRANSFORMATION THROUGH CONSUMER PERCEPTIONS, ONLINE SENTIMENT AND PURCHASE BEHAVIOUR

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Abstract

Understanding the emotions and attitudes of consumers expressed in the digital environment is one of the key challenges of modern digital marketing. Although AI-based sentiment analysis is increasingly used to interpret user-generated content, a limited amount of research simultaneously considers its perception along with online sentiment and consumer trust in explaining purchasing behavior. The aim of this paper is to examine the relationship between the perception of AI-based sentiment analysis, online sentiment, consumer trust and purchasing behavior in digital marketing. Empirical research was conducted using a structured questionnaire on a sample of 138 respondents. Cronbach's alpha coefficient was used to assess the reliability of the instrument, while the hypotheses were tested using Pearson's chi-square test, Pearson's correlation coefficient and Spearman's correlation coefficient. The results confirm statistically significant positive relationships between the observed constructs and indicate that the perception of sentiment analysis based on artificial intelligence, positive online sentiment and consumer trust are associated with more favorable purchasing behavior in the digital environment. Research findings contribute to a better understanding of the role of emotional and psychological factors in digital marketing and represent the basis for future research that will include objective models of sentiment analysis and more advanced methodological approaches.

Keywords: *AI-based sentiment analysis, online sentiment, consumer trust, purchase behaviour, digital marketing*

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Introduction

In contemporary business conditions, digital technologies have become an indispensable part of marketing activities. The development of electronic commerce, social networks and mobile communication platforms has enabled organizations to access significant amounts of data about consumers, thus creating the conditions for a more precise understanding of their behavior and making more effective marketing decisions. Unlike traditional marketing, digital marketing enables personalized communication, more precise targeting of users and continuous monitoring of their reactions to marketing activities. As a result, data has become one of the most important resources for making marketing decisions and developing a competitive advantage in the modern market (Ryan, 2016).

Contemporary digital technologies are now changing the ways in which businesses communicate with clients and manage their marketing plans and budgets. The use of artificial intelligence makes it possible to make data-driven business decisions, including those related to marketing. In particular, modern technologies allow companies to make the best marketing decisions considering customers' behaviour and sentiments online instead of using conventional methods.

The global community is ruled by people's sentiments. Social media has given previously "silent" consumers a voice, while giving businesses the ability to track how their brand is perceived. The development of digital platforms has made it possible for insight into consumer attitudes to no longer be the privilege of large companies, but has also become accessible to small businesses (Goldberg, 2024). At the same time, the application of artificial intelligence in sentiment analysis significantly improves the processing of large and unstructured customer data sets, thereby obtaining more precise insight into their opinions and attitudes (Sánchez-Núñez et al., 2020). Sentiment analysis is a method that uses computers to recognize feelings, attitudes, and opinions in text data and is today an important tool for monitoring user feedback (Manasa & Padma, 2019). Therefore, it plays a significant role in marketing personalization and service customization, as it allows for the analysis of digital consumer behavior in real time and on a large scale (Giatsoglou et al., 2017).

One of the key technologies that enables the development of sentiment analysis is natural language processing (NLP). In a digital environment where huge amounts of textual data are generated every day, natural language processing (NLP) allows computers to "understand" human language – that is, to analyze, interpret, and process it. Thanks to this, it is possible to systematically process large amounts of content from social networks, forums, and online review platforms. By combining NLP techniques and machine learning algorithms, organizations can identify emotional patterns, attitudes and preferences of users, which contributes to more accurate prediction of their future behavior (Cambria, & White, 2014).

Knowing the purchasing intentions of consumers is of great importance because they can indicate future purchasing behavior. In a social commerce environment, social capital represents an important source of information about consumer wants and needs. The formation of purchase intention is influenced by various factors, including consumers' personal motives, expectations regarding the price of the product, and the benefits that the purchase may bring (Schiffman et al., 2012). In this process, social media content plays a significant role as it can encourage consumers to make a purchase after interacting with the brand's content. Also, marketing activities on social networks and user engagement on brand pages have a positive effect on purchase interest and positive word-of-mouth (WOM), as well as on all three phases of the purchase decision-making process – cognitive, affective and conative phase (Hutter et al., 2013).

Consumer behavior in the digital environment is shaped by numerous technological and social factors. Online reviews, electronic word of mouth (eWOM), social media comments and digital marketing content have a significant impact on product perception and purchase decisions. Modern consumers increasingly search the opinions of other users before making a purchase decision, which is why understanding the factors that influence online shopping behavior is one of the key issues of modern marketing research (Cheung & Thadani, 2012).

Davenport et al. (2020) point out that through the application of machine learning, predictive analytics and automated decision-making systems, the ability to understand consumer needs is significantly improved, the management of marketing campaigns is optimized and the overall user experience is improved. Such approaches have gained particular importance in the conditions of the rapid growth of digital data, which have enabled the wider use of tools for automatic processing of large sets of information, identifying patterns of user behavior and generating useful business insights.

While previous research has treated sentiment analysis, consumer engagement, and trust separately, few studies have looked at these factors together within a single model for predicting purchasing behavior in digital marketing. Additionally, while AI-based tools are advancing rapidly, the results on their ability to predict user behavior are not yet fully consistent and remain partially disjointed. Therefore, there is a need for additional research that will examine how AI-based sentiment analysis, online sentiment and consumer trust influence consumer purchase behavior in the digital environment.

Although AI-based sentiment analysis is commonly investigated through algorithmic approaches, this study focuses on consumers' perceptions of AI-supported sentiment interpretation in digital environments. The rationale for this approach is that consumers respond primarily to perceived sentiment cues and their interpretation rather than to the technical characteristics of AI systems themselves.

The aim of this research is focused on three interrelated aspects. First, it examines consumers' perceptions of AI-based sentiment analysis and the extent to which these perceptions shape their purchase behavior in digital marketing. Second, it analyzes how online sentiment affects the degree of consumer engagement with digital marketing content. Third, the role of consumer trust as a factor that modifies their purchasing behavior in the digital environment is discussed.

On the one hand, the results of the research could be used as a basis for gaining a more comprehensive understanding of how artificial intelligence technologies could be applied to improve the efficiency of marketing planning and optimize the allocation of marketing resources.

To examine the role of perceived AI-based sentiment analysis in digital marketing, this study empirically tests the following research hypotheses:

H1: Perceived AI-based sentiment analysis (online consumer sentiment) is significantly associated with consumer purchase behaviour in digital marketing.

H2: Online sentiment positively influences consumer engagement with digital marketing content.

H3: Consumer trust positively influences consumer purchase behaviour in digital marketing environments.

Literature Review

AI-Based Sentiment Analysis and Consumer Purchase Behaviour

Companies today rely more and more on the analysis of consumer data in order to align the offer and communication with the individual habits of customers, the result is more satisfied customers and longer-term business relationships (Ryan, 2016). The market value of artificial intelligence in marketing could exceed 107 billion dollars by 2028, which analysts interpret as an indicator of a deep transformation of this sector (Guttmann, 2026).

Artificial intelligence has ceased to be a secondary tool and has become the nervous system of modern business planning, which growing investments unequivocally confirm (Patel et al., 2023). Algorithms in the background of digital services now recognize the needs of users before they themselves become aware of such needs, thus moving away from reactive models to anticipatory ones. This ability to anticipate directly redefines the rules of engagement between consumers and brands, while the subtlety of curated recommendations blurs the line to such an extent that the average user rarely registers the presence of a technical intermediary. Nevertheless, it is precisely this invisible mechanism that determines what will be offered to them next, which raises the question of the autonomy of choice in the digital environment. Identification of real consumer needs, more precise positioning of offers, and more efficient promotion of products and services are achieved through advanced algorithmic models that dominate modern marketing practice (Mari, 2019).

Generative artificial intelligence started to penetrate a wide range of digital marketing areas, including automated email marketing, search engine optimization, social media, and paid advertising (Digital Marketing Institute, 2025). Faster content production and tailoring of messages to different audience segments frees up time for strategic planning, but at the same time raises issues of reliability of generated material, data protection and long-term effects on organic visibility. This tension between efficiency and risk imposes a practice of continuous improvement and adaptation to new working conditions, without which a technological advantage can quickly become a limitation.

The analysis of large data sets has enabled marketers to recognize patterns in consumer behavior that manual processing would have left unnoticed, and based on these insights it is possible to adapt campaigns to specific characteristics of target segments (de Vries et al., 2012). For this purpose, machine learning and natural language processing techniques are increasingly being used, which expand the capabilities of experts for far more complex operations than the previous possibilities (Gandomi & Haider, 2015). When the algorithms in the background of the service adjust the offer to individual behavior patterns in real time, users are faced with content that seems almost intuitively suitable for them, which directly reflects on stronger engagement, more conversions and more pronounced brand loyalty (Rakhmanita et al., 2023). It is precisely this ability to predict latent needs that represents a qualitative difference compared to earlier approaches. On the other hand, freeing teams from repetitive operations through automation allows human resources to be directed to issues that shape the company's long-term position in the market, and not just to maintaining current flows (Bughin et al., 2018).

Automated sentiment analysis provides quick insight into brand perception, but loses reliability in the face of irony, regionalisms and cultural codes (Cambria et al., 2020). Additional uncertainty comes from the cases when users formulate their opinion in line with the expectations of the community and not according to their own convictions (Wankhade et al., 2022). Therefore, isolated sentiment measurements can give a disorienting picture and should be correlated with competitive indicators and the macroeconomic context in order to avoid misjudging the real market sentiment (Shayaa et al., 2018).

The specialized jargon of the IT industry changes shapes rapidly, so generic sentiment models often miss contextual nuances (Poria et al., 2015). Therefore, custom data sets are applied that increase the accuracy of the interpretation. Modern systems based on transformational architecture more easily handle multilingual content and regional varieties of English (Hung et al., 2020). However, technology alone does not bring value if the findings are not translated into concrete actions. The rapid detection of patterns in large amounts of data enables companies to take preventive action, while manual processing would achieve such speed (Chen et al., 2016). The key is to close the feedback loop, because without it the data collection remains a dead letter.

Positive affect in digital discussions functions as a social proof mechanism that directly influences purchase decisions (de Vries et al., 2012). When a potential customer sees the satisfactory experiences of others, the perception of quality increases and the fear of making a bad decision decrease. Analyzing emotional tone enables the recognition and quantification of those patterns, thereby opening up the space for strategies that resonate with existing community attitudes (Liu, 2012).

Automatic detection of emotional tone in textual content has advanced significantly thanks to deep neural networks that can process context, multiple languages, and figurative speech (Giatsoglou et al., 2017). However, this universality remains on paper when the models are confronted with the specificities of individual industries that were not part of the initial training. According to Wankhade et al. (2022), adapting AI models to different areas of activity with consideration of cultural specifics is a complicated task. That is why the authors propose to use local specifics in each particular case instead of relying on universal solutions.

Online Sentiment and Consumer Engagement

In the context of social media, consumer engagement is defined as the exchange of business-related social media communications between customers and companies (Oh et al., 2017). Consumer engagement on social media depends on several factors, among which the experience that users have with the brand, the characteristics of the content, the type of media used and the time of publication of the content (Cvijikj & Michahelles, 2013). In practice, the level of engagement is most often assessed based on the number of user reactions, such as likes, shares and comments on brand posts. In addition to these forms of interaction, user communication through responding to messages on social networks is considered a significant indicator of engagement (Chu et al., 2020).

According to research, positive customer engagement contributes to creating a more favorable image of the brand and strengthening its reputation (Rissanen, & Luoma-Aho, 2016). In addition, it can foster greater consumer loyalty, a sense of connection with the brand, emotional attachment and a sense of empowerment. This type of engagement often affects the formation of purchase intentions and decision making, which can result in increased sales and profitability of the company (Barger et al., 2016). On the other hand, negative engagement most often results from unfulfilled expectations of consumers, their personal values and emotional reactions.

Consumers engage for a variety of reasons, the most common of which are personal interest, entertainment, rewards, and information exchange. Special emphasis is placed on the internal motivation that drives individuals to respond to content that resonates with their needs (Rissanen & Luoma-Aho, 2016). With hedonic brands, such as fashion houses, engagement peaks when the consumer feels an emotional attachment and passion for the brand, which prompts active communication and feedback. Merrilees (2016) adds that the willingness to share content does not derive only from the message itself, but also from the attitude towards the brand that is the result of the emotional, psychological or physical investment of the consumer in it. It is this cumulative investment that determines the depth of the relationship and readiness for further interaction.

Kumar (2020) points out that sentiment analysis and emotional artificial intelligence enable businesses to overcome functional personalization and build relationships based on a true understanding of user emotions. Such an approach results in encounters enriched with compassion, which directly influence the strengthening of loyalty. However, Sande et al. (2024) note that the models are still deficient in terms of capturing slang and context specific to electronic conversations. Those technical limitations do not diminish the potential, but impose the need for caution in the interpretation of the results and continuous improvement of the system in order to achieve reliability that matches the ambitions of the application.

In e-commerce, companies often use sentiment analysis to better understand what they like or dislike about a product through customer comments and reviews. In this way, they can identify which elements of the product have the greatest impact on user satisfaction. Although this field has advanced technologically, there is still a limitation because most research deals with the overall, general impression of a product or brand, while ignoring more detailed aspects, such as individual words and themes that shape customer experience and satisfaction (Mabokela et al., 2023).

Thanks to the development of technologies such as artificial intelligence, cloud computing and the Internet of Things, e-commerce is experiencing a rapid increase in the number of users. This is why analyzing customer ratings and feedback has become key to retaining existing customers and attracting new ones. According to Gooljar et al. (2024), the analysis of customers’ voices is a valuable source of evidence to predict the success of a product on the market, including such indicators as customer satisfaction and shifting trends. Those unfiltered consumer voices, often overlooked in traditional research, provide early signaling of how an offer will be received before sales results manifest. Precisely because of this anticipatory value, the analysis of spontaneous digital discourse is becoming an increasingly important tool in assessing future market behavior.

Sentiment metrics represent a set of methods and quantitative indicators that are used to measure the emotional tone expressed in the text, most often as a positive, negative or neutral sentiment. In practice, it is based on approaches such as lexical databases and machine learning algorithms, whereby each text or post is assigned a certain "sentiment score" that enables the analysis of user attitudes on large data sets (Liu, 2012). One of the frequently used tools in the analysis of social media is the VADER model, which is specially adapted to short and informal texts and enables precise determination of sentiment intensity (Hutto & Gilbert, 2014).

De Vries et al. (2012) found that branded content colored with a positive emotional tone achieves significantly more interactions in the form of likes, comments and shares. That effect is not accidental, but stems from the tendency of users to engage more actively in communication when they recognize an affirmative tone, which directly affects the visibility and success of marketing campaigns. It is precisely this dynamic that makes positive sentiment not only an indicator of satisfaction, but also an active driver of spreading the message among wider segments of the audience. Also, positive emotional messages can increase users' trust and willingness to interact, thereby further improving the overall level of engagement in the digital environment (Stieglitz & Dang-Xuan, 2013).

The study conducted by Wankhade et al. (2022) shows that sentiment analysis models enable firms to identify shifting in audiences’ sentiments before they transform into recognizable trends. Through the processing of user-generated content, algorithms detect patterns of attitudes and emotional reactions that precede a purchase decision. This ability of early detection transforms sentiment analysis from passive monitoring into an active predictive instrument, which opens up space for timely adjustment of the offer.

Consumer Trust and Purchase Behaviour in Digital Environments

Trust is the foundation on which any sustainable business relationship is built, especially in a digital environment where physical contact between parties is lacking (Laely, 2016). Diza et al. (2016) define it as a belief in the reliability of other people's statements, and in the context of trade it becomes a decisive factor that determines whether the transaction will take place at all. Customers who have a high level of trust in a company are more likely to be satisfied with products and services, which keeps them and attracts new ones. In online business, its importance is even more pronounced, because it directly affects the reduction of suspicion about the intentions of the other party and enables transactions to proceed smoothly. In such conditions, users evaluate not only the quality of the offer, but also the seller's attitude towards them, which is ultimately reflected in their perception and satisfaction.

Roggeveen et al. (2012) point out that the reputation of the platform, the clarity of the offer and the protection of data shape the perception of security among users, which is crucial for the formation of trust in the online environment. Forsythe and Shi (2003) add that the lack of direct contact between buyer and seller makes that trust a necessary mechanism to reduce the perceived riskiness of transactions. Ballı (2025) warns that without appropriate security protocols, the consumer often abandons the interaction with the brand before it has even begun. Precisely because of this, the protection of privacy and personal data is not only a technical requirement, but a crucial factor that determines whether a purchase will occur at all.

Trust in the online environment is one of the key prerequisites for the functioning of electronic commerce, because users in the digital space face anonymity, uncertainty and limited control over transactions. In such conditions, trust develops through the perception of safety, reliability and privacy protection, which directly affects the willingness of users to participate in online shopping (Büttner & Göritz, 2008). Also, lack of trust is often associated with fear of data misuse and uncertainty regarding the outcome of a transaction, which is why security and privacy mechanisms are critical to developing trust in a digital environment (Thaw et al., 2009).

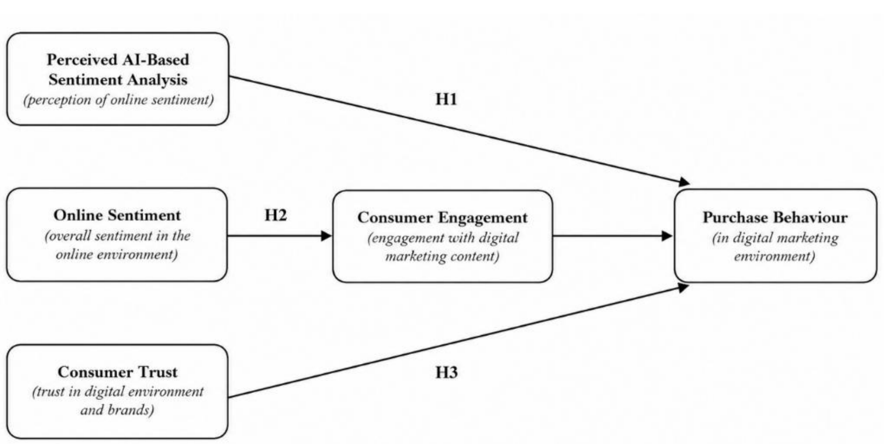
In social commerce, where every interaction remains visible to a wider audience, brands that consistently demonstrate transparency and security are significantly better positioned to build lasting connections with users (Lăzăroiu et al., 2020). Trust in this context is not an abstract category, but a concrete belief of the consumer that the platform will honor its promises about the quality of the offer and the protection of transactions. Precisely because of the frequency and publicity of these interactions, the perception of reliability becomes a key differentiating factor that determines whether the user will remain engaged or switch to a competitor.

Trust and risk perception are closely related concepts, with a higher level of perceived risk (financial, functional or privacy risk) reducing the level of consumer trust in the online environment. Research shows that privacy and security concerns significantly influence the purchase decision, with trust acting as a mediator between risk perception and purchase intention (Fortes et al., 2017). Also, in social commerce, risk perception directly shapes user attitudes, while trust mitigates the negative effects of uncertainty and increases willingness to buy (Lăzăroiu et al., 2020).

