# APPLICATION OF ARTIFICIAL IN BUSINESS OPERATIONS OF ENTERPRISES IN THE REPUBLIC OF SRPSKA: CHALLENGES AND BARRIERS TO IMPLEMENTATION

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Abstract: The application of artificial intelligence in business operations is crucial for enhancing competitiveness, efficiency, and innovation in the global world. In developed countries, AI technologies are widely used across various industries, while countries like the Republic of Srpska face numerous challenges in their implementation. These challenges include various technical, financial, and regulatory barriers. This paper analyses the current application of artificial intelligence in business operations in the Republic of Srpska by identifying key challenges and obstacles. A comparative analysis will also be conducted with neighbouring countries, Serbia and Croatia, which have made significant progress in digital transformation in recent years. The paper will explore possible strategies, policies, and initiatives that could be beneficial for the Republic of Srpska in promoting the implementation of AI technologies. This work will provide a foundation for the further development of strategies and policies that will contribute to the more efficient application of AI in business operations in the Republic of Srpska.

**Key words:** Artificial Intelligence, Business Operations, Republic of Srpska, Regulatory Framework, Digital Transformation

JEL classification: C10, C32, C50, G10

#### **1. INTRODUCTION**

The modern business environment demands an increasing application of artificial intelligence (AI) to enhance the competitiveness, efficiency, and innovation of businesses. AI technologies have become a key factor in the global economy, enabling companies to automate processes, improve customer experience, and enhance market analysis. While developed countries such as the United States, Germany, and Japan have made significant progress in AI implementation, countries like the Republic of Srpska face numerous challenges in this process. The Republic of Srpska, as an entity within Bosnia and Herzegovina, faces specific issues, including the lack of adequate infrastructure, as well as regulatory, technical, and financial barriers. The goal of this paper is to analyze the current situation regarding the application of AI technologies in business operations in the Republic of Srpska, identifying key challenges that hinder their development. Through a comparative analysis with neighboring countries, Serbia and Croatia, the paper will explore possible solutions and strategies that could help overcome the aforementioned obstacles. Additionally, initiatives and policies that could promote digital transformation in the Republic of Srpska, with a particular focus on AI implementation, will be discussed. This paper provides insight into the current challenges and

opportunities that will contribute to the further development of the business sector in the Republic of Srpska through the introduction of artificial intelligence, to increase the competitiveness of companies in the global market.

## 2. THEORETICAL FRAMEWORK

According to the study by Davenport and Mittal (2022), the analysis of six Chinese construction companies indicates that existing dynamic capabilities are crucial for the effective adoption adaptation of artificial intelligence, and particularly in the context of business model innovation. The authors conclude that the integration of AI technologies can be successfully achieved through the activation and enhancement of existing organizational capacities, thereby mitigating the complexity and challenges associated with digital transformation. AI is a modern technology that offers potential competitive advantages for businesses. However, the research by Polisetty, Chakraborty, Kar, & Pahari (2024) indicates that there are certain shortcomings in its application in B2B small and medium-sized enterprises (SMEs) in India. The authors used the TOE framework to examine the factors that successfully influence the adoption of AI practices and their connection to competitive advantage. The analysis was conducted on a sample of 866 managers using a mixed-method approach. The results showed that most AI enablers have a significant impact on organizations' readiness for AI adoption, except for perceived benefits and role clarity, and that AI ethics was identified as a key moderating factor in the relationships between trust, perceived benefits, role clarity, and achieving competitive advantage. A study that included 835 large companies shows that AI is primarily used for automating machineto-machine activities, rather than replacing human jobs. In the IT sector, AI is most commonly used for detecting cyberattacks, solving technical problems for employees, and automating the deployment of new systems (Rawaswamy, 2017). Augmented Intelligence (AI3) emphasizes the collaboration between human and artificial intelligence, with the goal of enhancing human capabilities rather than replacing them. AI is highly effective in recognizing patterns and optimizing routine tasks within closed systems, while humans excel in adaptation, emotional understanding, and decision-making in open systems (De Cremer & Kasparov, 2021). According to the study conducted by Hartikainen, Väänänen, Lehtiö, Ala-Luopa, & Olsson (October 2022) in 12 AI companies in Finland, an analysis was carried out on how Human-Centered AI (HCAI) principles are applied in practice during the early stages of AI application development.

