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Review Article

ARTIFICIAL INTELLIGENCE AND DIGITAL BUSINESS TRANSFORMATION – OPPORTUNITIES AND CHALLENGES

Srećko Ilić
Faculty of business economics Bijeljina, University of East Sarajevo, Republic of Srpska, BiH
srecko.ilic@fpe.ues.rs.ba
ORCID: 0000-0002-4010-8847

Abstract: *Artificial intelligence is a technology that has experienced significant growth and development in recent years and is applied in numerous fields. This technology encompasses machine learning and deep learning and refers to the development of systems designed to mimic human intelligence, with the goal of performing various tasks. Machine learning is the ability of computers to learn from patterns in data, with the aim of predicting future events and making better business decisions. Deep learning is a type of machine learning that uses neural networks, or complex algorithms, to recognize specific patterns in data. Digital business transformation refers to the integration of digital technologies into all aspects of business, which contributes to changing the way companies operate, all with the goal of increasing efficiency and the quality of goods and services. Numerous digital technologies support the process of business transformation, including Big Data, cloud computing, the Internet of Things, artificial intelligence, and many others. Artificial intelligence in the context of digital business transformation aims to enable companies to automate business processes, perform predictive analytics, improve customer experience, optimize business models, and innovate products and services. If a company decides to incorporate artificial intelligence into its digital transformation process, the opportunities presented include: increased productivity, better decision-making, reduced costs, and the ability to respond to market demands. In addition to these opportunities, there are numerous challenges companies may face when applying artificial intelligence, with the most significant being: data security and privacy, implementation complexity, ethical issues, and dependence on technology.*

Key words: *Artificial intelligence, digital business transformation, digital technologies*

JEL classification*: O33*

1. INTRODUCTION

Digital Business Transformation represents the integration of digital technologies into all aspects of business operations. Digital technologies include tools such as artificial intelligence (AI), cloud computing, machine learning, deep learning, Internet of Things (IoT), integrated information systems, and other technologies. None of these technologies needs to be used in isolation within the digital transformation process of a company. On the contrary, it is desirable for these technologies to be used in combination with one another in order to fully leverage the advantages they offer when applied together.

Artificial intelligence includes machine learning and deep learning and refers to the application of systems and algorithms designed to perform tasks that would typically require human intelligence. AI enables the automation of numerous business processes, thereby allowing employees to focus their efforts on strategic issues within the company. Given that a vast amount of information is collected on a daily basis in business operations, and in order to make business decisions more

efficient and faster, AI can be used to analyze these large data sets and improve the decision-making process.

This paper discusses the application of artificial intelligence in the context of digital business transformation, with the goal of highlighting the opportunities and challenges faced by companies that choose to digitally transform their operations using this technology. The paper is divided into three parts. The first part provides a brief literature review based on works written by experts in the field of digital transformation. The second part defines digital business transformation and artificial intelligence, with a focus on the opportunities and challenges of AI and digital transformation in general, including an overview of AI implementation in the countries of the former Yugoslavia. The third part presents concluding remarks on the topic and recommendations for further research.

2. RESEARCH METHODOLOGY

This paper employs a literature review as the primary research method. The scientific papers included in this study were sourced from the Web of Science, EBSCOhost, Google Scholar, and ResearchGate databases. The key terms used in the search process were digital business transformation, artificial intelligence, opportunities, and challenges. Only articles published in academic journals and conference proceedings were considered in the preparation of this paper. Search results that included final papers (such as undergraduate theses, master's theses, and doctoral dissertations), as well as articles that were not fully accessible, were not used as sources for this research.

3. LITERATURE REVIEW

Many authors have written in their research about digital transformation, as well as the numerous technologies that support the digital transformation of business, among which is artificial intelligence. Below is a brief literature review based on several papers that describe the significance of digital business transformation and the application of artificial intelligence in the context of business digital transformation.