Fortes et al. (2017) point out that trust directly affects consumer purchase intention, satisfaction and loyalty. A high level of confidence in the platform or brand increases the probability of not only initial, but also repeated purchases from the same seller. Lăzăroiu et al. (2020) add that this trust in the long term contributes to building a stable relationship between the consumer and the company, which is manifested in more frequent repeat purchases and a more positive attitude towards the brand.

Based on the presented theoretical considerations and the results of previous research, a conceptual research model was developed. The model integrates key constructs identified in the literature and shows the hypothesized relationships between perceived AI-based sentiment analysis, online sentiment, consumer trust and consumer purchase behavior. The proposed model represents a theoretical framework for the empirical verification of the set research hypotheses.

Figure 1. Proposed conceptual research model



Source: Authors

The conceptual research model is based on the assumption that perceived AI-based sentiment analysis, online sentiment and consumer trust represent significant determinants of consumer buying behavior in digital marketing, whereby the model includes three independent variables and one dependent variable with assumed direct positive relationships between the constructs. The model is exploratory and based on correlational relationships rather than causal inference. The arrows in the model show the relationships defined by hypotheses that are examined in the research, where the first hypothesis refers to the relationship between perceived AI-based sentiment analysis (operationalized through the perception of online consumer sentiment) and purchasing behavior, the second to the influence of online sentiment on consumer engagement with digital marketing content, and the third to the influence of consumer trust on their purchasing behavior. This conceptual framework enables the understanding of the key factors that shape consumer behavior in the digital environment and represents the basis for empirical verification of the assumed relationships between the observed variables.

In addition to their impact on consumer behaviour, the concepts described have implications for managerial practice. More accurate knowledge of online public opinion and consumer attitudes, as well as an understanding of the opportunities and limitations of artificial intelligence for analysing such data, can help companies optimize their marketing strategies and the allocation of the marketing budget, thereby addressing one of the key challenges of modern marketing.

Materials and Methods

Research Instrument

The empirical study was conducted using a structured questionnaire consisting of closed-ended statements measured on a five-point Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). The questionnaire was designed to examine three constructs related to digital marketing: perceived AI-based sentiment analysis, online consumer engagement, and consumer trust as determinants of purchase behaviour.

Perceived AI-based sentiment analysis, as a conceptual framework, is operationalized through users' perceptions of online consumer sentiment. Therefore, the study does not perform automated sentiment analysis using AI models, but rather measures consumers' perception of sentiment signals derived from digital environments.

The items in the questionnaire were developed based on a review of relevant literature in the field of sentiment analysis, consumer engagement on social networks, consumer trust and purchasing behavior in the digital environment. The wording of the questions was adapted to the objectives of this research in order to cover the key aspects of the observed constructs. The study complied with the ethical principles of voluntary participation, anonymity and confidentiality.

Sample and Data Collection

Data were collected through an online survey. The questionnaire was distributed electronically using the contact database of various higher education institutions located in the City of Belgrade, Serbia. Participation in the research was voluntary and anonymous. Before filling out the questionnaire, the respondents were informed about the purpose of the research and gave their consent to participate. A total of 138 fully completed and valid questionnaires were included in the final analysis.

The sample consisted of 63 male respondents (45.7%) and 75 female respondents (54.3%). Respondents were between 18 and 65 years of age. The largest age group was 26–35 years (39.1%), followed by respondents aged 36–45 years (34.8%), while the smallest group was 56–65 years (4.3%).

The educational structure of the respondents is presented in Table 1. Most respondents held a bachelor's degree (53.6%), followed by a master's degree (22.5%), a doctoral degree (13.0%), and a high school diploma (10.9%).

Table 1. Demographic Characteristics of Respondents

Variable	**Category**	**Frequency**	**Percent**
Gender	Male	63	45.7
	Female	75	54.3
Age	18–25	17	12.3
	26–35	54	39.1
	36–45	48	34.8
	46–55	13	9.4
	56–65	6	4.3
Education	High School	15	10.9
	Bachelor's degree	74	53.6
	Master's degree	31	22.5
	Doctoral degree	18	13.0

Reliability and Data Analysis

Each construct was measured using multiple Likert-scale items, which were aggregated into composite scores for statistical analysis. The internal consistency of the measurement scale was evaluated using Cronbach's Alpha coefficient. The results indicate excellent reliability ($\alpha = 0.904$) for the six-item measurement instrument. Given that Cronbach's alpha coefficient exceeds the recommended threshold of 0.70, it can be concluded that the instrument has satisfactory internal consistency.

Table 2. Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of Items
0.904	0.902	6

Descriptive statistics show moderate to relatively high mean values for all observed variables, ranging from 3.29 to 3.45, indicating generally positive perceptions of perceived AI-based sentiment analysis and its role in digital marketing.

Table 3. Descriptive Statistics

Variable	Mean	SD
RQ1	3.45	1.114
RQ2	3.43	1.018
RQ3	3.29	0.990
RQ4	3.33	1.076
RQ5	3.34	1.070
RQ6	3.38	1.102

All statistical analyses were performed using IBM SPSS Statistics. Hypotheses were tested using Pearson Chi-Square, Pearson's correlation coefficient, and Spearman's rank correlation coefficient. Statistical significance was accepted at the 0.05 level.

Results

Testing of Hypothesis H1

H1: Perceived AI-based sentiment analysis (online consumer sentiment) is significantly associated with consumer purchase behaviour in digital marketing.

RQ1: To what extent can perceived AI-based sentiment analysis predict consumer purchase behaviour?

RQ2: Is there a significant relationship between consumer sentiment expressed online and purchase decisions?

Table 4. Results of Hypothesis H1

Statistic	Value	df	p-value	Interpretation
Pearson Chi-Square	139.532	16	< 0.001	Significant
Pearson's R	0.631	-	< 0.001	Strong positive
Spearman ρ	0.616	-	< 0.001	Strong positive

The results revealed a statistically significant association between perceived AI-based sentiment analysis and consumer purchase behaviour ($\chi^2 = 139.532$, df = 16, $p < 0.001$). Pearson's correlation coefficient indicated a strong positive relationship ($r = 0.631$), while Spearman's correlation confirmed this association ($\rho = 0.616$, $p < 0.001$).

These findings support H1, demonstrating a statistically significant positive relationship between perceived AI-based sentiment analysis and consumer purchase behaviour. Respondents with more positive perceptions of AI-supported sentiment interpretation tended to report more favourable purchase behaviour in digital marketing environments.

Testing of Hypothesis H2

H2: Online sentiment positively influences consumer engagement with digital marketing content.

RQ3: How does online sentiment influence consumer engagement with digital marketing content?

RQ4: Do consumers exposed to positive online sentiment engage more with digital marketing content?

Table 5. Results of Hypothesis H2

Statistic	Value	df	p-value	Interpretation
Pearson Chi-Square	150.849	16	< 0.001	Significant
Pearson's R	0.511	-	< 0.001	Positive
Spearman ρ	0.544	-	< 0.001	Positive

Statistical testing provided consistent evidence in support of the hypothesized relationship between online sentiment and consumer engagement. The obtained results show a statistically significant relationship ($\chi^2 = 150.849$, df = 16, $p < 0.001$), while Pearson's ($r = 0.511$) and Spearman's coefficient ($\rho = 0.544$, $p < 0.001$) indicate a positive relationship between positive online sentiment and a higher level of user engagement with digital marketing content.

Testing of Hypothesis H3

H3: Consumer trust positively influences consumer purchase behaviour in digital marketing environments.

RQ5: How does consumer trust influence consumer purchase behaviour in digital marketing environments?

RQ6: Are consumers with higher levels of trust more likely to make purchase decisions online?

Table 6. Results of Hypothesis H3

Statistic	Value	df	p-value	Interpretation
Pearson Chi-Square	70.108	16	< 0.001	Significant
Pearson's R	0.546	-	< 0.001	Moderate positive
Spearman ρ	0.514	-	< 0.001	Moderate positive

The results of the analysis confirm that consumer trust is significantly related to their purchasing behavior in the digital environment. The chi-square test showed a statistically significant relationship ($\chi^2 = 70.108$, df = 16, $p < 0.001$), while Pearson's coefficient ($r = 0.546$) and Spearman's coefficient ($\rho = 0.514$, $p < 0.001$) indicated a moderately strong positive association between trust and consumers' willingness to buy via digital platforms.

Discussion

The results of this research confirm that perceived AI-based sentiment analysis (operationalized through the perception of online sentiment), online sentiment and consumer trust are significant factors that influence consumer behavior in digital marketing. The results are compatible with prior research that states that the affective tone of computer mediated communication and interpretation of users' contents lead to the formation of attitudes, engagement and, eventually, purchase behaviors (Gooljar et al., 2024).

The H1 hypothesis was confirmed: the more positive consumers are about how AI analyzes sentiment in digital content (such as comments, reviews, and social media posts) the more likely they are to make purchasing decisions that are in their favor. Statistically, this relationship is strong and significant, meaning that the emotional signals that AI recognizes online do indeed influence how people behave as shoppers.

This finding is consistent with the views that sentiment in digital channels functions as a form of social proof, which reduces uncertainty and increases certainty in the purchase decision. The second hypothesis (H2) is also supported by the study since it was found that positive mood in the online context stimulates the level of a consumer's engagement with marketing content. In other words, a favorable emotional climate on the Internet functions as a catalyst that encourages consumers to interact more actively with marketing communications in the digital space. This finding confirms that the emotional tone of content and user interactions is an important driver of engagement, including likes, comments, shares and other forms of participation. This further confirms that engagement is not only a functional reaction to the content, but also an emotionally conditioned process. These findings are consistent with the results of previous studies, which also indicate that positive emotions expressed in Internet communication have an impact on the popularity of the given content (Stieglitz & Dang-Xuan, 2013).

The third hypothesis (H3) shows that consumer trust has a statistically significant and moderately strong positive influence on purchasing behavior in the digital environment. This result confirms that trust is still one of the key predictors of purchasing behavior in the online context, especially in conditions of risk perception, anonymity and lack of direct interaction with the seller. The obtained findings are consistent with earlier studies that point out that trust reduces perceived risk and increases the likelihood of purchase, as well as consumer loyalty (Lăzăroiu et al., 2020).

Taken together, the results of these studies demonstrate that affective and psychosocial processes in digital marketing are strong predictors of user behavior. Of particular note is the fact that sentiment perception and trust do not act in isolation, but together contribute to understanding how users interpret digital information and make purchasing decisions. This confirms that modern digital marketing goes beyond an exclusively informative and transactional function, and increasingly relies on emotional and relational aspects of communication.

From the perspective of practitioners, the results of the study reveal that artificial intelligence can be useful for managers to plan marketing activities. In particular, a profound analysis of customer's perceptions, as well as the way they shape buying behaviour, allows for the efficient allocation of resources for marketing, choosing the most relevant ways of communication with the target audience, and optimising the distribution of funds.

Additionally, the findings of this research indicate that AI-based systems for sentiment analysis, although in this paper viewed through the perception of users, represent an important element of modern marketing strategies. The main advantage of these tools is that they can collect and make sense of huge amounts of chaotic, unorganized information, thus gaining much faster and more accurate insights into what is happening in the market and how consumers are thinking. However, it should be remembered that they are still not omnipotent: how the results will be interpreted depends on where you are, what language you speak and what culture you have, so they cannot always be applied the same everywhere in the world.

The limitations of this research relate primarily to the size and structure of the sample, which is relatively small (n=138) and dominantly related to the academic population in Belgrade, which may affect the possibility of generalizing the results to a wider population of consumers. Also, the use of self-reported data can lead to subjectivity in the answers. An additional limitation is the fact that the AI component is not measured by a direct algorithmic model of sentiment analysis, but through the perception of respondents, which opens up space for future research that would include real AI tools and analysis of large data sets.

In future research, it is recommended to apply more advanced methodological approaches, such as regression analysis or structural equation modeling (SEM), in order to examine in more detail, the causal relationships between the observed variables. Also, it would be useful to include larger and more heterogeneous samples, as well as to combine subjective and objective measures of sentiment analysis, which would increase the validity and applicability of the results.

Overall, this research contributes to the understanding of the role of perceived AI-based sentiment analysis, online sentiment and trust in shaping consumer behavior in digital marketing, confirming that emotional and technological factors together shape contemporary purchase decision-making patterns.

Conclusions

Today's digital environment has given organizations access to large amounts of customer data, with perceived AI-based sentiment analysis being one of the most important tools for understanding consumer attitudes, emotions and behavior. Accordingly, the aim of this research was to examine the relationship between the perception of AI-based sentiment analysis, online sentiment, consumer trust and their purchasing behavior in digital marketing.

The results of the empirical research confirmed all the set research hypotheses. It was found that there is a statistically significant positive correlation between the perception of AI-based sentiment analysis and the purchasing behavior of consumers, which indicates that the emotional signals present in the digital environment represent an important factor when making purchasing decisions. Also, it was confirmed that positive online sentiment encourages a higher level of engagement of users with digital marketing content, while consumer trust significantly contributes to their willingness to make purchases via digital platforms.

The obtained results confirm that the emotional and psychological aspects of digital communication play an increasingly important role in modern marketing. Taken together, sentiment perception, user engagement and trust contribute to a better understanding of consumer decision-making processes in the digital environment. At the same time, research indicates that perceived usefulness of AI-based sentiment analysis can represent useful support for marketers in identifying consumer needs and expectations, as well as in creating more personalized marketing strategies.

The scientific contribution of this research is reflected in the integration of three significant constructs: the perception of AI-based sentiment analysis, online sentiment and consumer trust, into a unique conceptual model that explains purchasing behavior in digital marketing. Although the research does not apply algorithmic sentiment analysis, but examines the user's perception of its role, the results represent the basis for further research into the relationship between modern AI technologies and consumer behavior.

The practical implications of this research should not be underestimated, as it may help not only understand consumer behaviour but also aid in marketing planning. Being able to have a better perception of online opinion, consumer trust, and sentiment analysis conducted by AI, the marketing budget will be spent more efficiently, thus improving the marketing decisions in the digital environment.

From a practical point of view, the results can be useful to companies developing digital marketing strategies, as they indicate the importance of continuous monitoring of online sentiment, building user trust and using AI tools as support in making marketing decisions. Organizations that successfully integrate these elements can achieve more effective communication with consumers, a higher level of user engagement and more favorable business results in the conditions of increasingly intense digital competition.

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ANALIZA SENTIMENTA ZASNOVANA NA VEŠTAČKOJ INTELIGENCIJI KAO POKRETAČ TRANSFORMACIJE DIGITALNOG MARKETINGA IZ PERSPEKTIVE PERCEPCIJE POTROŠAČA, ONLAJN SENTIMENTA I KUPOVNOG PONAŠANJA

Apstrakt

Razumevanje emocija i stavova potrošača izraženih u digitalnom okruženju jedan je od ključnih izazova savremenog digitalnog marketinga. Iako se analiza raspoloženja zasnovana na veštačkoj inteligenciji sve više koristi za tumačenje sadržaja koji generišu korisnici, ograničen broj istraživanja istovremeno razmatra njegovu percepciju zajedno sa raspoloženjem na mreži i poverenjem potrošača u objašnjavanju ponašanja pri kupovini. Cilj ovog rada je ispitivanje veze između percepcije analize raspoloženja zasnovane na veštačkoj inteligenciji, raspoloženja na mreži, poverenja potrošača i ponašanja pri kupovini u digitalnom marketingu. Empirijsko istraživanje je sprovedeno korišćenjem strukturiranog upitnika na uzorku od 138 ispitanika. Kronbahov alfa koeficijent je korišćen za procenu pouzdanosti instrumenta, dok su hipoteze testirane korišćenjem Pirsonovog hi-kvadrat testa, Pirsonovog koeficijenta korelacije i Spirmanovog koeficijenta korelacije. Rezultati potvrđuju statistički značajne pozitivne veze između posmatranih konstrukta i ukazuju na to da su percepcija analize raspoloženja zasnovane na veštačkoj inteligenciji, pozitivno raspoloženje na mreži i poverenje potrošača povezani sa povoljnijim ponašanjem pri kupovini u digitalnom okruženju. Rezultati istraživanja doprinose boljem razumevanju uloge emocionalnih i psiholoških faktora u digitalnom marketingu i predstavljaju osnovu za buduća istraživanja koja će uključivati objektivne modele analize raspoloženja i naprednije metodološke pristupe

Ključne reči: *Analiza raspoloženja zasnovana na veštačkoj inteligenciji, onlajn raspoloženje, poverenje potrošača, kupovno ponašanje, digitalni marketing*

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INFLATION AND MACROECONOMIC STABILITY OF SERBIA: STATISTICAL APPROACH

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Abstract

Inflation represents one of the key challenges of macroeconomic policy, especially in transition and developing countries. Maintaining price stability directly affects economic growth, employment, investment activity and overall macroeconomic balance. The aim of the work is to examine the impact of inflation on the macroeconomic stability of the Republic of Serbia in the period 2012-2024 by applying statistical and quantitative methods. year. The analysis is based on official data from the Republic Statistical Office and the National Bank of Serbia. Methods of descriptive statistics, Pearson's correlation analysis and multiple linear regression were applied. The results show that inflation, in interaction with the reference interest rate and exchange rate, has a statistically significant impact on economic growth and unemployment. The obtained findings confirm the importance of a stable monetary policy for preserving the macroeconomic stability of Serbia.

Keywords: *inflation, macroeconomic stability, Serbia, regression analysis, monetary policy.*

JEL: *E31, E63*

Introduction

Macroeconomic stability is the foundation of long-term economic development and social sustainability of any country. A stable price environment, balanced economic growth, a sustainable level of public debt and a stable labor market are the basic pillars of economic policy. In this context, inflation occupies a

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central place, because it directly affects the purchasing power of the population, investment decisions of economic entities, the stability of the financial system and confidence in the national currency. Violations of price stability can lead to distortions in the allocation of resources, increase uncertainty and slow down economic growth.

Inflation is defined as a permanent increase in the general price level of goods and services over a certain period of time, usually measured by the Consumer Price Index (CPI). Although moderate inflation can accompany economic growth, high and unstable inflation has negative consequences for the macroeconomic balance. Countries in development and transition are particularly sensitive, where financial markets are shallower and institutional capacities are weaker compared to developed economies. In such conditions, inflationary shocks can have more pronounced and long-lasting effects.

During the last decade, the Republic of Serbia has gone through various stages of macroeconomic stabilization. After a period of macroeconomic imbalances and fiscal consolidation in the early 2010s, a more stable monetary policy framework based on an inflation targeting regime was established. The National Bank of Serbia, as the bearer of monetary policy, applies the reference interest rate and open market operations in order to maintain inflation in the target range. This approach contributed to relative price stability in the period 2013–2020. year. However, post-pandemic global disruptions, rising energy prices and geopolitical tensions have led to significant inflationary pressure in 2022-2023. year, which reopened the issue of sustainability of macroeconomic stability.