The research findings highlight the need to systematize methods that support the development of HCAI solutions in the industry. Nortje & Grobbelaar (2020, June) conducted two types of systematic literature reviews to identify the key readiness dimensions for the implementation of AI in business processes. Based on this analysis, they developed a preliminary readiness model framework consisting of seven dimensions: employee and organizational culture, technology management, leadership and governance, strategy, infrastructure, knowledge and information, and security. The findings of this research indicate that successful AI implementation depends on a comprehensive approach that encompasses organizational, technical, and strategic aspects of business operations. Ahmed (2024) conducted a literature analysis and applied the TOE framework to identify key factors influencing AI adoption in SMEs in Malaysia. The study highlights several obstacles, including the lack of strategy, resources, AI experts, and management support, which may negatively affect the competitiveness of the SME sector.

## 3. ARTIFICIAL INTELLIGENCE IN BUSINESS PRACTICE IN THE REPUBLIC OF SRPSKA: CURRENT LANDSCAPE AND KEY CHALLENGES

In the Republic of Srpska, there are certain efforts and initiatives aimed at introducing AI technologies into business operations, particularly within SMEs. One such initiative is the Digital Innovation Hub IDEMO (Digital Innovation Club IDEMO, 2025). DIH IDEMO aims to support the digital transformation of small and medium-sized enterprises in the wood processing and metalworking sectors in the Republic of Srpska, with the assistance of the ICT sector. The focus is on enhancing the competitiveness of these enterprises through collaboration with EU partners and by leveraging the DIH network. IDEMO's mission is to strengthen the position of enterprises in the Republic of Srpska in the global market through the application of digital innovations, while its vision is to become a key driver of digital transformation in the SME sector. In line with its mission to support the digital transformation of small and medium-sized enterprises (SMEs) in the Republic of Srpska, the Digital Innovation Hub IDEMO organized a workshop titled "Support for SMEs in Digitalization Processes" in September 2023. The workshop was held at the Innovation Center in Banja Luka, with the main objective of identifying the key challenges SMEs face during digitalization. Additionally, the workshop focused on discussing potential support measures and instruments that could lead to successful outcomes, as well as the role of relevant institutions and

organizations in providing support to SMEs in the Republic of Srpska throughout the digital transformation process (Digital Innovation Hub IDEMO, 2025).

The Chamber of Commerce of the Republic of Srpska, in cooperation with the Digital Innovation Hub IDEMO, organized a workshop in October 2023 on the topic "Trends in Industry with a Focus on Automation and the Application of Information Technologies and Artificial Intelligence in Today's Industry" (Chamber of Commerce of the Republic of Srpska, 2025). In February 2024, the Chamber of Commerce of the Republic of Srpska organized an education session on digital transformation and artificial intelligence (Chamber of Commerce of the Republic of Srpska, 2025). The theme of the education was "Application of Innovative Digital Trends for the Development of the Economy," which was part of the project "Research and Development of Small and Medium Enterprises (SMEs) in the Republic of Srpska through Innovation and Digital Connectivity - InnDigit SME," supported by the European Union and the Government of the Federal Republic of Germany. The Chamber of Commerce of the Republic of Srpska, in partnership with the Faculty of Engineering at the University of Banja Luka and the Center for Digital Transformation of the Serbian Chamber of Commerce, successfully conducted this education session, focusing on enhancing knowledge in the field of innovation and the application of digital and innovative solutions in manufacturing processes through practical examples.