Burilović (2020) defines digital business transformation as the way in which a company uses digital technologies to develop a new digital business model aimed at creating and providing greater value for the company. He also believes that many organizations, entrepreneurs, and managers are not sufficiently familiar with the concept of digital business transformation. Often, digital business transformation is equated with the digitization of existing business models and analog processes, as well as solutions enabled by ICT (Information and Communication Technologies) such as ERP systems (Enterprise Resource Planning) and other tools that primarily serve as support in modern business practices. However, digital transformation represents an organizational transformation supported by digital technologies. The author further suggests that for successful digital business transformation, a change in mindset and corporate culture is necessary to enable long-term sustainable business operations and achieve a competitive advantage.

Akter, Michael, Uddin, McCarthy, and Rahman (2020) believe that the digital transformation of businesses, through the use of AI and other technologies such as blockchain, cloud computing, and data analytics, can contribute to the development of customer relationships, supplier relationships, and the creation of innovative business models. The authors also state that AI platforms based on cloud infrastructure aim to secure a competitive advantage for companies through predictive and prescriptive analytics. The goal is to integrate various technologies to explain the behavior of product users and employees within the company. Organizations across various industrial sectors are investing in artificial intelligence with the goal of automating the value chain and providing better customer service. The authors argue that AI, blockchain, cloud, and data analytics are key next-generation technologies that can successfully transform business operations and ensure a long-term perspective for organizations that digitally transform their operations through the application of these technologies.

Palanivelu and Vasanthi (2020) argue that artificial intelligence is becoming a central part of the digital world. The application of AI enables the identification of trends in data to minimize market risks, improve customer support through virtual personal assistants, and analyze large numbers of documents on company servers to identify documents that are not in compliance with current regulations. From a business perspective, AI is highly scalable, which allows companies to achieve significant cost savings. The authors also suggest that the application of AI in the future will pose a challenge for organizations that need to digitally transform their operations, as companies must train their employees to adapt to new technologies, including AI. The authors' stance is that working with AI is imperative if a company wants to survive in the market, not an option.

Kitsios and Kamariotou (2021) believe that AI is still under-researched, despite the fact that many corporate strategies rely on human-AI collaboration. They also highlight that there are still numerous challenges in implementing AI

across different industries and at various levels. The authors believe that, in certain situations, AI makes better decisions than humans, but when it comes to critical thinking, humans still outperform AI.

Ononiwu, Onwuzulike, and Shity (2024) emphasize that technologies such as AI, machine learning, and IoT enable extremely high levels of automation, data analysis, and connectivity. AI, which encompasses machine learning and deep learning, not only allows for the personalization of user experience and market trend forecasting but also enables the optimization of supply chains. The authors also note that the application of AI allows companies to tailor their products and services to individual consumer demands, ultimately increasing customer loyalty and satisfaction. One of the main challenges of applying AI in the context of digital business transformation is the displacement of jobs due to the automation of processes that were previously performed by humans. As a solution, the authors suggest retraining and upskilling employees to successfully adapt to the new changes.

4. DIGITAL TRANSFORMATION AND ARTIFICIAL INTELLIGENCE

Digital business transformation refers to the application of digital technologies within an organization's operations. The process of digital business transformation involves the integration of digital technologies into all aspects of business. Business models are redefined through digital transformation. Digital technologies, or business digitization, have eliminated intermediaries through digital products and services. The core technologies that ensure successful digital transformation (Ilić and Damjanović, 2024) include:

- Artificial Intelligence (machine learning and deep learning)
- IoT technologies
- Cloud computing
- Big data
- Mobile technologies.

Artificial intelligence is a technology that is increasingly being applied in various fields. Investment in AI is gradually becoming an imperative, rather than just an option, for strategic development. The environment in which companies operate today is extremely dynamic, and companies strive to retain or improve their market position. By investing in AI, businesses aim to automate routine tasks, improve decision-making processes, and identify patterns in collected data to successfully forecast future business scenarios. Investment in AI involves allocating resources for the acquisition, development, and implementation of artificial intelligence. In addition to predictive analytics, the application of AI in everyday business also enables natural language processing and process automation through robotics. As AI continues to advance, companies gain access to new opportunities that can be leveraged to foster innovation, further enhance productivity, and ensure long-term business growth (Mardani, 2024).