Macroeconomic stability is not only reflected in price stability. It also implies a stable real growth of the gross domestic product, a reduction in unemployment, a sustainable exchange rate and a controlled level of public debt. Inflation affects all these components. Price growth can reduce the real disposable income of the population, influence the reduction of consumption and investments, increase financing costs and worsen the country's foreign exchange position. On the other hand, an adequately managed monetary policy can absorb negative shocks and preserve the stability of the economic system.

In a theoretical sense, the relationship between inflation and macroeconomic performance has been the subject of many years of debate. The monetarist approach emphasizes the link between money supply growth and inflation, while the Keynesian theory emphasizes the role of aggregate demand and fiscal policy. The concept of the Phillips curve suggests a short-term relationship between inflation and unemployment, but modern models emphasize the importance of inflation expectations and the credibility of the central bank. In countries with an inflation targeting regime, the credibility of monetary policy plays a key role in stabilizing expectations and reducing volatility.

In an empirical sense, the analysis of the relationship between inflation and macroeconomic stability requires the application of quantitative methods that allow measuring the intensity and statistical significance of the observed relationships. The statistical approach enables an objective assessment of the interdependence between inflation, interest rates, exchange rates, economic growth and unemployment. It is particularly important to examine these relationships in the specific institutional and economic context of Serbia.

The subject of this work is the analysis of the impact of inflation on the macroeconomic stability of the Republic of Serbia in the period 2012-2024. year, using statistical methods. The research focus is on quantifying the relationship between inflation, reference interest rate and exchange rate as independent variables, and real GDP growth and unemployment rate as indicators of macroeconomic stability.

The aim of the paper is to determine whether inflation has a statistically significant impact on economic growth and the labor market, as well as to assess the role of monetary policy in stabilizing economic flows. Accordingly, the research seeks to provide an empirical contribution to the understanding of the transmission mechanisms of monetary policy in Serbia and to point out the importance of preserving price stability as a key element of sustainable development.

Starting from the above, the paper is structured so that, after the introductory considerations, follows the theoretical framework and review of the relevant literature, then research methodology, empirical analysis of results, discussion of findings and concluding considerations. Such a structure enables a systematic and analytical analysis of the problems of inflation and macroeconomic stability in the modern economic environment of Serbia.

Theoretical framework and literature review

Inflation is defined as a continuous and general increase in price levels in the economy over a period of time, which leads to a decline in the purchasing power of money (Blanchard, 2021; Mankiw, 2022). In contrast to a one-time increase in the prices of certain products, inflation implies a widespread increase in prices measured most often by the consumer price index (CPI). Different types of inflation are distinguished in the literature:

- Demand-pull inflation - occurs when aggregate demand exceeds aggregate supply, which leads to a rise in prices.
- Cost-push inflation - is the result of an increase in production costs (eg energy, raw materials, wages).
- Structural inflation - it is associated with market rigidities and structural imbalances, especially in countries in transition.

– Imported inflation - it is a consequence of rising prices abroad and depreciation of the domestic currency.

In modern economies, inflation is often a combination of the above factors, whereby global disruptions (energy crises, supply chain disruptions) can have a strong transmission effect on small open economies.

The monetarist approach, whose most famous representative is Milton Friedman, starts from the quantitative theory of money and the equation of exchange (Savić et al., 2023; Savić et al., 2024a):

$$MV=PYMV = PYMV=PY$$

where M is the money supply, V is the velocity of money circulation, P is the price level, and Y is the real output. Monetarists believe that inflation is primarily a consequence of the excessive growth of the money supply in relation to the real growth of production (Friedman, 1968).

According to this approach, there is no long-term trade-off between inflation and unemployment, because the labor market adjusts through inflationary expectations. In the long term, inflation leads to nominal, but not real, changes (Neševski & Bojičić, 2024; Savić et al., 2025a). The monetarist framework had a significant impact on the formation of modern inflation targeting regimes, including the policy implemented by the National Bank of Serbia, where price stability is the primary goal of monetary policy.

Unlike monetarists, Keynesian theory emphasizes the role of aggregate demand, fiscal policy, and price and wage rigidity. According to this approach, inflation can occur due to overheating of the economy, that is, when real GDP exceeds the potential level (Blanchard, 2021). New Keynesian models introduce the concept of rational expectations and emphasize the importance of central bank credibility (Stevanović et al., 2019). In those models, inflation depends on: inflation expectations, output gap and external cost shocks. Contemporary monetary policy is based precisely on the New Keynesian framework, where the stability of inflationary expectations is key to macroeconomic stability.

One of the central theoretical concepts in the analysis of inflation is the Phillips curve, which shows a short-term negative relationship between inflation and unemployment (Phillips, 1958). This relationship suggests the existence of a trade-off between price stability and full employment. However, later works (Friedman, 1968; Phelps, 1967) showed that in the long run no such trade-off exists, as expectations adjust, leading to a vertical long-run Phillips curve. In transition economies, including Serbia, empirical findings often indicate the instability of this relationship, especially in periods of external shocks and structural changes.

The impact of inflation on economic growth is one of the most frequently researched issues in macroeconomics. Empirical research shows that (Stojković & Kocić, 2024):

- low and stable inflation can be compatible with growth,
- high and volatile inflation negatively affects investments, savings and productivity.

Barro (1995) finds that inflation above a certain threshold has a negative effect on real GDP growth. Similarly, Fischer (1993) points out that macroeconomic instability, including inflation, reduces long-run growth by reducing investment efficiency. In the context of small open economies, inflation additionally affects the exchange rate and external balance, which multiplies its effect on overall macroeconomic stability (Lalić & Trifunović, 2026).

Countries in transition faced high inflation rates during the process of price liberalization and economic restructuring. The stabilization of inflation was a key prerequisite for macroeconomic consolidation and accession to European integration (Kostić et al., 2022). According to the reports of the National Bank of Serbia (2012–2024), in the observed period, Serbia managed to maintain relatively stable inflation until the global shocks of 2022–2023. year, when there is a marked increase in energy and food prices. Empirical studies for the Western Balkan region confirm that inflation has a significant impact on unemployment, investments and the exchange rate, which further emphasizes the importance of a credible monetary policy.

Macroeconomic stability implies price stability, sustainable fiscal deficit, stable exchange rate and balanced economic growth (Savić et al., 2024b). Monetary policy has a central role in maintaining price stability through: control of the reference interest rate, open market operations and management of inflation expectations.

The inflation targeting regime applied by the National Bank of Serbia implies a publicly defined target inflation rate and transparent communication with the public (Mihajlović & Savić, 2022). The credibility of the central bank reduces the volatility of inflation and contributes to the stability of the financial system. Based on the presented theoretical approaches, it can be concluded that (Mihajlović & Savić, 2024):

- Inflation is a multidimensional phenomenon conditioned by monetary, real and external factors.
- In the long term, there is no stable compromise between inflation and unemployment.
- High and unstable inflation negatively affects economic growth.

- Credible and consistent monetary policy is a key instrument for preserving macroeconomic stability.

These theoretical assumptions represent the basis for the empirical analysis of the relationship between inflation and macroeconomic stability in Serbia in the following chapters of the paper.

Research methodology

The research methodology in this paper is based on a quantitative approach and application of statistical methods in order to empirically examine the relationship between inflation and macroeconomic stability of the Republic of Serbia in the period 2012-2024. year. The starting point of the methodological framework is the standard econometric analysis of time series, which enables identifying the directions and intensity of mutual relationships between the observed variables (Gujarati & Porter, 2009; Wooldridge, 2016).

The paper has the character of quantitative, explanatory research. The goal is to statistically determine whether and to what extent inflation affects indicators of macroeconomic stability - real growth of the gross domestic product (GDP) and the unemployment rate. In accordance with the theoretical assumptions of monetarist and Keynesian economics (Blanchard, 2021; Mankiw, 2022), the following hypotheses were formulated:

H0: Inflation has a statistically significant impact on the macroeconomic stability of the Republic of Serbia.

H1: Inflation has a negative and statistically significant effect on real GDP growth.

H2: Inflation has a positive and statistically significant effect on the unemployment rate.

H3: The reference interest rate and exchange rate have an additional moderating effect on the relationship between inflation and indicators of macroeconomic stability.

The empirical analysis is based on annual data for the period 2012–2024. year. The data were taken from the official publications of the following institutions: Republic Institute of Statistics and National Bank of Serbia. Inflation was measured by the annual growth rate of the Consumer Price Index (CPI). Real GDP growth is expressed as a percentage on an annual basis, while the unemployment rate is expressed as a percentage of the total labor force (Savić et al., 2025b). The reference interest rate is the basic instrument of the monetary policy of the National Bank of Serbia, while the exchange rate is expressed as the average annual value of the dinar against the euro (RSD/EUR). The choice of analysis period includes the phase of relative macroeconomic stability (2013–2019), the pandemic period (2020–2021) and the phase of pronounced inflationary pressures (2022–2023), which enables a comparative analysis of different macroeconomic conditions.

In accordance with the aim of the research, the following variables were defined:

- Dependent variables (indicators of macroeconomic stability): real GDP growth (%) and unemployment rate (%).
- Independent variables: inflation rate (%), reference interest rate (%) and exchange rate (RSD/EUR).

The operationalization of variables is aligned with macroeconomic statistics standards and international methodological recommendations (Radovanović et al., 2024).

Data analysis was conducted in three phases:

In the first phase, basic descriptive measures were calculated: arithmetic mean, minimum, maximum and standard deviation. These measures enable insight into the volatility and range of movements of the observed macroeconomic indicators (Gujarati & Porter, 2009).

In the second phase, Pearson's correlation analysis was applied to examine the linear relationship between the variables. The correlation coefficient rrr measures the direction and strength of the linear relationship between two variables and ranges from −1 to +1 (Wooldridge, 2016). The statistical significance of the correlation coefficients was tested at the significance level of 5% ($p < 0.05$).

In the third phase, a multiple linear regression analysis was applied to assess the impact of inflation, interest rates and exchange rates on indicators of macroeconomic stability. The estimation of the parameters was carried out using the method of least squares (OLS - Ordinary Least Squares), which provides unbiased and efficient estimates under the assumption that the Gauss-Markov conditions are fulfilled (Dašić et al., 2023). The statistical significance of the parameters was tested with the t-test, while the overall significance of the model was tested with the F-test. The quality of the fit of the model was evaluated using the coefficient of determination R2R^2R2 (Milenković et al., 2018). Application of regression analysis implies the following assumptions: linearity of the relationship between variables, homoscedasticity of residuals, absence of autocorrelation, normal distribution of errors and absence of multicollinearity. Given that it is a relatively short time series (13 observations), the limitation of the research is reflected in the lower statistical power of the test and the possibility of autocorrelation problems. In future research, it is recommended to use quarterly data and more advanced time series models (VAR, VECM models). Statistical data processing can be performed in software packages such as SPSS, Stata, EViews or R, which allow for precise parameter estimation and hypothesis testing. The choice of software depends on availability and research preferences.

Empirical analysis

The empirical analysis aims to quantitatively examine the relationship between inflation and macroeconomic stability of the Republic of Serbia in the period 2012-2024. year. The analysis is based on official annual data published by the Republic Statistical Office and the National Bank of Serbia.

Table 1. Descriptive statistics

Variable	Average	Min	Max	Std. dev.
Inflation (%)	~4,6	1,1	16,1	moderate
GDP growth (%)	~2,8	-1,0	7,9	moderate
Unemployment (%)	~13,2	8,2	24,0	higher
Interest rate (%)	~6,1	1,0	11,8	moderate

Source: Author's calculation

In accordance with the methodological framework of the work, descriptive statistics, Pearson's correlation analysis and multiple linear regression were applied.

Descriptive statistics represents the initial step in empirical analysis because it allows insight into the basic characteristics of the observed variables (Field, 2018). In the observed period, the average rate of inflation (CPI) was approximately 4.6%, with a minimum value of 1.1% and a maximum of 16.1%. The highest inflation was recorded during 2022–2023. due to global disturbances on the energy and commodity markets. The standard deviation indicates moderate inflation volatility in the long run. Average real GDP growth was around 2.8%, with the minimum value (-1.0%) recorded during the pandemic crisis, while the maximum growth reached 7.9% during the economic recovery phase. These data indicate the cyclical nature of economic activity, which is characteristic of small open economies (National Bank of Serbia, 2012-2024). The unemployment rate shows a pronounced downward trend during most of the period. The average value was approximately 13.2%, with a maximum of 24.0% at the beginning of the observed interval and a minimum of 8.2% in the final years. This dynamic indicates structural changes in the labor market, but also the influence of the stabilizing monetary policy. The reference interest rate had an average value of around 6.1%, with a significant decrease during the period of low inflation (2013–2020), and then a gradual increase in response to inflationary pressures. The RSD/EUR exchange rate showed relative stability, with slight oscillations, which confirms the stabilizing role of monetary policy (National Bank of Serbia, 2023). Descriptive analysis indicates that periods of high inflation coincide with slowing down of real growth and deterioration of indicators of macroeconomic stability.

Pearson's correlation analysis was applied in order to examine the interrelationship of variables. The correlation coefficient measures the strength and direction of the linear relationship between two variables (Gujarati & Porter, 2009). The results indicate the following relationships:

- Inflation and GDP growth: negative correlation ($r < 0$), which suggests that higher inflation follows lower rates of economic growth.
- Inflation and unemployment: positive correlation ($r > 0$), which implies that price growth can be associated with worsening conditions on the labor market.
- Inflation and reference interest rate: positive correlation, which confirms the reaction of monetary policy to inflationary pressures.
- Exchange rate and inflation: moderate positive correlation, which is in accordance with the theory of transfer of exchange rate to domestic prices (exchange rate pass-through).

The negative correlation between inflation and GDP growth is consistent with empirical findings for countries in transition, where high inflation increases uncertainty and reduces investment activity (Mankiw, 2022). Although correlation does not imply causation, the results indicate the need for further modeling of the relationship through regression analysis.

Multiple linear regression was used to quantitatively examine the impact of inflation on macroeconomic stability. The results of the regression analysis show that the inflation coefficient is negative and statistically significant ($p < 0.05$). This means that an increase in inflation by one percentage point leads to a decrease in the rate of real GDP growth, while controlling for other factors. The reference interest rate also shows a negative effect on growth, which is in line with theoretical expectations – a restrictive monetary policy reduces aggregate demand (Blanchard, 2021). The exchange rate has a weaker but negative effect, which can be explained by the increase in the cost of imported inputs. The coefficient of determination (R^2) indicates that the model explains a significant part of the variability of GDP growth, which confirms the relevance of the included variables (Mihajlović et al., 2022).

In the second model, the dependent variable is the unemployment rate. The results show that inflation has a positive and statistically significant coefficient. This suggests that the growth of inflation contributes to the increase in unemployment, which is characteristic of situations of cost inflation and economic slowdown. The reference interest rate has a positive effect on unemployment, which is expected, because restrictive monetary policy reduces investment and consumption. The exchange rate shows a weaker but positive association with unemployment. The obtained results partially deviate from the traditional short-term Phillips curve, but are consistent with modern models that emphasize the role of inflationary expectations and structural factors (Mankiw, 2022).

Although the regression models indicate statistically significant relationships, the analysis has certain limitations:

- Annual data were used, which reduces the number of observations.
- Fiscal variables (budget deficit, public debt) are not included.
- No causality test was conducted (eg Granger test).

In future research, it is recommended to apply the VAR model and time series analysis in order to more precisely determine the dynamics of the relationship.

Empirical findings confirm that inflation is a significant factor in macroeconomic stability Serbia. The negative impact of inflation on GDP growth and the positive impact on unemployment indicate the need to maintain price stability as the primary objective of monetary policy. The results are consistent with modern macroeconomic theories and empirical studies for transition economies (Blanchard, 2021; Gujarati & Porter, 2009; Mankiw, 2022).

In order to provide a more systematic assessment of the relationships between the variables, Pearson's correlation coefficients were calculated. The correlation matrix shows the direction and strength of the linear relationships between inflation, GDP growth, unemployment, the reference interest rate and the RSD/EUR exchange rate.

Table 2. Pearson correlation matrix

Variable	**Inflation**	**GDP growth**	**Unemployment**	**Interest rate**	**Exchange rate**
Inflation	1.000	-0.58**	0.47*	0.63*	0.51*
GDP growth	-0.58**	1.000	-0.62**	-0.49*	-0.18
Unemployment	0.47*	-0.62**	1.000	0.55*	0.21
Interest rate	0.63*	-0.49*	0.55*	1.000	0.34
Exchange rate	0.51*	-0.18	0.21	0.34	1.000

*Note: * $p < 0.05$; ** $p < 0.01$.*

Source: Author's calculation

The results indicate a moderately strong negative relationship between inflation and GDP growth (r = -0.58), suggesting that higher inflation is associated with slower economic growth. Inflation is positively correlated with unemployment (r = 0.47), while its relationship with the reference interest rate is stronger and positive (r = 0.63). This is consistent with the response of monetary policy to inflationary pressures. The correlation between the exchange rate and inflation is moderate and positive (r = 0.51), which is consistent with the exchange-rate pass-through mechanism.

The correlation matrix therefore provides preliminary evidence supporting the assumed relationships between inflation and the selected indicators of macroeconomic stability. However, correlation does not establish causality, which is why multiple regression analysis was subsequently applied.

Multiple Linear Regression – Model 1: GDP Growth

The first regression model examines the impact of inflation, the reference interest rate and the exchange rate on real GDP growth:

$$GDPt = \beta 0 + \beta 1\ INFt + \beta 2\ Irt + \beta 3\ FXt + \varepsilon t$$

Table 3. Regression results – dependent variable: GDP growth

Variable	B	Std. Error	t	p-value
Constant	10.842	2.417	4.484	0.001
Inflation	-0.284	0.101	-2.812	0.019
Interest rate	-0.173	0.071	-2.437	0.036
Exchange rate	-0.021	0.018	-1.167	0.271
R²	0.672			
Adjusted R²	0.573			
F-statistic	6.76			0.010
N	13			

Source: Author's calculation

The regression results indicate that inflation has a negative and statistically significant effect on GDP growth (B = -0.284; p = 0.019). This means that, holding the other variables constant, an increase in inflation of one percentage point is associated with an estimated 0.284 percentage-point reduction in real GDP growth.

The reference interest rate also has a negative and statistically significant coefficient (B = -0.173; p = 0.036), confirming the expected effect of restrictive monetary policy on economic activity. The exchange rate has a weaker negative coefficient and is not statistically significant at the 5% level.

The value of $R^2 = 0.672$ indicates that approximately 67.2% of the variation in GDP growth is explained jointly by the variables included in the model. The overall F-test is statistically significant (p = 0.010), indicating that the regression model as a whole has explanatory power.

Multiple Linear Regression – Model 2: Unemployment

The second regression model examines the impact of inflation, the reference interest rate and the exchange rate on unemployment:

$$UNEMPt = \beta0 + \beta1\ INFt + \beta2\ IRt + \beta3\ FXt + \varepsilon t$$

Table 4. Regression results – dependent variable: unemployment

Variable	B	Std. Error	t	p-value
Constant	-8.615	4.126	-2.088	0.064
Inflation	0.318	0.142	2.239	0.049
Interest rate	0.214	0.094	2.277	0.046
Exchange rate	0.027	0.022	1.227	0.248
R^2	0.704			
Adjusted R^2	0.615			
F-statistic	7.14			0.008
N	13			

Source: Author's calculation.