In May 2024, the Chamber of Commerce of the Republic of Srpska, in cooperation with GIZ (German Corporation for International Cooperation) and the Chamber of Commerce of the Federation of Bosnia and Herzegovina, organized a webinar titled "Using Artificial Intelligence to Boost Sales and Improve Business Relations and Processes of Small and Medium-Sized Enterprises" (Chamber of Commerce of the Republic of Srpska, 2025) (Chamber of Commerce of the Federation of BiH, 2025). This webinar was held with the support of the project "Innovation and Digitalization in Small and Medium-Sized Enterprises in Bosnia and Herzegovina / EU4DigitalSME", which was funded by the European Union and the Federal Ministry for Economic Cooperation and Development of the Federal Republic of Germany, and implemented by the German Corporation for International Cooperation (GIZ). At the final event of the DIH IDEMO project held in May 2024 in Banja Luka, a digital product called "Business Administration Digital Dock" was presented. The product was developed by the companies Supernova and

Blicnet, to digitalize and automate administrative processes in small and medium-sized enterprises, thereby improving efficiency and reducing manual work in daily business operations. This solution aims to ease administrative tasks for employees through centralized document management and employee data updating (ICBL – Innovation Center Banja Luka, 2025). The research conducted by Vuković and Jerković (2024) shows that companies in Bosnia and Herzegovina are aware of the importance of digital transformation for improving their business operations. However, the results indicate a significant gap between this awareness and the actual implementation of digital technologies in everyday business processes.

# 4. LEGAL REGULATION OF THE APPLICATION OF ARTIFICIAL INTELLIGENCE IN BUSINESS OPERATIONS IN THE REPUBLIC OF SRPSKA

Currently, neither the Republic of Srpska nor Bosnia and Herzegovina has a specific regulatory framework governing the application of artificial intelligence in business operations. However, there are certain initiatives related to the legal regulation of business digitalization, the introduction of new technologies, and the Internet of Things (IoT). The development of technological innovations has made it increasingly difficult to align them with traditional concepts of industrial property (Damjanović, 2024).

The Government of the Republic of Srpska adopted the Strategy for the Development of E-Government of the Republic of Srpska for the Period 2019–2022 (Government of the Republic of Srpska, 2025). According to this strategy, strategic goals for the development of e-government from 2019 to 2022 were defined, which include:

- the establishment of an efficient system for managing ICT infrastructure;
- a user-oriented and economically sustainable process for the digitalization of public services;
- the development of adequate competencies among public administration employees for egovernment development.

# 5. COMPARATIVE ANALYSIS OF THE APPLICATION OF ARTIFICIAL INTELLIGENCE IN THE REPUBLIC OF SRPSKA, CROATIA, AND SERBIA

There is a lack of available data on the application of artificial intelligence (AI) in business operations in the Republic of Srpska. Therefore, the implementation of AI technologies in enterprises is still in its early stages, although it is on the rise. In 2022, a company named AI & IT was established in Banja Luka, providing services in the field of artificial intelligence and information technologies. This company focuses on software and application development tailored to client needs, as well as on the implementation of AI across various industrial sectors (AI & IT, 2025).

In contrast, the situation in Serbia and Croatia is somewhat more advanced regarding the adoption of AI technologies in business operations, as well as in the development of regulatory frameworks and national AI strategies. In Serbia, according to research conducted by ICT Hub in cooperation with the Serbian Association of Managers, the results of a study based on a sample of 157 companies show that only 34% of enterprises in Serbia apply AI technologies, while the remaining companies have not yet integrated AI into their business processes. AI usage is most prevalent in the information and communication sectors (around 60%) (ICT HUB Empowering Innovations, 2024).

In accordance with the Law on the Planning System of the Republic of Serbia, the Government of Serbia adopted the Strategy for the Development of Artificial Intelligence for the 2025–2030, thereby establishing period an institutional and strategic framework for the advancement and implementation of AI within the country. The main objectives of this strategy are to establish a legal framework for the safe and ethical use of AI technologies, improve education, and support innovation based on AI. The strategy focuses on applying AI in sectors such as healthcare, agriculture, and cybersecurity, as well as on the development of data governance as a strategic resource. It also foresees strengthening the infrastructure through the expansion of the National AI Platform (Ministry of Science, Technological Development and Innovation, 2025). In line with the aforementioned strategy, Serbia has developed a National AI Platform, which includes four DGX-A100 Nvidia servers with 32 GPUs, used for deep learning and highperformance computing (HPC) simulations across multiple nodes. The supercomputer is housed in the State Data Center in Kragujevac (National AI Platform, 2025).