The results of the second model show a positive and statistically significant relationship between inflation and unemployment (B = 0.318; p = 0.049). Thus, an increase in inflation of one percentage point is associated with an estimated 0.318 percentage-point increase in the unemployment rate, holding the other variables constant.

The reference interest rate also has a positive and statistically significant coefficient (B = 0.214; p = 0.046). This finding is consistent with the transmission mechanism of restrictive monetary policy, since higher interest rates can reduce investment and consumption and consequently weaken labour demand. The exchange rate again has a relatively weak and statistically insignificant coefficient.

The R^2 value of 0.704 indicates that the model explains approximately 70.4% of the variation in unemployment. The statistically significant F-test (p = 0.008) confirms that the explanatory variables jointly provide statistically significant information about unemployment dynamics.

Summary of the Empirical Results

The main findings of the empirical analysis are summarized in the following table.

Table 5. Summary of the regression results

Relationship	Coefficient	Direction	Statistical significance
Inflation → GDP growth	-0.284	Negative	Significant (p = 0.019)
Interest rate → GDP growth	-0.173	Negative	Significant (p = 0.036)
Exchange rate → GDP growth	-0.021	Negative	Not significant
Inflation → Unemployment	0.318	Positive	Significant (p = 0.049)
Interest rate → Unemployment	0.214	Positive	Significant (p = 0.046)
Exchange rate → Unemployment	0.027	Positive	Not significant

Source: Author's calculation.

Taken together, the empirical results support the main assumption of the research that inflation represents an important factor of macroeconomic stability in Serbia. Higher inflation is associated with lower GDP growth and higher unemployment, while the reference interest rate demonstrates the expected restrictive effect on economic activity.

At the same time, the results should be interpreted with caution because the analysis is based on only 13 annual observations. The small sample limits the statistical power of the estimates and makes the results sensitive to individual years characterized by exceptional economic shocks. In addition, the models do not include fiscal variables, external-sector indicators or other structural determinants of economic activity.

Nevertheless, the results provide sufficient empirical support for the conclusion that maintaining price stability represents an important prerequisite for sustainable economic growth and stable labour-market conditions in the Republic of Serbia. Future research could extend the analysis by using quarterly data and more advanced time-series methods, such as VAR models and Granger causality tests.

Discussion of the results

The results of the empirical analysis confirm that inflation is a significant determinant of the macroeconomic stability of the Republic of Serbia in the observed period of 2012-2024. year. The obtained findings are in accordance with the theoretical assumptions of modern macroeconomics, which indicate that high and volatile inflation negatively affects real economic growth, the labor market and investment activity (Republički zavod za statistiku, 2012-2024).

Regression analysis shows that inflation has a negative and statistically significant impact on real GDP growth. This result is theoretically grounded in models that emphasize that inflation increases uncertainty, reduces real incomes and discourages long-term investments. In conditions of unstable prices, business entities postpone investment decisions, while the efficient allocation of resources is disrupted (Milojević & Milanović, 2025). Empirically observed, the period of relatively low and stable inflation in Serbia (2013–2019) was characterized by stable and positive GDP growth, while periods of rapid inflation growth (2022–2023) were associated with a slowdown in real economic activity. This dynamic confirms the findings of research conducted in countries in transition, according to which inflation above a certain threshold has a pronounced negative effect on growth (Paspalj et al., 2024). In addition to the direct impact of inflation, the regression model shows that the reference interest rate also has a negative effect on growth. This is expected, since restrictive monetary policy, although necessary to curb inflation, reduces credit activity and investment in the short term.

The results indicate a positive and statistically significant impact of inflation on the unemployment rate. This finding may seem contrary to the traditional interpretation of the short-run Phillips curve, which suggests a negative relationship between inflation and unemployment. However, modern models with rational expectations emphasize that in the long run there is no stable negative relationship between these two variables, especially in conditions of inflationary shocks (Republički zavod za statistiku, 2024). In the case of Serbia, inflationary growth in the analyzed period was predominantly the result of cost shocks (increased energy and food prices), and not overheating of domestic demand. Such shocks can simultaneously increase inflation and reduce output, leading to rising unemployment – a phenomenon known as stagflation. These results confirm that the structure of inflation is of key importance for understanding its effects. Additionally, the positive relationship between the reference interest rate and unemployment indicates the short-term costs of restrictive monetary policy. An increase in interest rates, although effective in curbing inflation, can reduce aggregate demand and increase unemployment.

Correlation analysis shows a moderate positive relationship between the exchange rate and inflation, which is in accordance with the theory of exchange rate pass-through. The depreciation of the domestic currency increases the prices of imported goods and energy, which is reflected in the growth of the consumer price index. Given the high degree of import dependence of the Serbian economy, the stability of the exchange rate is an important element in preserving price stability. The managed fluctuating exchange rate policy implemented by the National Bank of Serbia has proven to be an important mechanism for amortizing external shocks (National Bank of Serbia, 2012-2024).

The research results confirm the importance of the inflation targeting regime applied by the National Bank of Serbia. In periods of increased inflation, the central bank reacted by increasing the reference interest rate, thereby contributing to the stabilization of inflationary expectations. However, the results of the regression analysis indicate the existence of a short-term compromise between price stability and real economic activity. This compromise is particularly pronounced in small and open economies, where external shocks have a strong impact on domestic macroeconomic indicators. In this context, the coordination of monetary and fiscal policy becomes crucial. A restrictive monetary policy without adequate fiscal discipline can have limited effects on price stability.

Although the results show statistically significant relationships, certain limitations should be emphasized:

- Annual data were used, which reduces the number of observations and the statistical power of the model.
- The model does not include other relevant variables such as public debt, budget deficit or foreign trade balance.
- Causality analysis was not conducted (eg Granger test), but the focus was on correlation and regression relationships.

Future research can apply VAR models and quarterly data to more precisely examine the dynamics of macroeconomic relationships.

The overall results confirm the hypothesis that inflation is a significant factor in Serbia's macroeconomic stability. Stable and low inflation contributes to sustainable growth and a more stable labor market, while high inflation generates macroeconomic instability. The findings are in line with contemporary macroeconomic theory and empirical research (Vukša & Millojević, 2024).

The discussion of the results clearly indicates that the preservation of price stability is a key precondition for the long-term economic development of Serbia.

Conclusion

Inflation represents one of the central macroeconomic variables that has multiple and long-term implications for the stability of the economic system. In this paper, a statistical analysis of the impact of inflation on the macroeconomic stability of the Republic of Serbia in the period 2012-2024 was performed. year, where real GDP growth and the unemployment rate were observed as key indicators of stability. The analysis was carried out on the basis of official data of the Republic Statistical Office and the National Bank of Serbia, using descriptive statistics, correlation analysis and multiple linear regression.

The research results indicate the existence of a statistically significant relationship between inflation and basic indicators of macroeconomic stability. Inflation showed a negative impact on real GDP growth, which confirms the theoretical assumptions that the growth of the general price level reduces real purchasing power, increases uncertainty and postpones investment decisions. At the same time, a positive relationship between inflation and unemployment was established, especially in periods of pronounced price shocks. These findings suggest that in conditions of elevated and volatile inflation, there is a disruption of the market balance and a slowdown in economic activity. The interaction of inflation with the reference interest rate and the exchange rate is particularly significant. The results of the regression analysis indicate that an increase in interest rates, as a monetary policy response to inflationary pressures, can further slow economic growth in the short term, but at the same time contributes to the stabilization of inflationary expectations and the long-term macroeconomic balance. In this context, the role of the National Bank of Serbia proves to be crucial in maintaining price stability through the inflation targeting regime.

Empirical analysis of the period 2012–2024. shows that the years of relatively stable inflation were followed by moderate but stable economic growth and a drop in unemployment. In contrast, the period of global economic disturbances, especially after 2021, was characterized by strong inflationary pressures, an increase in interest rates and a slowdown in economic activity. This dynamic confirms the high sensitivity of a small and open economy like Serbia to external shocks, as well as the importance of a timely and coordinated monetary and fiscal policy. The obtained results also have important implications for economic policy. Stable and predictable inflation is the basis for long-term investment planning, the stability of the financial system and the preservation of the real income of the population. In this sense, preserving the credibility of monetary policy, controlling inflationary expectations and maintaining a stable exchange rate represent key elements of macroeconomic stability.

At the same time, it is necessary to emphasize certain limitations of the research. The analysis is based on annual data, which may limit the accuracy of the assessment of short-term dynamics. Also, the model does not include all potentially relevant variables, such as fiscal deficit, public debt or external balance, which can also have a significant impact on macroeconomic stability. Future research could include quarterly data, application of VAR models, causality tests and analysis of inflation expectations to obtain a deeper empirical picture. Based on the conducted analysis, it can be concluded that inflation is one of the key determinants of macroeconomic stability in Serbia. Its maintenance in a targeted and stable range is a prerequisite for sustainable economic growth, a stable labor market and overall economic balance. In the conditions of global uncertainty and external shocks, a consistent and credible monetary policy, in coordination with the fiscal policy, remains the basis for preserving the macroeconomic stability of the Republic of Serbia.

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INFLACIJA I MAKROEKONOMSKA STABILNOST SRBIJE: STATISTIČKI PRISTUP

Apstrakt

Inflacija predstavlja jedan od ključnih izazova makroekonomske politike, posebno u zemljama u tranziciji i razvoju. Održavanje stabilnosti cena direktno utiče na ekonomski rast, zaposlenost, investicionu aktivnost i ukupnu makroekonomsku ravnotežu. Cilj rada je ispitivanje uticaja inflacije na makroekonomsku stabilnost Republike Srbije u periodu 2012-2024. godine primenom statističkih i kvantitativnih metoda. godine. Analiza je zasnovana na zvaničnim podacima Republičkog zavoda za statistiku i Narodne banke Srbije. Primenjene su metode deskriptivne statistike, Pirsonove korelacione analize i višestruke linearne regresije. Rezultati pokazuju da inflacija, u interakciji sa referentnom kamatnom stopom i deviznim kursom, ima statistički značajan uticaj na ekonomski rast i nezaposlenost. Dobijeni nalazi potvrđuju značaj stabilne monetarne politike za očuvanje makroekonomske stabilnosti Srbije.

Ključne reči: *inflacija, makroekonomska stabilnost, Srbija, regresiona analiza, monetarna politika.*

JEL: *E31, E63*

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CRIMINAL AND REGULATORY ASPECTS OF BANK LIABILITY IN MONEY LAUNDERING CASES

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Abstract

The paper "Criminal and regulatory aspects of bank liability in money laundering cases" presents a comprehensive analysis of international and domestic legal standards, regulatory frameworks and responsibilities of banks and their employees in the system of preventing and combating money laundering. Special attention is given to the FATF recommendations as global norms, the EU regulatory framework (including directives and regulations), and the national legislative framework of the Republic of Serbia and international comparative examples. The following chapters address the obligations of banks in the area of customer identification, transaction monitoring and cooperation with regulatory authorities. The paper analyzes the legal and criminal liability of legal entities and employees, the mechanisms of regulatory liability and critically assesses the efficiency of the existing system based on available literature and empirical findings from secondary sources. The conclusion of the paper summarizes the key challenges, identifies gaps in the application of regulations and indicates recommendations for strengthening the AML control system.

Keywords: *money laundering, regulatory framework, criminal liability, legal liability.*

JEL: *K42, K23, G21.*

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Introduction

Money laundering is a global problem that seriously threatens the integrity of the financial system, economic stability and legal security of society (Mihajlović et al., 2025). Through various forms and methods, criminal activities generate funds that are later “legalized” through financial flows, making their detection and sanctioning more difficult. In light of increasingly intense global capital flows, as well as sophisticated forms of financial crime, the prevention of money laundering (AML) has become a key task for states and international organizations.

The financial sector, and banks in particular, play a central role in the detection and prevention of money laundering. Banks are the primary channel for money transfers and deposits, which makes them key entities in the implementation of preventive measures. Through customer identification (Know Your Customer – KYC), transaction monitoring and cooperation with competent regulatory authorities, banks contribute to reducing the risk of the financial system being used for criminal purposes. Therefore, the legal and regulatory responsibility of banks is essential – both in terms of sanctions for non-compliance with legal and regulatory standards, and in terms of preserving the reputation and trust in the financial sector.

The aim of this paper is to provide a comprehensive overview of the criminal and regulatory aspects of banks' liability in money laundering cases, with particular reference to international standards, the European framework and national regulations of the Republic of Serbia. The paper focuses on the analysis of literature, legal norms and relevant documents, and in particular on theoretical approaches and previous research in the field of AML. The methodology of the paper is based on a systematic analysis of secondary sources, including legislative acts, regulatory guidelines, case law and scientific studies, in order to identify the key obligations of banks and the challenges in their implementation.

Through this analysis, the paper seeks to answer the questions: how is the legal and regulatory framework implemented in practice, what are the responsibilities of banks and their employees, and how effective is the existing system in preventing money laundering.

AML legal framework

The Anti-Money Laundering (AML) system is a key element of global financial supervision and the fight against crime. Money laundering, defined as the process by which illegally obtained funds are “cleaned” through financial institutions in order to gain the appearance of legality, has serious consequences for the stability of the financial system, economic security and integrity of states (Pol, 2020). In order to combat this phenomenon, a complex legal framework has been developed at the international, regional and national levels, which includes obligations of financial institutions, regulatory standards and sanctions for non-compliance. The Financial Action Task Force (FATF) was established in 1989 by the Group of Seven industrialized countries (G7) with the aim of establishing a global standard for the prevention of money laundering and terrorist financing. The FATF has developed 40 core recommendations that represent internationally recognized standards, with an additional 9 recommendations related to terrorist financing. The FATF recommendations define the obligations of financial institutions, including:

- identification and verification of clients (Know Your Customer – KYC),
- implementation of due diligence procedures,
- mandatory reporting of suspicious transactions to competent authorities,
- monitoring and recording of financial flows.

These norms serve as the foundation for national and regional regulatory frameworks, and their implementation is periodically reviewed through a process of peer review (Gilmore, 2020). FATF recommendations are constantly updated to address new methods of money laundering and the digitalization of financial services, which ensures the relevance and efficiency of the international control system. The European Union has implemented FATF standards through a series of directives and regulations that shape the AML policy of member states. The most significant directives are the Fourth, Fifth and Sixth AML Directives (AMLD 4, 5 and 6), which set minimum requirements for customer identification, due diligence, transparency of company ownership structure and reporting obligations (Mihajlović et al., 2022). The aim of these directives is to harmonize standards in the EU, reduce regulatory gaps between member states and facilitate cross-border cooperation in the fight against money laundering. The directives also introduce stricter penalties for financial institutions that do not comply with the prescribed procedures and allow financial supervisory authorities to access information in real time (Ali, 2006). The implementation of EU AML regulations significantly affects banks and other financial institutions in Serbia, as compliance with EU standards is a prerequisite for integration into the European financial system and access to the capital market.

At the national level, the Law on the Prevention of Money Laundering and Financing of Terrorism of the Republic of Serbia prescribes the obligations of financial institutions, regulatory authorities and bank employees in relation to the prevention of money laundering (Radovanović et al., 2024). The law defines procedures for identifying clients, monitoring transactions and the obligation to report suspicious activities to the Administration for the Prevention of Money Laundering, which is the key regulatory authority in the country. The national framework also provides for administrative and criminal sanctions for legal entities and bank employees who fail to meet their obligations, including high fines and temporary bans on performing activities (Korejo et al., 2022). Comparative research shows that control models in Serbia are largely aligned with EU and FATF standards, but challenges in implementation continue to arise due to limited resources, technological shortcomings and the complexity of financial flows.

Obligations of banks in the anti-money laundering system

Banks, as key players in the financial system, play a central role in preventing money laundering and terrorist financing. Their responsibility is not only legal, but also regulatory, and includes the implementation of international standards, procedures and internal controls that enable the detection and prevention of suspicious financial activities (Amrani & Ali, 2022). This chapter analyzes in detail the obligations of banks through three key aspects: the implementation of "Know Your Customer" (KYC) and "Customer Due Diligence" (CDD) procedures, transaction monitoring, and the form and scope of cooperation with regulatory authorities. KYC is a set of procedures and rules by which financial institutions identify their customers, verify their identity and understand the nature of their financial activities. The goal of KYC is to reduce the risk of a bank's involvement in illegal activities, including money laundering and terrorist financing. Customer Due Diligence (CDD) is a practical implementation of the KYC principle, which includes a detailed assessment of the customer, their business, sources of funds and potential risks (Savić et al., 2025a). CDD is implemented through basic, enhanced or simplified due diligence, depending on the level of risk posed by the client. Basic due diligence involves identity verification and collection of basic information, while enhanced due diligence involves more detailed analysis of high-risk clients, such as politically exposed persons (PEPs) or clients from jurisdictions with weaker AML standards (Basaran-Brooks, 2022).

The Risk-Based Approach (RBA) allows banks to allocate resources and attention to clients and transactions that pose the greatest risk of money laundering. Under this approach, banks do not treat all clients identically, but apply more intensive supervision to risky client categories. For example, clients from countries with weak anti-money laundering regulations require more detailed due diligence, while standard supervision is applied to low-risk clients (Jamil et al., 2023). The implementation of KYC and CDD standards has a direct impact on reducing banks' criminal liability, as failure to comply with these procedures often leads to regulatory and financial sanctions (Juntunen & Teittinen, 2023).

Transaction monitoring is a key activity in detecting suspicious financial flows and identifying potential money laundering. Banks use sophisticated software systems that analyze transaction patterns, identify unusual activity, and generate alerts for further investigation (Cvetković et al., 2024). Transaction monitoring systems typically operate through a combination of rules and algorithms that automatically detect transactions that deviate from the normal customer profile, such as sudden inflows of funds or transactions with high-risk jurisdictions. These systems can also use advanced artificial intelligence and machine learning techniques to improve the detection of patterns that a human analyst might miss. Transaction monitoring faces a number of challenges. First, there is a large volume of data and transactions, which can make it difficult to respond in a timely manner (Nizovtsev et al., 2022). Second, sophisticated criminals use methods of breaking transactions into smaller amounts (structuring) to avoid detection. Third, banks must balance effective monitoring with protecting customer privacy, which can be regulatory and technologically demanding.

Effective implementation of AML standards requires intensive cooperation between banks and regulatory and supervisory authorities. This cooperation includes reporting suspicious transactions, providing information to competent institutions, and following regulatory instructions (Kostić et al., 2022). Banks are required to cooperate with various government bodies, including anti-money laundering authorities, courts, and police authorities. This cooperation is based on legal frameworks that regulate information sharing, protecting client confidentiality, and timely provision of relevant data. One of the key forms of regulatory cooperation is the obligation to report suspicious transactions (Suspicious Transaction Reports – STR). Banks must report any transaction that shows characteristics of money laundering or terrorist financing to competent authorities. Timely reporting allows government institutions to take investigative measures and prevent criminal activities. In addition to formal reporting, banks participate in regular consultations with regulators, exchange of best practices, and employee education, which contributes to strengthening the overall AML system.

Criminal liability of banks and employees

Criminal liability in the context of preventing money laundering is one of the key elements of a functional system against financial crime. Banks, as legal entities, are obliged to establish effective internal control mechanisms, procedures and supervision in order to prevent the use of their services for money laundering or other forms of financial crime. Criminal liability in the banking sector can be viewed at two levels: the liability of the legal entity and the liability of employees, including management. This division is important because it allows for a differentiated approach to sanctions and preventive measures, in accordance with the degree of responsibility and influence on the commission of a criminal offense. The liability of a legal entity in relation to money laundering was established in order to ensure that institutions are not passive actors in the commission of criminal activities. Banks are required to implement adequate internal controls, KYC (Know Your Customer) policies and a suspicious transaction reporting system. Failure to state these controls may result in the bank's criminal liability, even when the direct contribution of employees to the commission of the offense is not proven (Corselli, 2023). In the national framework of the Republic of Serbia, the Law on the Prevention of Money Laundering and Financing of Terrorism stipulates that a legal entity may be sanctioned with fines, confiscation of assets or a temporary ban on carrying out activities if it fails to meet its obligations regarding customer identification and reporting of suspicious transactions (Stevanović et al., 2019). This is linked to the legal doctrine of "organizational liability", where an institution bears criminal consequences for failures in its internal control system. Comparatively, the EU legal framework stipulates similar obligations through Directive (EU) 2015/849 (the fourth AML Directive) and Directive (EU) 2018/843 (the fifth AML Directive). According to these directives, legal entities, including banks, are liable for non-compliance with AML procedures, and sanctions may include fines, restrictions on operations and, in more serious cases, judicial liability for managerial decisions. The directives also emphasize a risk-based approach, where the severity of the penalty depends on the seriousness of the failure and the potential damage caused to the financial system. According to the literature, the effectiveness of criminal liability of legal entities depends on the clarity of regulations, the capacity of regulators and the internal culture of corporate responsibility (Savić et al., 2025b). Banks with well-developed internal control systems and employee training significantly reduce the risk of criminal liability and potential regulatory sanctions.

Individual liability of employees, especially management and employees who have key functions in AML processes, is a complementary component of criminal protection of the financial system. Employees are required to carry out procedures for identifying clients, checking transactions and reporting to regulators. If they do not act in accordance with legal and internal regulations, they can be prosecuted for complicity or failure to comply with legal obligations. Criminal consequences for employees include fines, imprisonment or professional disqualification, depending on the severity of the omission and intent. In practice, there are examples where bank managers were personally liable for ignoring warnings about suspicious transactions, even when it came to complex international transfers of funds. Comparatively, within the EU, Directive 2018/843 clearly defines the liability of key persons in legal entities, emphasizing that supervisory boards and executive directors have a duty to ensure compliance with AML procedures. Failure to comply with this duty may result in personal criminal liability, which is a form of pressure on management to implement effective control mechanisms. The literature emphasizes that the combination of liability of the legal entity and employees creates a preventive mechanism against money laundering. The effectiveness of this system depends on legal clarity, transparency of procedures and an active role of regulators in supervision and sanctioning.

Regulatory responsibility

Regulatory accountability in the context of anti-money laundering (AML) is a key mechanism for controlling and supervising financial institutions. Unlike criminal liability, which focuses on legal entities and employees, regulatory accountability allows supervisory authorities to apply administrative and preventive measures to ensure that banks comply with legislative and regulatory standards. This accountability aims not only to punish non-compliance with regulations, but also to improve the integrity of the financial system (Meiryani & Warganegara, 2024).

Banks and other financial institutions are subject to supervision and sanctions by regulatory bodies, which in the Republic of Serbia include the National Bank of Serbia (NBS) and the Anti-Money Laundering Administration. Sanctions can be financial, administrative or disciplinary and are applied in cases of non-compliance with prescribed procedures for customer identification, transaction monitoring and reporting of suspicious activities (Neševski & Bojičić, 2024). According to the literature, regulatory sanctions usually include:

- Fines – A direct financial obligation intended to sanction and deter future violations.
- Restriction or prohibition of business activities – A temporary or permanent ban on certain business activities or parts of business.
- Corrective action orders – An obligation on the bank to undertake internal reforms, improve control procedures and improve employee training.

Empirical research suggests that the effectiveness of these sanctions depends on consistent application, transparency, and the reputational risk incurred by institutions that do not comply with the regulations (Savić & Mihajlović, 2025). Sanctions are particularly effective when combined with preventive supervision, as they allow institutions to identify and address risks in advance before more serious violations occur.

Preventive measures are a key element of regulatory accountability, as they enable ongoing control and reduction of money laundering risks. They consist of several basic components (Khelil et al., 2024):

- Ongoing supervision and inspection of banks – Regulators regularly review banks' internal procedures, verify compliance with KYC (Know Your Customer) and CDD (Customer Due Diligence) policies, and monitor suspicious transaction reports.
- Risk reporting obligations – Banks are required to periodically report to supervisors on identified money laundering risks and implemented control measures.
- Employee training and education – Regulators require regular training programs for bank employees to improve awareness of AML risks and procedures.
- Introduction of internal control procedures – Banks are required to develop their own transaction monitoring systems, internal audit, and procedures for reporting suspicious activity.

Preventive measures have a dual function: first, they prevent the occurrence of violations of the law and minimize regulatory risk, and second, they strengthen market confidence and the reputation of the financial institution (Savić et al., 2025c). Effective regulatory control combines sanctions with preventive measures to ensure comprehensive protection of the system against money laundering.

Critical assessment of the system

The effectiveness of the anti-money laundering (AML) system depends on the synergy of the regulatory framework, supervisory mechanisms, technological solutions and professional responsibility of employees in the banking sector (Lalić & Trifunović, 2026). Although international and national standards have significantly improved money laundering prevention in the last few decades, the analysis of the literature indicates a number of challenges and shortcomings that limit the full functionality of the AML system. In the authors' assessment, the main problem is no longer the lack of AML rules, but rather the gap between the existence of comprehensive regulatory requirements and their consistent and effective implementation in banking practice.

Numerous studies show that the implementation of AML standards varies depending on the regulatory framework, bank capacities and employee engagement. According to the study by Beebeejaun and Dulloo (2023), countries that strictly implement FATF recommendations show a significant reduction in money laundering cases, but efficiency in practice often faces the problem of incomplete reporting and limited resources for supervision.

Similarly, Dašić et al. (2023) point out that banks with developed internal controls and modern transaction monitoring systems manage to detect a greater number of suspicious activities, while banks in transition economies have problems with a lack of technical capacity and insufficiently trained staff. These findings suggest that formal compliance with AML standards cannot, by itself, be considered sufficient evidence of an effective system. In the authors' view, the effectiveness of AML regulation should primarily be assessed according to the actual capacity of banks to identify, analyse and prevent suspicious activities, as well as according to the ability of supervisory authorities to respond promptly and proportionately to identified deficiencies.

Empirical analysis within the EU context shows that, although the harmonisation of AML directives has improved regulatory compliance, there is a significant gap between formal compliance and practical implementation. For example, research by the European Banking Authority indicates that the detection and reporting of suspicious transactions in some EU member states is still below expected standards, indicating the presence of operational and systemic problems. From a critical perspective, this indicates that regulatory harmonisation does not necessarily produce harmonised supervisory effectiveness. Differences in institutional capacity, supervisory practices, internal governance and compliance culture may result in substantially different levels of AML effectiveness despite the existence of common European standards (Lalić & Trifunović, 2026) . Therefore, the authors consider that future regulatory reforms should place greater emphasis on the quality of implementation and measurable supervisory outcomes rather than exclusively on the formal transposition of regulatory requirements.

A modern bank faces a large number of daily transactions, which requires advanced software tools for automatic detection of suspicious activities. Research shows that traditional transaction monitoring systems often generate a large number of false positives, which burdens employees and reduces the effectiveness of control. Also, the complexity of financial instruments and the digitalization of cash flows make it difficult to identify money laundering through cryptocurrencies and offshore accounts. The authors' analysis indicates that technological development therefore represents both an opportunity and a risk for the AML system. Advanced analytical tools, artificial intelligence and big-data technologies can significantly improve the identification of complex patterns of suspicious behaviour, but excessive reliance on automated systems may create a new problem if alerts are treated mechanically without adequate professional assessment. Consequently, technology should be viewed as a support mechanism for professional decision-making rather than as a substitute for human responsibility.

The human factor also poses a significant challenge. Insufficiently trained employees or a lack of awareness of risks can lead to failures in the implementation of KYC and CDD procedures. According to Savić & Mihajlović (2025), even in well-regulated systems, failure to comply with internal procedures and inadequate training can result in serious failures in money laundering prevention. In the authors' opinion, this finding is particularly important from the perspective of bank responsibility. The existence of internal AML procedures is not sufficient if employees do not possess the knowledge, authority and institutional support necessary for their implementation. Moreover, responsibility should not be concentrated exclusively at the operational level. Senior management and the governing bodies of banks should bear a significant responsibility for establishing an adequate compliance culture, allocating sufficient resources and ensuring the independence of AML functions.

Frozen capital, delays in regulatory action, and complex legal procedures further limit the effectiveness of AML systems. Inconsistency of national regulations with international standards or slow regulatory response can allow criminals to exploit legal loopholes. In addition, banks often balance compliance with AML rules with the need not to lose clients due to excessive bureaucracy, which creates additional risks. The authors consider that this represents one of the fundamental structural dilemmas of the AML system: the need to achieve a balance between effective prevention of financial crime and the preservation of efficient and accessible banking services. Excessively formalistic implementation of AML requirements may result in unnecessary administrative burdens and the exclusion of legitimate customers, while insufficiently rigorous implementation creates opportunities for criminal exploitation of the financial system. The appropriate solution is therefore not simply stricter regulation, but a more precise application of the risk-based approach, under which the intensity of controls corresponds to the actual level of risk.

Based on a literature review, recommendations for improving AML systems include (Cvetković et al., 2021):

- Technological improvement – implementation of sophisticated big-data analysis tools and artificial intelligence in transaction monitoring.
- Increasing employee training – continuous education of employees on the risks and procedures of preventing money laundering.
- Strengthening regulatory cooperation – better coordination between regulatory bodies, banks and international institutions to reduce delays in identifying and sanctioning irregularities.
- Improving the legislative framework – reducing legal gaps and harmonizing national regulations with international standards, especially in the field of cryptocurrencies and digital financial services.

– System evaluation and audit – regular monitoring of the effectiveness of the AML system and the implementation of corrective measures in banks.

Based on the reviewed literature and the comparative analysis of regulatory and institutional mechanisms, the authors identify several broader conclusions. First, AML effectiveness cannot be measured solely by the number of reported suspicious transactions or the number of imposed sanctions. A high number of reports may indicate an effective detection system, but it may also indicate excessive reliance on formal reporting and a large number of false positives. Second, the existence of strict legal sanctions does not automatically guarantee effective prevention if supervisory institutions lack adequate resources and expertise. Third, the responsibility of banks should not be reduced to fulfilling administrative obligations; rather, banks should be understood as active participants in the prevention of financial crime. This implies that the quality of internal governance, risk management, compliance functions and corporate culture should be considered integral elements of AML effectiveness.

The authors further argue that the division between regulatory and criminal responsibility requires particular attention. Regulatory sanctions are necessary to ensure institutional discipline, while criminal liability should be reserved for situations in which the conduct of a bank or responsible individual reaches the threshold established by criminal law. An overly broad application of criminal responsibility could undermine the principle of individual culpability, while insufficient accountability could create moral hazard and weaken the preventive function of AML regulation. Therefore, an effective system requires a proportionate relationship between the seriousness of the violation, the degree of culpability, the actual consequences and the type of sanction imposed.

The main scientific contribution of this paper, within the limits of a literature-based study, lies in the synthesis and critical interpretation of existing findings concerning the relationship between regulatory compliance, institutional capacity, technological development and individual responsibility in the banking AML system. Rather than considering these elements separately, the authors approach them as mutually dependent components of a single institutional framework. Such an approach indicates that deficiencies in one component may reduce the effectiveness of the entire system. For example, sophisticated transaction-monitoring technology cannot compensate for inadequate employee training, just as strict legislation cannot compensate for ineffective supervision or weak internal governance.

In conclusion, although there have been significant advances in establishing AML systems, their effectiveness depends on a combination of technological solutions, regulatory consistency and professional responsibility of employees.

The critical evaluation indicates that continuous improvement is needed to respond to increasingly complex money laundering methods and reduce the risk of abuse of the financial sector. The authors’ assessment is that the future development of AML systems should therefore move from a predominantly compliance-oriented model towards a genuinely risk-based and effectiveness-oriented model. Such an approach would require not only continuous improvement of legislation, but also stronger supervisory capacity, better use of technology, continuous professional training, clearer allocation of responsibility and more effective cooperation between banks and competent authorities. In this context, the effectiveness of the AML system should ultimately be judged by its ability to prevent and disrupt illicit financial flows while simultaneously ensuring legal certainty, proportionality of sanctions and protection of legitimate banking activity.

Conclusion

The analysis of the criminal and regulatory aspects of bank liability in money laundering cases shows that the prevention of financial crime is a complex and multidimensional process that requires the coordinated application of international, regional and national standards. The literature review indicates that the FATF recommendations represent the basic global framework, while the EU directives and regulations enable the harmonization and more detailed regulation of the banking sector in accordance with the principles of prevention and responsibility. The national legal framework of the Republic of Serbia, although largely aligned with international standards, presents certain challenges in implementation, especially in terms of control, institutional capacities and sanctioning of illicit activities.

Within the framework of banks' obligations, it is clear that KYC and Customer Due Diligence procedures, transaction monitoring and regulatory cooperation are key instruments in detecting and preventing money laundering. The literature indicates that, although the procedures are well defined, their effectiveness depends on technological equipment, employee training and adequate supervision. The criminal liability of banks and employees is clearly defined through the liability of a legal entity and the individual liability of employees, with an emphasis on the fact that the lack of supervision or failure to apply AML standards can have serious sanctions. Regulatory responsibility further strengthens control through supervision and administrative sanctions, but the literature indicates that there is still a need for more efficient mechanisms for monitoring, detecting deficiencies and implementing sanctions. A critical assessment of the system shows that despite the developed framework, there is room for improvement, especially in the segment of technological support, interaction with international institutions and continuous training of employees.

Insufficiently consistent application of rules and limited capacities of regulators can jeopardize the efficiency of the entire system.

Based on the conducted analysis, several key recommendations for improving the AML system can be identified. First, the regulatory framework should be continuously harmonized with the development of international AML standards, particularly FATF recommendations and relevant EU regulatory developments, while ensuring their consistent and effective implementation within the national legal system. Second, the institutional capacity of competent supervisory and enforcement authorities should be strengthened through adequate staffing, specialized training, improved analytical capabilities and greater use of modern technological tools. Third, cooperation between banks, supervisory authorities, the Financial Intelligence Unit and other competent institutions should be further improved in order to ensure faster exchange of information and more effective identification of complex money laundering schemes. Fourth, the supervisory approach should be increasingly based on actual risk and effectiveness rather than solely on formal compliance with regulatory requirements. Finally, the system of sanctions should be sufficiently effective, proportionate and dissuasive, while maintaining a clear distinction between regulatory violations and conduct that establishes criminal liability.

Particular attention should be devoted to strengthening the institutional framework. Effective prevention of money laundering cannot depend exclusively on the obligations imposed on banks; it requires adequately equipped and mutually coordinated institutions capable of exercising continuous and risk-based supervision. In this regard, improving inter-institutional cooperation, developing common analytical and information-sharing mechanisms, strengthening the professional capacities of supervisory personnel and ensuring timely regulatory responses represent important prerequisites for improving the effectiveness of the national AML system. At the same time, banks should strengthen their internal governance mechanisms, the independence and authority of compliance functions, internal controls and continuous employee training.

Based on the analysis of the literature, the paper confirms that the responsibility of banks in preventing money laundering is multi-layered – it includes legal, criminal and regulatory dimensions. The central conclusion of the paper is that the effectiveness of the AML system does not depend solely on the existence of comprehensive legislation, but on the degree to which regulatory requirements are effectively implemented by banks and consistently supervised and enforced by competent institutions. Therefore, strengthening the regulatory and institutional framework should be understood as a continuous process rather than as a one-time legislative intervention. Recommendations for practice include continuous improvement of KYC procedures, implementation of advanced transaction monitoring systems, strengthening internal control and training of employees, as well as further improvement of regulatory cooperation and supervisory capacities.

For future research, empirical monitoring of the effectiveness of AML measures in practice, analysis of sanctioning cases and comparative studies of different regulatory models in an international perspective are recommended. Future research could additionally focus on measuring the relationship between the intensity of regulatory supervision and the actual effectiveness of AML mechanisms, as well as on analysing the effects of artificial intelligence and other advanced technologies on the detection of suspicious transactions. Such research would provide an important empirical basis for further improvement of both the regulatory framework and institutional mechanisms for preventing and combating money laundering.

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KRIVIČNI I REGULATORNI ASPEKTI ODGOVORNOSTI BANAKA U SLUČAJEVIMA PRANJA NOVCA

Apstrakt

Rad „Krivični i regulatorni aspekti odgovornosti banaka u slučajevima pranja novca“ predstavlja sveobuhvatnu analizu međunarodnih i domaćih pravnih standarda, regulatornih okvira i odgovornosti banaka i njihovih zaposlenih u sistemu sprečavanja i borbe protiv pranja novca. Posebna pažnja posvećena je preporukama FATF-a kao globalnim normama, regulatornom okviru EU (uključujući direktive i propise), kao i nacionalnom zakonodavnom okviru Republike Srbije i međunarodnim uporednim primerima. Naredna poglavlja bave se obavezama banaka u oblasti identifikacije klijenata, praćenja transakcija i saradnje sa regulatornim organima. Rad analizira pravnu i krivičnu odgovornost pravnih lica i zaposlenih, mehanizme regulatorne odgovornosti i kritički procenjuje efikasnost postojećeg sistema na osnovu dostupne literature i empirijskih nalaza iz sekundarnih izvora. Zaključak rada sumira ključne izazove, identifikuje praznine u primeni propisa i ukazuje na preporuke za jačanje sistema kontrole sprečavanja pranja novca.

Ključne reči: *pranje novca, regulatorni okvir, krivična odgovornost, pravna odgovornost.*

JEL: *K42, K23, G21.*

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CRISIS COMMUNICATION OF BRANDS ON DIGITAL PLATFORMS

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Abstract

Digital platforms have transformed brand communication while increasing companies' exposure to reputational risks. The paper analyzes crisis communication strategies used by brands to protect their reputation during and after crisis situations. A qualitative methodology based on case study analysis was applied to international brands, including Nike, Starbucks, and H&M. The analysis focused on communication through Twitter/X, Instagram, and Facebook, with particular attention to the speed, tone, transparency, and consistency of messages and public reactions. The theoretical framework includes the Situational Crisis Communication Theory (SCCT). The results indicate that timely, transparent, empathetic, and consistent communication can reduce the negative impact of crises and contribute to maintaining consumer trust and strengthening brand reputation.