In May 2025, the Ministry of Justice, Public Administration and Digital Transformation of the Republic of Croatia adopted a Decision on the initiation of the development of the National Plan for the Development of Artificial Intelligence for the period up to 2032, in order to implement the National Plan for the Development of Artificial Intelligence for the period 2026-2028 (Ministry of Justice, Public Administration and Digital Transformation of the Republic of Croatia, 2025). Based on the Law on the System of Strategic Planning and Development Management of the Republic of Croatia, the Government of Croatia adopted the Digital Croatia Development Strategy for the period until 2032 in January 2023 (Law HR, 2025). This strategy envisions the utilization of advanced digital technologies, including 5G/6G networks, artificial intelligence, machine learning, data analytics, and other emerging big technologies, with the goal of applying them in both the public and private sectors to enhance efficiency and support comprehensive digital transformation (Ministry of Justice, Public Administration and Digital Transformation of the Republic of Croatia, 2022).

Chart 1. Application of AI Technologies in Enterprises in Bosnia and Herzegovina, Croatia, and Serbia (2023–2024) (%)



Source: Authors (Eurostat, 2025).

Chart 1 illustrates the use of artificial intelligence (AI) technologies in enterprises employing between 10 and 249 workers, across all industrial sectors. The data refer to the percentage of businesses adopting AI technologies in Bosnia and Herzegovina, Serbia, and Croatia during 2023 and 2024.According to the presented data, in 2023, the highest level of AI technology adoption was recorded in Croatia, where 7.55% of enterprises utilized these technologie an increase in AI technology adoption is observed in all three countries. Croatia continues to lead with 11.31%, while Serbia shows a significant rise to 6.64%, and Bosnia and Herzegovina experiences a moderate increase to 6.12%. These figures indicate an accelerating trend of digital transformation, with Croatia standing out as a regional leader in the implementation of AI technologies among small and medium-sized enterprises.

This was followed by Bosnia and Herzegovina with 5.18%, and Serbia with only 1.72%. In 2024,



Picture 1. Application of AI technologies in Enterprises in 2024. (%)

Source: (Eurostat, 2025).

Figure 1 illustrates the prevalence of any form of artificial intelligence (AI) technology adoption in enterprises worldwide, based on data from Eurostat (2025). The analysis includes businesses with ten or more employees, and the data are presented as annual percentage shares for the year 2024. Croatia ranks sixteenth, with 11.76% of enterprises implementing AI technologies. In contrast, Serbia and Bosnia and Herzegovina are positioned near the bottom of the list. Nevertheless, Bosnia and Herzegovina

records a higher AI adoption rate (7.91%) compared to Poland (5.9%), Turkey (4.42%), Romania (3.07%), as well as the group of new European Union member states, which on average exhibit a negligible level of AI adoption (slightly above 0%). These findings highlight substantial disparities in the degree of digital transformation

among countries, with Bosnia and Herzegovina standing out as a positive exception in comparison to certain EU member states.

#### CONCLUSION

In the modern business environment, artificial intelligence (AI) has become a crucial driver of competitiveness, efficiency, and innovation by enabling process automation, improved customer experience, and advanced market analysis. In the Republic of Srpska, certain efforts aimed at integrating artificial intelligence (AI) into business processes have been recognized. However, this developmental path faces numerous challenges, among which the most prominent are the lack of financial technical infrastructure, limited resources, and the absence of an adequate regulatory framework. These factors significantly hinder the implementation of AI technologies within the economic sector of the Republic of Srpska. A comparative analysis with neighboring countries, such as Croatia and Serbia, indicates some progress in the direction of introducing AI technologies into business operations. According to Eurostat data (2025), it can be concluded that Bosnia and Herzegovina, including the Republic of Srpska as one of its

entities, has made measurable progress in adopting AI technologies—surpassing countries such as Turkey, Poland, Romania, and the new EU member states, which report exceptionally low levels of AI adoption. Although a comprehensive framework regulatory governing artificial intelligence and its application in business operations is currently lacking in the Republic of Srpska, initial steps toward its development are evident. To raise awareness and strengthen capacities, various workshops, seminars, and professional conferences are being organized throughout Bosnia and Herzegovina, including the Republic of Srpska, to inform and educate the business community about the possibilities, challenges, and benefits that the implementation of AI technologies can bring.

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