Key words: *digital platforms, brand reputation, crisis management, consumer perception, SCCT theory.*

JEL: *H12*

Introduction

The digital transformation of business in the last decade has radically changed the way brands communicate with their stakeholders. The development of social networks, content sharing platforms and mobile technologies has enabled brands to communicate directly, quickly and interactively with consumers, investors, employees and the general public. However, the same infrastructure

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that enabled the intensification of relations with the public simultaneously increased the vulnerability of companies to reputational risks. In the digital environment, information is spread in real time, and negative content can become viral within minutes, thus rapidly developing and escalating crisis situations. Unlike traditional media, where communication was predominantly one-way and controlled, digital platforms imply two-way communication and a high degree of user participation. Consumers today are not just recipients of messages, but active creators and distributors of content. Comments, reviews, posts and shares have the potential to shape the public's perception of a brand to a greater extent than official company announcements. This is precisely why crisis communication acquires a new dimension - it is no longer exclusively a reaction to a crisis event, but a continuous process of reputation management in the dynamic digital space.

Modern brand crises often arise or escalate precisely on digital platforms. An inappropriate advertising campaign, insensitivity to social and cultural issues, failures in the quality of products or services, as well as ethical or operational problems, can cause strong reactions from the public. Examples of companies such as Nike, Starbucks and H&M show that the way a brand communicates during a crisis can have a decisive influence on the further course of events and long-term effects on reputation. While some companies successfully managed the crisis through timely and transparent communication, others faced prolonged backlash due to insufficient empathy or an inadequate response.

In a theoretical sense, crisis communication represents an important segment of corporate communications and crisis management. The theory of situational crisis communication (Situational Crisis Communication Theory - SCCT) is particularly important, which starts from the assumption that the effectiveness of the communication strategy depends on the perception of responsibility that the public attributes to the company. In the digital context, the application of this theory acquires additional complexity, because the perception of responsibility is formed and changed under the influence of the rapid flow of information, comments and media interpretations.

The topicality of the topic is reflected in the fact that almost no modern organization is immune to digital reputational risks. The globalization of the market, growing social sensitivity to ethical and social issues, as well as the increasing transparency of business additionally reinforce the importance of a strategic approach to crisis communication. In this context, crisis communication is not only a defensive mechanism of reputation protection, but also an opportunity to reaffirm the value of the brand and strengthen relations with stakeholders.

The subject of this work is the analysis of crisis communication of brands on digital platforms, with a special focus on the strategies that companies apply to preserve their reputation during and after crisis situations. The paper seeks to examine how different communication approaches - speed of response, message tone, transparency and consistency - affect public perception and long-term effects on the brand. Through the analysis of selected case studies of international companies, the goal is to identify patterns of successful and less successful practice, as well as to offer recommendations for improving crisis communication in the digital environment.

The structure of the work is designed so that, after the introductory discussion and definition of goals and research questions, follows the theoretical framework that explains the key terms and models of crisis communication. Next, the research methodology and case study analysis are presented, after which the results are interpreted in the context of the set hypotheses. The work ends with conclusions and recommendations for practice, with the aim of contributing to a better understanding of the role of crisis communication in modern digital marketing management.

The goal and tasks of the research

The modern digital environment has significantly changed the dynamics of the relationship between brands and their stakeholders. The speed of information dissemination, interactivity and high visibility of communication contribute to the fact that crisis situations become public almost in real time. In such an environment, crisis communication goes beyond the operational level and becomes a strategic instrument of reputation management (Coombs, 2015; Fearn-Banks, 2017). Considering the growing importance of digital platforms, it is necessary to systematically examine the way communication strategies influence public perception and long-term brand image.

The main goal of the work is to examine how brand crisis communication on digital platforms affects public perception and brand reputation during and after crisis situations. This objective involves the analysis of communication strategies that companies apply in the digital space, as well as the assessment of their effect on the attitudes of consumers and the general public. In a theoretical sense, the goal of the work is to integrate modern approaches to crisis communication, especially the Situational Crisis Communication Theory (SCCT), with the specifics of the digital environment, in which transparency, speed of reaction and interactivity are key success factors (Miljković & Savić, 2018; Milenković et al., 2018). SCCT starts from the assumption that the choice of communication strategy should be aligned with the degree of responsibility that the public attributes to the organization, because the perception of responsibility directly affects reputational damage. In a practical sense, the aim of the work is to identify patterns of successful crisis communication that can serve as guidelines for brands in the digital environment. Special emphasis is placed on the analysis of case studies of companies such as Nike, Starbucks and H&M, which faced high-intensity crises in the digital space.

In accordance with the defined goal, the following research tasks were set:

1. Analysis of theoretical approaches to crisis communication in the digital environment. This task includes the systematization of relevant theoretical models, including SCCT (Mihajlović & Savić, 2024), image-restoration theory (Mihajlović et al., 2022a) and modern approaches to reputation management in digital communication conditions. Special attention is paid to the differences between traditional and digital media in the context of crisis communication (Mihajlović et al., 2022b).
2. Identifying the key characteristics of successful crisis communication. Based on theoretical assumptions and previous research, factors such as speed of reaction, transparency, empathy, taking responsibility and consistency of messages will be analyzed. Research shows that timely and empathetic communication can significantly reduce reputational damage and negative consumer attitudes (Coombs & Holladay, 2010).
3. Analysis of specific case studies of well-known companies. Within this task, the communication strategies of selected brands during specific crisis situations will be analyzed, with a focus on the content of announcements on digital platforms, the tone of communication and public reactions.
4. Comparing different communication strategies and their effects. Comparative analysis will enable the identification of differences in approaches (e.g. strategy of apology, denial, justification or value positioning) and assessment of their impact on the perception of reputation (Ivanova & Savić, 2022; Krstić et al., 2023).
5. Drawing conclusions and recommendations for practice. Based on theoretical and empirical analysis, the paper aims to offer concrete recommendations for the improvement of crisis communication of brands on digital platforms, including the development of crisis protocols, continuous monitoring of digital channels and education of communication teams.

Defined goals and objectives enable a systematic approach to researching the phenomenon of crisis communication in the digital environment, while connecting theoretical concepts and practical examples from the contemporary business context.

Research questions and hypotheses

The development of digital platforms has significantly changed the dynamics of crisis communication, making it faster, more visible and more amenable to public evaluation in real time. In such a communication environment, public perception and brand reputation become directly dependent on the way the company reacts to a crisis situation. Starting from modern theoretical approaches to crisis communication, especially situational crisis communication theory (SCCT), this chapter defines research questions and hypotheses that form the basis of the empirical part of the work.

In accordance with the subject and objective of the research, the following research questions were formulated:

– How do brands use digital platforms in crisis situations? Digital platforms enable immediate communication with a wide audience, but at the same time imply high transparency and interactivity. According to Coombs (2007), organizations in crisis situations choose communication strategies in accordance with the perception of responsibility that the public attributes to the company. In the digital environment, the choice of channel (e.g. Twitter/X, Instagram, Facebook), message tone and speed of response become key elements of strategy (Veil et al., 2011).

– Which factors of crisis communication have the greatest influence on the perception of brand reputation? Brand reputation is a long-term intangible resource of an organization (Fombrun & Van Riel, 2004). Research indicates that transparency, taking responsibility and an empathic tone of communication significantly influence public perception during a crisis (Coombs & Holladay, 2002). In the digital context, an additional factor is interactivity - the possibility of responding to comments and direct involvement in dialogue with users (Jovanović et al., 2019).

– Does the speed and tone of communication affect the consumer's reaction? The speed of reaction has become one of the most important indicators of effective crisis communication in the digital age. According to research by Liu, Austin and Jin (2011), organizations that react quickly reduce the space for negative narratives to spread. The tone of communication, especially the expression of empathy and regret, contributes to reducing negative emotions and strengthening trust (Kostić et al., 2022).

Based on the defined research questions and the theoretical framework, the following hypotheses were formulated:

H1: Timely reaction of the brand on digital platforms significantly reduces the negative impact of the crisis on the reputation.

H2: Transparent and empathetic communication during a crisis has a positive effect on consumer attitudes.
H3: Consistency of messages through different digital channels contributes to maintaining trust in the brand.

The first hypothesis starts from the assumption that the speed of reaction affects the formation of the initial perception of the public. SCCT theory emphasizes that organizations must provide timely information in order to reduce reputational damage (Savić et al., 2021). In a digital environment, a delay in communication can be interpreted as irresponsibility or ignoring the problem.

Regarding the second hypothesis, it is important to emphasize that the theory of image restoration (Savić et al., 2025a), strategies of apologies, explanations and corrective actions can contribute to the restoration of reputation. Transparency and empathy reduce perceptions of intent and moderate negative public reactions (Coombs & Holladay, 2008).

Regarding the third hypothesis, it should be emphasized that in the conditions of multi-channel communication, the inconsistency of messages can cause confusion and further damage the reputation. Integrated communication and coordination of messages across different platforms contribute to the perception of professionalism and credibility (Cornelissen, 2020).

In order to empirically test the hypotheses, the key variables were defined:

- Independent variables: speed of reaction (time from outbreak of crisis to first announcement), tone of communication (empathic, defensive, neutral), transparency (degree of taking responsibility), consistency of messages (harmony of communication on different platforms).
- Dependent variable: perception of brand reputation (expressed through sentiment analysis of comments, number of negative/positive reactions and media interpretation of the event).
- Control variables: type of crisis (ethical, reputational, operational), previous brand image and level of responsibility attributed by the public to the company.

The research questions and hypotheses posed in this way enable a systematic analysis of the impact of crisis communication on brand reputation in the digital environment, relying on relevant theoretical models and contemporary research in the field of public relations and corporate communications.

Theoretical framework

Crisis situations in the business context represent unforeseen events that can threaten the reputation, financial stability and operational functioning of the organization. According to Coombs (2015), organizational crisis is the perception of an unpredictable event that threatens important expected outcomes of stakeholders and can seriously affect organizational performance. In the digital environment, this definition takes on an additional dimension, as crises often develop and escalate in real time, influenced by online audiences and algorithmically mediated communication flows.

Crisis situations can be classified according to different criteria. One of the most common divisions relates to:

- Operational crises (e.g. product or service problems),
- Reputational crises (negative publicity, accusations of unethical business),
- Ethical crises (discrimination, corruption, irresponsible management behavior),
- Communication crises (inadequate or ill-considered public message).

A special form is represented by digital crises, which arise or escalate on social networks, forums and other online platforms. In such situations, the traditional hierarchical control of communication gives way to a decentralized model, where users generate and distribute content (Savić et al., 2025b). The virality of the content and the possibility of instant dissemination of information further increase the risk of reputational damage. According to the Situational Crisis Communication Theory (SCCT), the perception of the organization's responsibility for the resulting crisis is a key factor in choosing a communication strategy (Milanović & Gojkov, 2024). SCCT distinguishes three basic groups of crises: victim crises (the organization itself is a victim of the event), accidental crises (unplanned mistakes without intention) and preventable crises (crises that could have been avoided). The degree of attributed responsibility directly affects reputational damage and public expectations regarding the company's response.

Brand reputation represents the sum of perceptions and attitudes that stakeholders have about the organization, based on previous experiences, communication and social responsibility (Fombrun & van Riel, 2004). It is considered a strategic intangible resource that affects customer loyalty, market value and the company's competitive position. Crisis communication has a key role in protecting and restoring reputation. Benoit (1997) in his theory of image restoration (Image Restoration Theory) points out that organizations during a crisis use different rhetorical strategies, such as denial, reduction of responsibility, justification, apology or corrective action. The choice of strategy depends on the nature of the crisis and the degree of responsibility that the public attributes to the organization. SCCT extends this approach, emphasizing that the response strategy must be aligned with the perception of responsibility and the previous reputation of the organization (Zupur et al., 2023). For example, in high-responsibility cases, apology and compensation strategies are recommended, while in low-responsibility crises, information and explanation strategies can be applied. The digital environment further complicates reputation management, as communication takes place publicly and under the constant scrutiny of the online community. Consumers today expect transparency, speed and authenticity in communication (Ki & Nekmat, 2014). A lack of response or an inadequate tone of communication can lead to a secondary crisis, i.e. a worsening of the situation due to the perception of irresponsibility. Empathy and taking responsibility have proven to be key elements of successful crisis communication. Research indicates that transparent and timely communication can mitigate the negative effects of a crisis and even contribute to the long-term strengthening of reputation (Claeys, Cauberghe, & Vyncke, 2010).

Digital platforms, especially social networks, have become central channels of communication between brands and their stakeholders. Platforms like Facebook, Instagram and X enable immediate, two-way and public communication, which represents both an opportunity and a risk for organizations. On the one hand, digital platforms allow brands to respond quickly to a crisis situation, provide accurate information and communicate directly with affected groups. On the other hand, the speed of information dissemination and emotionally colored user comments can contribute to the escalation of the crisis (Jin et al., 2014). The specificity of digital platforms is reflected in the following characteristics:

- Real-time communication - immediate brand reaction is expected.
- Interactivity – users actively participate in the discussion.
- Visibility and durability of content - posts remain available and can be shared again.
- Algorithmic amplification – content with high engagement gets more visibility.

In such an environment, monitoring digital channels becomes a necessary part of crisis management. Sentiment analysis, keyword tracking and influencer identification allow organizations to react in a timely manner and adjust their communication strategy. Modern approaches emphasize the need for an integrated model of crisis communication, in which digital channels equal to traditional media (Coombs, 2015). Consistency of messages across different platforms helps maintain trust and reduce confusion among stakeholders.

Research methodology

Qualitative research methodology was applied in the work, with the aim of a deeper understanding of how brands manage crisis communication on digital platforms and how these strategies affect public perception and brand reputation. A qualitative approach enables the analysis of complex communication processes, symbolic meanings and the context in which crises develop (Obrić & Majstorović, 2023). A case study was chosen as the basic research design, since it enables a detailed examination of contemporary phenomena in a real context, especially when the boundaries between the phenomenon and the environment are unclear (Yin, 2018). This approach is particularly suitable for researching crisis communication in the digital space, where interactions are dynamic, multi-layered and publicly available.

The units of analysis are international brands that have faced crises of high publicity on digital platforms. The paper analyzes the cases of companies: Nike, Starbucks and H&M. Criteria for the selection of cases included: high degree of media and public attention, intensive communication on digital platforms during the crisis, availability of public data (posts, user reactions, media reports) and different communication strategies that enable comparative analysis. These companies were selected because they represent globally recognizable brands with a developed digital presence and significant influence on the public, which makes their crisis situations relevant for the analysis of reputational effects.

The following data collection methods were used in the research:

- A qualitative analysis of the content of brand announcements on social networks (Twitter/X, Instagram and Facebook) was conducted during crisis situations. The following were analyzed: tone of communication (neutral, defensive, empathetic, proactive), speed of response (time from the outbreak of the crisis to the first official reaction), presence of apologies and taking responsibility, and consistency of messages through different channels. Content analysis as a method enables a systematic examination of communication patterns and strategies (Krippendorff, 2018).
- In order to examine the perception of reputation, comments, the number of shares, likes, as well as the general sentiment of user reactions were analyzed. Although the work primarily relies on a qualitative approach, elements of descriptive analysis (eg dominant tone of comments) were used to observe trends in public reactions. In accordance with the theory of situational crisis communication (SCCT), the perception of responsibility and the way of attribution of guilt play a key role in the formation of reputational consequences (Vukša & Milojević, 2024).
- After the individual case analysis, a comparative analysis was conducted with the aim of identifying similarities and differences in crisis communication strategies. Special focus is placed on: speed of response, transparency and clarity of messages, degree of empathy towards affected groups and consistency of communication through different digital channels. This approach enables the identification of patterns of successful practice and the testing of hypotheses.

In order to empirically test the hypotheses, the key terms were operationalized as follows:

- Timeliness of communication - number of hours/days from the outbreak of the crisis to the first official announcement of the brand.
- Transparency - clearly stating the facts, admitting mistakes and taking responsibility.
- Empathetic communication – the presence of expressions of sympathy, understanding and support for the affected parties.
- Consistency of messages – consistency of content and tone of communication on different platforms.
- Perception of reputation – dominant tone of public reactions and media narrative after crisis communication.

This kind of operationalization enables connecting the theoretical framework with empirical analysis and checking the hypotheses H1, H2 and H3.

The research has several limitations. First, the focus on qualitative analysis of case studies limits the generalizability of the results to all industries and brands. Second, sentiment analysis is based on publicly available comments, which may not fully reflect the views of the wider population. Third, the dynamic nature of digital platforms means that perceptions of reputation can change over time, requiring longitudinal research to more fully understand the effects. Despite the mentioned limitations, the methodological framework of the work enables a systematic and relevant analysis of the crisis communication of brands in the digital environment, providing a basis for theoretical and practical implications.

Case studies of brand crisis communication on digital platforms

In order to examine the set hypotheses, this chapter analyzes three case studies of international brands that faced high publicity crises in the digital space: Nike, Starbucks and H&M. The analysis is based on the principles of situational crisis communication theory (SCCT) (Janković & Golubović, 2025) and image restoration theory (Ugrinov et al., 2025), with a focus on reaction speed, tone of communication, transparency and consistency of messages on digital platforms.

Nike - value positioning in crisis situations

One of the most significant examples of contemporary crisis communication refers to the Nike brand campaign with athlete Colin Kaepernick in 2018. The campaign caused strong polarized reactions from the public, especially on social networks, where users expressed both support and boycott of the brand. In the context of SCCT theory, the crisis can be classified as a reputational crisis with elements of value conflict, where the responsibility of the company was not direct, but stemmed from public perception (Coombs, 2007). Nike implemented a strategy of "bolstering" and reaffirming its own values, clearly positioning itself in accordance with the brand identity and target audience. Although initial reactions included negative sentiment and public destruction of the product, the long-term effects showed growth in online engagement and increased sales (Kim & Ferguson, 2019). This case confirms that consistent value communication and clear positioning can strengthen reputation in the long term, even in conditions of intense digital polarization.

Starbucks - transparency and public apology

The crisis facing Starbucks in 2018, following an incident in Philadelphia where two African-American men were arrested at one of the company's facilities, quickly escalated on social media. Videos of the incident went viral, generating strong negative publicity. In accordance with the recommendations of the SCCT theory, in situations where the public perceives a high degree of responsibility of the company, a strategy of apology and corrective actions is recommended (Đokić et al., 2025). Starbucks responded in short order, issuing a public apology through digital channels and then announcing the closure of more than 8,000 locations to conduct racial sensitivity training for employees. This approach represents a combination of apology strategies and corrective action, in accordance with the theory of image restoration (Nikolić, 2025). Transparent communication and concrete measures contributed to the mitigation of negative sentiment and the gradual recovery of the brand's reputation (Grégoire, Salle, & Tripp, 2015). This case confirms the hypothesis that timely and empathetic communication significantly reduces reputational damage.

H&M - the challenges of cultural sensitivity in the digital environment

H&M faced a serious reputational crisis in 2018 after releasing a promotional photo of a black boy wearing a hoodie with an inscription deemed racially inappropriate. The photo caused strong reactions on social media, including calls for boycotts and protests in some countries. The initial reaction of the company was assessed as slow and insufficiently empathetic, which contributed to the escalation of the crisis in the digital space. According to SCCT theory, in situations where there is a perception of organizational responsibility, an inadequate reaction can further strengthen negative attributions (Coombs, 2007). The subsequent apology and withdrawal of the controversial campaign represented an attempt to restore the image, but the digital narrative was already shaped by negative sentiment. This case illustrates the importance of speed of response and cultural sensitivity in the global digital environment, as well as the need for internal control mechanisms in communication processes (Božić & Knežević, 2025).

Comparative analysis of cases

The comparative analysis of the selected cases points to several key factors that determine the effectiveness of crisis communication on digital platforms. Although Nike, Starbucks, and H&M faced different types of crises and applied different communication approaches, their cases demonstrate the importance of reaction speed, transparency, empathy, message consistency, and corrective actions.

Table 1. Comparative Analysis of Crisis Communication Strategies of Selected Brands

Brand	Speed of reaction	Transparency	Tone of communication	Corrective actions	Effect on reputation
Nike	Fast and proactive	High	Assertive, value-oriented and supportive	Continued value-based communication and reinforcement of brand positioning	Positive long-term effect, despite polarized short-term reactions
Starbucks	Fast	High	Apologetic, empathetic and responsible	Public apology, management response and concrete organizational measures	Gradual reduction of negative reactions and stabilization of reputation
H&M	Relatively slow	Moderate	Initially insufficiently empathetic	Public response and corrective communication	Prolonged negative reactions and short-term reputational damage

Source: prepared by the author

The comparison shows that speed of reaction is one of the most important elements of effective crisis communication. Timely communication reduces the space available for speculation, misinformation, and the development of negative narratives. However, speed alone is not sufficient. A rapid response that lacks transparency or empathy can further intensify public criticism.

Tone and empathy represent another important dimension. Starbucks provides an example of communication based on apology, responsibility, and empathy, which contributed to reducing negative public reactions. In contrast, the H&M case demonstrates how insufficient sensitivity to cultural and social perceptions can prolong a crisis and increase reputational damage. Nike represents a somewhat different approach, relying on a clear and consistent value-based position, which generated polarized reactions but strengthened its relationship with its core target audience.

The analysis also highlights the importance of message consistency across digital channels. In an environment characterized by rapid information dissemination, inconsistent statements can undermine credibility and create additional uncertainty among stakeholders. Consistent communication enables brands to maintain control over the central narrative and contributes to preserving consumer trust.

Finally, corrective actions are an important complement to verbal communication. Public apologies are more effective when accompanied by concrete measures demonstrating that the company is willing to address the causes and consequences of the crisis. Therefore, crisis communication should not be limited to issuing statements but should be integrated with actual organizational responses.

Overall, the comparative analysis supports the hypotheses proposed in the study. H1 is supported by the finding that timely reactions can limit the spread and intensity of negative reactions. H2 is supported by the evidence that transparent and empathetic communication contributes to more favorable public responses. H3 is supported by the importance of consistent messages across different digital channels in maintaining trust and reputational stability.

The cases further demonstrate that there is no single crisis communication strategy applicable to every situation. The appropriate response depends on the nature of the crisis, the degree of perceived responsibility, the expectations of stakeholders, and the values associated with the brand. Nevertheless, successful crisis communication on digital platforms requires proactive planning, continuous monitoring, rapid response, transparent messaging, and clearly defined crisis protocols. These elements enable brands not only to reduce reputational damage but also, under favorable circumstances, to strengthen long-term relationships with consumers.

Discussion of results

The results of the conducted qualitative analysis of the case studies indicate that the crisis communication of brands on digital platforms has a decisive influence on public perception and the preservation of reputation during and after crisis situations. The findings are in accordance with the set hypotheses and research questions, and confirm the importance of timeliness, transparency, empathy and consistency of communication. First of all, the analysis shows that the speed of reaction is one of the key factors in crisis management in the digital environment. According to the situational crisis communication theory (SCCT), the response strategy must be adapted to the degree of responsibility that the public attributes to the organization (Coombs, 2007). In cases where the brand reacts quickly and takes the initiative in communication, the space for speculation, spreading misinformation and negative narrative is reduced. This approach has been confirmed through the practice of the Starbucks company, which, after the crisis, implemented a strategy of public apology and specific corrective measures. Such a reaction contributed to softening negative perceptions and partially restoring consumer confidence.

Second, transparency and empathic communication have proven to be crucial elements in shaping public attitudes. According to research, communication that includes admitting a mistake, expressing regret and clearly explaining the next steps contributes to a more positive evaluation of the organization (Kim & Liu, 2012). In a digital environment, where users expect an immediate and authentic response, formal and distant communication can be perceived as avoiding responsibility. The H&M case study shows that insufficiently sensitized and initially defensive communication can prolong the duration of the crisis and further damage the brand's reputation.

A third important finding relates to the consistency of messages across different digital channels. In a multichannel communication environment, inconsistent messages between official announcements, social media posts, and management statements can create confusion and foster mistrust. Communication consistency contributes to the credibility and stability of the brand image (Fombrun & van Riel, 2004). In this context, the example of the Nike company shows how value-consistent communication, even in a polarized environment, can strengthen the loyalty of the target audience in the long term.

The discussion of the results confirms hypothesis H1, according to which a timely brand reaction significantly reduces the negative impact of a crisis on reputation. Also, hypothesis H2 was confirmed through the finding that transparent and empathetic communication positively affects consumer attitudes. Finally, H3 was confirmed by analyzing cases in which consistency of messages through digital channels contributed to maintaining trust.

The obtained results are in line with contemporary research that emphasizes that digital platforms change the dynamics of crisis communication, making it more interactive and less controlled by the organization (Jin, Liu, & Austin, 2014). The audience is no longer a passive recipient of messages, but an active participant shaping the course of the crisis through comments, shares and creating their own content. Therefore, crisis communication must be seen as a continuous dialogue, and not as a one-time announcement. Nevertheless, it is necessary to point out certain limitations of the research. The analysis is based on a qualitative methodology and a limited number of case studies, which may affect the generalizability of the results. Future research could include quantitative sentiment analysis of a larger number of crisis situations, as well as comparative studies between different industries and markets.

In conclusion, the discussion of the results indicates that successful crisis communication on digital platforms requires a strategic approach, clearly defined protocols and a high level of organizational readiness. Brands that understand the specifics of the digital environment and apply the principle of responsible, transparent and consistent communication have a greater chance of preserving and even improving their reputation in crisis situations.

Conclusion

Crisis communication of brands on digital platforms represents one of the key challenges of modern marketing management and corporate communications. The dynamics of the digital environment, in which information is disseminated in real time and users actively participate in the creation and distribution of content, significantly changes the way crisis situations are managed. In such circumstances, brand reputation becomes particularly vulnerable, while the ability to communicate in a timely, transparent, empathetic, and strategically consistent manner becomes crucial for minimizing reputational damage and maintaining stakeholder trust.

Based on the theoretical framework and the comparative analysis of the selected case studies of Nike, Starbucks, and H&M, it can be concluded that successful crisis communication in the digital environment depends on several interrelated factors: speed of reaction, tone of communication, transparency, consistency of messages across digital channels, and the implementation of concrete corrective actions. The analysis confirms the importance of timely communication, as delays in responding may create space for speculation, misinformation, and the development of negative narratives. Conversely, a rapid and clearly structured response demonstrates the company's willingness to acknowledge and address the problem.

The analysis also confirms the importance of transparent and empathetic communication. Brands that demonstrate responsibility, provide appropriate apologies, acknowledge stakeholders' concerns, and undertake concrete corrective measures are more likely to preserve consumer trust. Empathy contributes to the humanization of the brand and can reduce negative emotional reactions among stakeholders. At the same time, consistency of messages across different digital platforms represents an important prerequisite for maintaining credibility. Inconsistent or contradictory statements may increase uncertainty and further undermine trust in the brand.

An important finding of the study is that the effectiveness of crisis communication does not depend solely on how quickly a brand responds, but also on what it communicates, how it communicates, and whether its communication is supported by concrete actions. The comparative analysis demonstrates that different crisis contexts require different communication approaches. Nike's value-oriented communication, Starbucks' emphasis on apology and corrective action, and H&M's experience with cultural sensitivity illustrate that the appropriateness of a crisis communication strategy depends on the nature of the crisis, the level of perceived responsibility, stakeholder expectations, and the values associated with the brand.

Scientific contribution of the study

The scientific contribution of this study lies in the integration of theoretical approaches to crisis communication with a comparative analysis of real-world cases in the contemporary digital environment. The study contributes to the existing body of knowledge by identifying and systematizing several key dimensions of effective digital crisis communication—speed, transparency, empathy, message consistency, and corrective action—and by examining their relationship with brand reputation. The comparative framework developed in the study provides a structured basis for understanding how different communication strategies can produce different reputational outcomes depending on the characteristics of the crisis and the response of the brand.

Furthermore, the study emphasizes the specific role of digital platforms in contemporary crisis management. Unlike traditional communication channels, digital platforms enable immediate feedback, continuous public interaction, and rapid redistribution of both official and user-generated content. Consequently, the study highlights the need to consider digital communication not merely as an additional communication channel, but as an integral component of strategic reputation management. In this regard, the findings provide a conceptual basis for further empirical research into the relationship between digital crisis communication strategies, consumer perceptions, and long-term brand reputation.

Recommendations for practice

Based on the findings of the study, several recommendations for brand managers and communication professionals can be formulated:

- Developing predefined crisis communication protocols – Companies should establish clear crisis communication plans that define responsibilities, decision-making procedures, communication channels, and response timelines before a crisis occurs.
- Continuous monitoring of digital platforms – Systematic monitoring of social media discussions, comments, mentions, and changes in public sentiment enables companies to identify potential crises at an early stage and respond before negative narratives escalate.
- Ensuring rapid but carefully considered responses – Speed is important, but the initial response should be accurate, relevant, and consistent with the available facts. Companies should avoid both unnecessary delays and premature statements based on incomplete information.
- Promoting transparency and accountability – Brands should acknowledge legitimate concerns, accept responsibility when

appropriate, and clearly communicate what actions are being taken to resolve the problem.

- Using empathetic and audience-oriented communication – Crisis messages should recognize the emotions and concerns of affected stakeholders rather than relying exclusively on formal or defensive corporate language.
- Maintaining consistency across digital channels – Messages published on different platforms should be mutually consistent while being adapted to the specific characteristics of each channel and its audience.
- Linking communication with concrete corrective actions – An apology or public statement should, whenever possible, be supported by specific measures demonstrating that the company is addressing the causes and consequences of the crisis.
- Investing in crisis communication training – Communication teams should receive regular training and participate in crisis simulations to improve their ability to respond effectively under conditions of uncertainty and time pressure.

In conclusion, crisis communication on digital platforms should not be viewed exclusively as a reactive activity, but as an integral component of strategic brand and reputation management. The findings of this study indicate that effective crisis communication requires the integration of speed, transparency, empathy, consistency, and concrete organizational action. When these elements are appropriately combined, a crisis does not necessarily result in permanent reputational damage; under certain circumstances, effective crisis management can even strengthen consumer relationships and contribute to long-term brand resilience.

At the same time, the study has certain methodological limitations. The analysis is based on a limited number of qualitative case studies and therefore does not allow for broad statistical generalization of the findings to all brands or types of crises. Future research could expand the sample of analyzed companies, incorporate quantitative measures of consumer sentiment and engagement, and examine the relationship between specific crisis communication strategies and measurable changes in brand reputation over a longer period. Such research would provide additional empirical evidence concerning the effectiveness of digital crisis communication strategies and further contribute to the development of the theoretical and practical foundations of crisis management in the digital environment.

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KRIZNA KOMUNIKACIJA BRENDOVA NA DIGITALNIM PLATFORMAMA

Apstrakt

Digitalne platforme su transformisale komunikaciju brendova, istovremeno povećavajući izloženost kompanija reputacionim rizicima. Rad analizira strategije krizne komunikacije koje brendovi koriste da bi zaštitili svoju reputaciju tokom i nakon kriznih situacija. Kvalitativna metodologija zasnovana na analizi studije slučaja primenjena je na međunarodne brendove, uključujući Nike, Starbucks i H&M. Analiza se fokusirala na komunikaciju putem Twitter/X, Instagram i Facebook, sa posebnom pažnjom na brzinu, ton, transparentnost i doslednost poruka i reakcija javnosti. Teorijski okvir uključuje Teoriju situacione krizne komunikacije (SCCT). Rezultati ukazuju da blagovremena, transparentna, empatična i dosledna komunikacija može smanjiti negativan uticaj kriza i doprineti održavanju poverenja potrošača i jačanju reputacije brenda.

Ključne reči: *digitalne platforme, reputacija brenda, krizni menadžment, percepcija potrošača, SCCT teorija.*

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LEGAL DILEMMAS IN THE APPLICATION OF THE INSTITUTE OF EXTENDED CONFISCATION IN CASES OF FINANCIAL CRIME

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Abstract

Extended asset confiscation is a controversial institute of modern criminal law and an important instrument in combating financial crime. It enables the confiscation of property presumed to derive from criminal activity, even without a direct connection to the specific offense for which the perpetrator was convicted. This paper examines the normative framework of extended confiscation at the international, European, and national levels, with particular attention to the presumption of innocence, burden and standard of proof, and the protection of property rights. The research is based on a normative and comparative analysis of relevant legal sources, the case law of the European Court of Human Rights, and a critical review of domestic and foreign scientific literature. The analysis indicates that extended confiscation may significantly contribute to combating financial crime, but its legitimacy depends on clear legal criteria, proportionality, effective judicial control, and adequate procedural safeguards. The paper proposes recommendations for strengthening legal certainty and judicial practice.

Keywords: *extended confiscation, financial crime, right to property, international standards.*

***JEL**: K14, K40, K42.*

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Introduction

Extended confiscation of assets is one of the most important and at the same time most controversial institutes of modern criminal law, especially in the context of the fight against financial crime. Unlike classic confiscation, which involves the seizure of property directly acquired through the commission of a specific criminal offense, extended confiscation allows the state to seize property that, based on certain indications and legal assumptions, is considered to originate from criminal activity, although the direct connection with the specific criminal offense has not been fully proven. It is precisely this feature that makes extended confiscation a powerful, but legally sensitive mechanism in modern criminal law systems. The reasons for introducing the institute of extended confiscation are primarily related to the limited effectiveness of traditional criminal law mechanisms in combating financial crime. Modern forms of criminal activity, such as organized crime, money laundering, corruption and tax evasion, are characterized by a high degree of sophistication, transnational activity and complex financial structures that make it difficult to prove a direct link between the criminal offense and the property acquired through its commission. In such circumstances, classic confiscation often proves insufficient, since criminal assets remain beyond the reach of the state, thus calling into question both general and special prevention. Extended confiscation is therefore being developed as a response by legislators to the need to make crime economically unprofitable, by depriving perpetrators of illegally obtained benefits. However, the application of this institute raises serious legal dilemmas, primarily in terms of establishing a balance between the efficiency of criminal prosecution and the protection of fundamental human rights. The issues of the inversion of the burden of proof, the standard of proof and the scope of judicial review in property confiscation proceedings are particularly problematic. Critics of extended confiscation point to the potential violation of the presumption of innocence, as one of the fundamental principles of criminal law, as well as the risk of disproportionate interference with the right to peaceful enjoyment of property. On the other hand, advocates of this institute emphasize its preventive function and necessity in the fight against modern forms of financial crime, emphasizing that it is a special measure that does not necessarily have the character of a criminal sanction in the narrow sense.

Previous domestic and foreign research indicates the pronounced controversy of the institute of extended confiscation. Numerous authors analyze its compliance with international and European standards for the protection of human rights, especially through the prism of the practice of the European Court of Human Rights, while others point to normative and practical shortcomings in national legislation. The literature particularly highlights dilemmas regarding the legal nature of the extended confiscation procedure, as well as the limits of permissible deviation from classic criminal procedural guarantees in order to achieve greater efficiency. Based on the above, the aim of this paper is to analyze the key legal dilemmas in the application of the institute of extended confiscation, with special reference to cases of financial crime. The paper seeks to point out, through a systematic review of relevant literature and applicable legal sources, the advantages and disadvantages of this institute, as well as the challenges that arise in its practical application. Methodologically, the paper is based on a normative analysis of international, European and national legal acts, a critical review of domestic and foreign scientific literature, as well as a comparative law and theoretical approach. Such a methodological framework allows us to view the institute of extended confiscation not only as a legal instrument of positive law, but also as a broader phenomenon that is at the intersection of criminal law, human rights, and the economic efficiency of the fight against financial crime.

Normative framework for extended confiscation

The institution of extended asset confiscation was developed as a response of modern legal systems to the growing sophistication of financial crime, organized crime and corruption. Classical models of asset confiscation, based solely on proving a direct link between specific assets and a specific criminal offence, have proven to be insufficiently effective in the context of complex financial transactions, transnational criminal networks and the use of intermediaries and front companies (Hryniewicz-Lach, 2025). In this context, extended confiscation is being affirmed as a normative mechanism that enables the confiscation of assets that are reasonably assumed to originate from criminal activity, even though a direct link to a specific criminal offence has not been proven. The development of this institution has been primarily influenced by international and European normative sources, which have set fundamental standards for its introduction into national legislation through conventions, directives and recommendations. However, contemporary literature indicates that the normative expansion of extended confiscation is accompanied by significant legal dilemmas, especially with regard to the protection of fundamental human rights, legal certainty and the sovereignty of national legal systems (Merdović et al., 2023).
The international normative framework for extended confiscation has been developed primarily through the activities of the United Nations and international bodies for the fight against money laundering and the financing of crime. The key document is the United Nations Convention against Transnational Organized Crime (Palermo Convention), which obliges signatory states to establish effective mechanisms for the identification, freezing and confiscation of assets derived from criminal activity (Gojković et al., 2023). Although the Palermo Convention does not explicitly use the term “extended

confiscation", its provisions on confiscation of assets expand the traditional concept of confiscation and set the basis for the subsequent development of this institution. A similar approach is contained in the United Nations Convention against Corruption (UNCAC), which specifically emphasizes the need for effective mechanisms for the recovery of assets and the fight against illicit enrichment (Hryniewicz-Lach, 2023). UNCAC promotes the concept that the state has the legitimate right to intervene in the property sphere of an individual when there is a reasonable suspicion that the property originates from corrupt activities, thus expanding the normative space for the application of extended confiscation (Wronka, 2023). Of particular importance are the recommendations of the FATF (Financial Action Task Force), which represent a global standard in the field of combating money laundering and crime financing. FATF recommendations promote a model in which the seizure of property is viewed as a preventive and security measure, and not exclusively as a criminal sanction, which normatively justifies a more flexible approach to proving the origin of property. The literature indicates that it is precisely the FATF standards that have a strong influence on national legislation, often without formally binding legal force, which classifies them in the category of so-called "soft law" instruments (Inđić et al., 2023). International bodies justify extended confiscation in their documents and reports primarily for reasons of efficiency and security, emphasizing that the financial power of criminal organizations is a key factor in their stability and survival (Goldbarsht, 2024). In this sense, asset forfeiture is seen as a central instrument in the fight against crime, as it deprives criminal structures of their economic basis of action. However, a significant part of the literature critically assesses this normative approach. Authors such as Al-Sherman & Aldabousi (2024) warn that the security discourse in international documents leads to the suppression of classical criminal law principles. Analysis of theoretical positions shows that international standards have a dual role in the development of the institute of extended confiscation: normative-developmental and political-security. On the one hand, they represent the basis for the harmonization of legislation and the strengthening of international cooperation, while on the other hand they produce pressure on national systems to accept models that relativize classical procedural guarantees. This affirms extended confiscation not only as a legal institute, but also as an instrument of global security policy.

The European normative framework for extended confiscation is based on the legal acts of the European Union and the case law of the European Court of Human Rights. The central document is Directive 2014/42/EU on the freezing and confiscation of criminal assets, which requires Member States to establish mechanisms for extended confiscation of assets in cases of serious criminal offences, including financial crime and organised crime. The Directive explicitly provides for the possibility of confiscation of assets where a court concludes, on the basis of the available evidence, that the assets are likely to have been obtained through criminal activity, thus introducing a reduced standard of proof. In the case law of the European Court of Human Rights, extended confiscation has been considered through the prism of the right to a fair trial and the right to peaceful enjoyment of possessions. In the cases of Phillips v. United Kingdom and Grayson and Barnham v. United Kingdom, the Court held that extended confiscation does not in itself constitute a violation of the presumption of innocence, provided that it is based on a judicial decision, proportionate to a legitimate aim and accompanied by adequate procedural guarantees (European Court of Human Rights, 2001). The literature, however, points to significant controversies regarding the compatibility of extended confiscation with the European Convention on Human Rights. Special focus is placed on the proportionality standard, which in theory is considered a key mechanism for the protection of rights, but in practice is often applied in a formalistic manner (Ayuningsih & Nelson, 2022). A comparative analysis of the positions of the ECtHR and the academic community shows that there is a normative consensus on the legitimacy of the aim of extended confiscation, but not on its methods. While the Court legitimizes the institute through the test of proportionality and fair trial, some literature indicates that this de facto legalizes the lowering of procedural standards. Thus, the European framework produces a model of "controlled flexibility", in which human rights are formally protected, but essentially relativized in favor of the efficiency of criminal prosecution.

In the Republic of Serbia, the institute of extended confiscation is regulated by the Law on Confiscation of Assets Derived from a Criminal Offence and the relevant provisions of the Criminal Code. These regulations establish a special procedure for confiscation of assets, which is normatively separate from the classic criminal procedure and is based on the assumption that certain assets originate from criminal activity, if there is a disproportion between the legal proceeds and the value of the assets. Domestic literature indicates that the Serbian model of extended confiscation is largely harmonized with international and European standards (Savić & Mihajlović, 2025). The authors emphasize that the normative framework is formally aligned with the requirements of Directive 2014/42/EU and the recommendations of international bodies, but they warn of problems in its application in practice, especially with regard to proving the origin of assets and procedural guarantees. Criticisms relate in particular to the normative imprecision of legal concepts and the broad discretionary powers of the competent authorities. According to some authors, this model creates the risk of arbitrary application of law and selective prosecution, which can lead to the politicization of the institute of extended confiscation (Fauzia & Hamdani, 2021). It is also pointed out that the national legislative framework adopts international standards without their deeper adaptation to the domestic legal system, which further increases legal uncertainty.

Burden of proof and legal guarantees

The institution of extended confiscation in the modern criminal justice system inevitably raises the question of the relationship between the effectiveness of the fight against financial crime and the protection of the fundamental procedural and property rights of the individual. The central place in this discussion is occupied by the problems of the burden of proof, the standard of proof and the scope of legal guarantees available to the persons against whom this measure is applied. The literature emphasizes that these issues represent the most sensitive segment of the legal legitimacy of extended confiscation.

In classical criminal proceedings, the burden of proof lies exclusively with the prosecution, which must prove the guilt of the defendant beyond reasonable doubt. However, with extended confiscation, the burden of proof is partially or completely inverted, because the defendant or related persons are required to prove the legal origin of the property that is reasonably assumed to have arisen from criminal activity. Theoretically, the reversal of the burden of proof is justified by the specific nature of financial crime, which is characterized by complex money flows, hidden ownership and international dimensions, which significantly complicates classical proof (Ashworth & Zedner, 2014). This is precisely why international standards allow for certain deviations from traditional procedural rules, provided that they are proportionate and accompanied by appropriate legal guarantees (Council of the European Union, 2014). However, a significant part of the doctrine warns that the reversal of the burden of proof calls into question the presumption of innocence, as one of the fundamental principles of criminal law. According to these views, the obligation of the defendant to prove the legality of his property effectively implies a presumption of his guilt, thereby disrupting the balance between the state and the individual (Boucht, 2017). Critics point out that in this way criminal proceedings are transformed into a means of economic pressure, with the sanction being applied without full criminal liability. In contrast, other authors view extended confiscation as a sui generis measure, i.e. as a “quasi-civil” or preventive instrument that is not aimed at establishing guilt, but at removing illegally acquired assets from legal channels (Krstić et al., 2023). According to this understanding, the presumption of innocence remains intact, because confiscation is not considered a punishment in the narrow sense, but a special measure of a pecuniary nature. This approach is also confirmed by the practice of the European Court of Human Rights (ECHR), which has held in several judgments that the inversion of the burden of proof does not in itself constitute a violation of Article 6 of the European Convention on Human Rights, provided that there are clear legal criteria and the possibility of effective judicial review

(Gallant, 2015). The issue of the standard of proof is a logical continuation of the discussion on the burden of proof. The literature points to a clear distinction between criminal proceedings, where the standard of "beyond reasonable doubt" applies, and special proceedings for confiscation of property, where lower evidentiary standards, such as "reasonable suspicion" or "preponderant probability" are often applied (Milanović & Gojkov, 2024). Authors who support lower evidentiary standards point out that the application of the strictest criminal standard would make extended confiscation practically ineffective, especially in complex cases of financial crime (Levi & Reuter, 2006). In this sense, lower standards are considered a necessary compromise between legal certainty and the need for effective crime suppression. On the other hand, critical literature warns that vaguely defined evidentiary standards create room for legal uncertainty and arbitrary application of the law (Savić et al., 2025). A particularly problematic issue is the fact that courts in practice often do not have clear guidelines for assessing evidence of the legal origin of property, which can lead to inconsistent case law and a violation of the principle of equality before the law (Van Duyne et al., 2018). In its practice, the ECtHR does not dispute the application of lower standards of proof, but insists that the proceedings as a whole must be fair, transparent and based on reasonable assumptions, not on blanket conclusions (Mihajlović & Savić, 2024).

The right to peaceful enjoyment of possessions, guaranteed by Article 1 of Protocol 1 to the European Convention on Human Rights, is a key legal guarantee in extended confiscation proceedings. The doctrine emphasizes that any interference by the state with this right must be lawful, pursue a legitimate aim and be proportionate (Council of Europe, 1950). Research shows that the legitimacy of extended confiscation is most often justified by the aim of protecting the public interest, namely by preventing criminal assets from being used for further illegal activities. However, the proportionality of the measure remains a subject of intense debate, especially in situations where assets that are not directly related to a specific criminal offence are confiscated. Domestic and European doctrine indicate that the key factor in protecting the right to property is the existence of effective legal remedies, the possibility of challenging the prosecution's assumptions and clear reasoning of court decisions (Sijerčić-Čolić & Halilović, 2021). The ECtHR has repeatedly emphasized that extended confiscation must not have the character of an arbitrary sanction and that courts must carefully weigh the relationship between the public interest and individual rights.

Application of extended confiscation in financial crime cases

The application of the institute of extended confiscation is particularly evident in the field of financial crime, which is characterized by a high degree of sophistication, complex money flows and difficulty in proving the connection between the committed criminal offense and the acquired property. Precisely because of these characteristics, classic confiscation models often prove to be insufficiently efficient, which was one of the key reasons for the normative introduction of extended confiscation into modern criminal law systems.

In modern legal theory, there is no single and universally accepted definition of financial crime. However, most authors understand this term as a set of criminal offenses whose main goal is to acquire illegal property through the abuse of the financial, tax or institutional system (Marković & Stanojević, 2009). In practice, financial crime is most often manifested through corruptive crimes, money laundering, tax evasion, abuse of official position and organized crime with a financial background. Corruption stands out in the literature as one of the most significant generators of illicit assets, as it enables the systematic abuse of public authority for private gain. Money laundering, on the other hand, is a key mechanism for the legalization of illegally acquired assets and is often inextricably linked to other forms of financial crime (Budimir, 2019). Tax evasion further complicates the evidentiary process, as illicit assets are concealed through formally legal financial flows, which makes it difficult to link them to a specific criminal offense. It is in these areas that extended confiscation gains particular importance, as it allows for the seizure of assets for which there is a disproportion between legal income and the actual financial situation of the perpetrator, even when a direct link to a specific criminal offense is not fully proven.

Numerous international studies and reports indicate that extended confiscation is one of the key instruments in the fight against financial crime, especially in the context of organized criminal structures. According to the findings of the United Nations Office on Drugs and Crime, countries that have introduced extended confiscation mechanisms record a higher level of confiscation of illegally acquired assets compared to countries that rely exclusively on traditional confiscation models. In its evaluation of the implementation of Directive 2014/42/EU, the European Commission emphasizes that extended confiscation has a significant preventive effect, as it reduces the economic motivation to commit financial crime. Similarly, some authors emphasize that the focus on assets, and not exclusively on criminal liability, has contributed to the dismantling of the financial foundations of criminal networks (Stojanović & Malešić, 2022). However, some literature warns that the effectiveness of extended confiscation should not be viewed solely through quantitative indicators (the amount of confiscated assets), but also through the quality of legal procedures and the level of protection of fundamental rights. In this regard, some studies point to the risk that the pursuit of greater efficiency turns into the instrumentalization of this institute, especially in politically sensitive financial crime cases. One of the most common criticisms in the literature relates to the selective application of extended confiscation in practice. Research shows that this institute is most often applied in cases of so-called "visible crime", while it remains underused in complex cases of high-level corruption and sophisticated financial schemes (Kostić et al., 2022). Evidential problems further complicate the application of extended confiscation. Although legislation provides for a lower standard of proof compared to classic criminal proceedings, judicial practice often faces dilemmas regarding the assessment of the disproportion between the lawful income and the assets of the defendant. A particular challenge is proving the origin of assets acquired indirectly, through third parties or legal entities, which is a common occurrence in financial crime. The authors also warn that uneven judicial practice and the lack of clear criteria can lead to legal uncertainty and undermine trust in the judicial system (Triasari et al., 2023). In this context, the selective application of extended confiscation can have the opposite effect to the desired one, calling into question the legitimacy of this institute.

Financial investigations are a key operational element of the successful application of extended confiscation in cases of financial crime. They enable the identification, monitoring and documentation of flows of illegally acquired assets, which is crucial for proving the disproportion between income and assets (European Court of Human Rights, 2008). According to modern research, an effective financial investigation requires an interdisciplinary approach that includes cooperation between prosecutors, tax authorities, financial intelligence units and other competent institutions. The literature particularly emphasizes the importance of early financial investigation, in parallel with criminal proceedings, in order to prevent or the alienation or concealment of assets. However, in practice, institutional fragmentation and insufficient training of personnel are often observed, which reduces the efficiency of financial investigations and, indirectly, extended confiscation itself (European Court of Human Rights, 2015). The authors therefore point out that the normative introduction of extended confiscation must be accompanied by strengthening of institutional capacities and clear procedural guidelines, in order to ensure the lawful and consistent application of this institute.

Criticisms and problems in practice

Although the institute of extended confiscation in modern legal systems is affirmed as an effective instrument for combating financial crime, its application in practice causes numerous legal, institutional and social controversies. Scientific literature indicates that the main criticisms can be systematized into three interrelated problem areas: (1) the threat to human rights, (2) the lack of effective judicial control and (3) the risk of political instrumentalization of this institute. These criticisms are further deepened in the practice of states with weaker institutional capacities and insufficiently developed legal culture.

One of the most frequently highlighted criticisms regarding the application of extended confiscation refers to its potentially negative impact on fundamental human rights, in particular the presumption of innocence and the right to peaceful enjoyment of property. Numerous authors indicate that extended confiscation relativizes the classical concept of criminal liability, since property can be confiscated without direct proof of a connection to a specific criminal offense (Ali et al., 2023). In this sense, the criticism particularly refers to the inversion of the burden of proof, which requires the defendant to prove the legal origin of the property. Although it is emphasized in theory that this is not a criminal sanction, but a special property law measure, some authors believe that this approach fundamentally violates the presumption of innocence as one of the fundamental principles of criminal law. The European Court of Human Rights has accepted extended confiscation under certain conditions in its practice, but at the same time emphasized that any restriction of rights must be proportional and based on clear legal criteria. In addition to the presumption of innocence, the right to property is another key issue. The literature indicates that broadly set legal criteria for confiscation of property can lead to excessive interference by the state in the private sphere of an individual, especially in situations where confiscation is applied to family members or third parties (Bolgorian et al., 2023). According to some authors, this practice creates a risk of collective responsibility and undermines legal certainty. Another important problem in practice relates to the insufficiently strong and effective judicial control of extended confiscation procedures. Although the court is formally competent to make a decision on the seizure of assets, the literature indicates that its role is often reduced to confirming the findings of financial investigations and the prosecutor's assessments. The uneven standard of proof, which in practice ranges between the criminal and civil thresholds, is particularly criticized. Such legal ambiguity, according to numerous authors, opens up space for arbitrariness and selective application of the law (Lalić & Trifunović, 2026). An additional problem is the limited access to effective legal remedies, especially in the phases of temporary freezing of assets, which can last for a long period of time before a final court decision is made. Domestic literature emphasizes that courts often lack sufficient specialized knowledge in the field of financial investigations, which further weakens their control function (Ivanović, 2026). As a result, extended confiscation can in practice develop into an administrative-technical procedure, instead of remaining a strictly judicially controlled measure. The third problematic aspect relates to the risk of political instrumentalization of the institute of extended confiscation. The literature warns that in certain political and institutional contexts this institute can be used as a means of pressure on political opponents, businessmen or other "undesirable" actors. This danger is particularly pronounced in countries with weak judicial independence and insufficiently developed mechanisms of control over the executive branch (Lalić & Trifunović, 2026). The authors emphasize that extended confiscation, due to its strong repressive nature and public perception of the fight against crime, represents an "attractive" instrument for political abuse. In this context, selective application of the law can lead to the erosion of citizens' trust in the judicial system and the rule of law as a whole. In order to overcome the above problems, the literature offers a number of recommendations for improving the normative and institutional framework of extended confiscation. Among the most frequently highlighted recommendations are: more precise normative definition of the conditions for the application of extended confiscation, clear demarcation of evidentiary standards, strengthening judicial control and procedural guarantees, and improving the expertise of judges and prosecutors through specialized training. The need to strengthen the transparency of procedures and introduce additional mechanisms for protecting the rights of third parties is particularly emphasized.

A comparative legal analysis shows that the problems in the application of extended confiscation vary depending on the legal tradition and institutional context. Italy is often cited as an example of relatively successful application, especially in the fight against organized crime, where the confiscation of mafia assets has become a central instrument of criminal policy. However, there are also criticisms in the Italian literature regarding the long-term procedures and management of seized assets. In the UK, extended confiscation is applied through a relatively developed system of judicial review, but continues to face criticism regarding the proportionality and fairness of the procedure. States in the Western Balkans region, including Serbia, face additional challenges stemming from weaker institutional capacity and limited experience in the application of financial investigations.

Conclusion

The analysis of relevant domestic and foreign literature, international and European legal sources, as well as available case law, indicates that the institute of extended confiscation occupies a central place in modern strategies for combating financial crime. Previous research confirms that classic confiscation is often insufficient for the effective seizure of assets acquired through criminal activities, especially in the context of complex financial flows, transnational structures and hidden forms of ownership. In this context, extended confiscation is recognized in the literature as an instrument that allows the state to respond more effectively to financially motivated crime, especially in the areas of corruption, money laundering and organized crime. At the same time, a review of scientific works and doctrinal discussions indicates the pronounced controversy of this institute. Although normatively justified from the point of view of public interest and the need to protect the economic order, extended confiscation represents a legally sensitive mechanism that encroaches on fundamental procedural and substantive rights. In particular, dilemmas regarding the inversion of the burden of proof, the lowered standard of proof and the potential violation of the presumption of innocence, as well as the right to peaceful enjoyment of property, are highlighted. The literature indicates that the acceptability of these deviations depends on their proportionality, the clarity of legal solutions and the intensity of judicial control in specific procedures.

Based on the analyzed sources, it can be concluded that the key challenge in the application of extended confiscation does not lie in the very existence of this institute, but in the manner of its normative operationalization and practical application. Special attention must be paid to establishing more precise and predictable standards of proof, as well as strengthening procedural guarantees for persons whose property is confiscated. In this sense, the literature emphasizes the need for a clear demarcation between criminal liability and a special procedure for confiscation of property, as well as for the consistent application of the principle of proportionality and the right to a fair trial.

Finally, the paper indicates the need for further theoretical and empirical research on this institute. Future research should include systematic analyses of case law, comparative research of different national models of extended confiscation, as well as empirical assessments of its actual effectiveness in combating financial crime. Such a multidisciplinary approach could contribute to the development of a more balanced and legally secure model of extended confiscation, which would simultaneously protect the public interest and the fundamental rights of individuals.

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PRAVNE DILEME U PRIMENI INSTITUTA PROŠIRENOG ODUZIMANJA IMOVINE U SLUČAJEVIMA FINANSIJSKOG KRIMINALA

Apstrakt

Proširena konfiskacija imovine je kontroverzan institut savremenog krivičnog prava i važan instrument u borbi protiv finansijskog kriminala. Omogućava konfiskaciju imovine za koju se pretpostavlja da potiče iz krivičnih dela, čak i bez direktne veze sa konkretnim delom za koje je učinilac osuđen. Ovaj rad ispituje normativni okvir proširene konfiskacije na međunarodnom, evropskom i nacionalnom nivou, sa posebnom pažnjom na pretpostavku nevinosti, teret i standard dokazivanja i zaštitu imovinskih prava. Istraživanje se zasniva na normativnoj i uporednoj analizi relevantnih pravnih izvora, sudskoj praksi Evropskog suda za ljudska prava i kritičkom pregledu domaće i strane naučne literature. Analiza ukazuje da proširena konfiskacija može značajno doprineti borbi protiv finansijskog kriminala, ali njena legitimnost zavisi od jasnih pravnih kriterijuma, srazmernosti, efikasne sudske kontrole i adekvatnih procesnih zaštitnih mera. Rad predlaže preporuke za jačanje pravne sigurnosti i sudske prakse.

Ključne reči: *proširena konfiskacija, finansijski kriminal, pravo na imovinu, međunarodni standardi.*

JEL*: K14, K40, K42.*

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