The key components of AI are machine learning and deep learning. Machine learning enables systems to learn from patterns identified in data and use those patterns to predict future events. Machine learning algorithms typically fall under supervised learning, which involves training systems using labeled datasets. The purpose of business process automation is to reduce task execution time and minimize the likelihood of errors. Automating routine tasks allows human resources to focus on activities that generate greater value for the company. AI can also detect bottlenecks in production processes, allowing companies to intervene in a timely manner to eliminate these inefficiencies. In manufacturing, AI is used to monitor the performance of machinery, predict maintenance needs, and detect components that may cause breakdowns, potentially avoiding production delays. This enables timely procurement of spare parts and planning for repairs or replacements. In the financial and retail sectors, AI algorithms provide the ability to analyze customer data and tailor offerings to their specific needs. This increases customer satisfaction and, in turn, loyalty to the product, brand, or company. Higher levels of customer satisfaction can lead to increased market share and enhanced competitive advantage (Ajay Aakula, Vipin Saini and Taneem Ahmad, 2024).

IoT technologies involve smart devices connected to the internet, equipped with various sensors. These sensors monitor the environment and record changes, collecting large volumes of data. The data is stored in a central database, typically in the cloud. Analytics is then performed on this data to support better and more efficient business decision-making, especially when IoT devices are used in a business environment. Beyond business use, IoT is also implemented in households, where it helps reduce household costs. In business contexts, IoT helps prevent excessive and inefficient use of resources. IoT-driven business process automation contributes to higher product and service quality. In addition to cost reduction, these technologies also improve productivity, accuracy, and precision in product and service

delivery. The main goal of IoT is to ensure that the right data is collected and stored in the right place, supporting decision-making and preventing business process disruptions. When IoT systems are properly configured, human intervention is not necessary—only system monitoring is required (Ilić and Damjanović, 2024).

Cloud computing technologies allow organizations to expand their operations with minimal cost and eliminate bottlenecks by providing on-demand resources. Thanks to cloud technologies, companies no longer need to invest heavily in hardware and software for daily operations. Cloud services include Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS), which are billed based on a "pay-as-you-go" model. This enables organizations to scale their resources up or down based on operational needs. Cloud computing supports AI-based analytics, encouraging businesses to adopt AI in the cloud to boost customer engagement and sales. When IoT technologies are combined with cloud computing, they enable real-time data collection and storage, which improves overall business efficiency and decision-making processes (Karamchand, 2024).

Big data refers to the massive volume of data generated at high speed, which cannot be processed using traditional methods. As companies gather more data, the complexity of analyzing it also increases, requiring companies to define the specific types of data they need. Data analytics enables companies to gain deep insights into customer behavior—such as navigation patterns on a website, purchase frequency, and more. For these and similar reasons, businesses undergoing digital transformation should utilize big data technologies to ensure a more successful transformation and improve decision-making (Samadi-Parviznejad, 2021). Data analytics provides unbiased analysis of collected data and highlights opportunities for organizational growth. Resources are used more rationally because analysts have the opportunity to focus on more complex tasks that cannot be fully automated. Data analytics also ensures that business users get answers to questions faster without having to rely on analysts on a daily basis (Alghamdi and Al-Baity, 2022).

Mobile technologies refer to the use of mobile devices and applications in everyday business activities. Devices such as smartphones and tablets are increasingly common in workplaces due to the many benefits they offer employees. These applications are designed for customers, partners, employees, and suppliers, aiming to increase sales revenue and provide timely access to information—anytime and anywhere (Matković, Marić, Tumbas and Đurković, 2018).

4.1. OPPORTUNITIES IN THE APPLICATION OF ARTIFICIAL INTELLIGENCE IN THE CONTEXT OF DIGITAL BUSINESS TRANSFORMATION

Several factors influence the adoption of digital technologies. The most significant factors that play a key role in the decision-making process related to digital business transformation are (Smith, Rossi, Khan, 2025):

- Technological advancement
- Consumer expectations
- Competition
- Regulatory framework.

Advancements in technologies such as artificial intelligence, IoT, big data analytics, and cloud computing enable companies to reduce their costs, optimize business processes, and enhance decision-making. Consumers are becoming increasingly demanding, and meeting their needs and desires is becoming more complex. Companies are expected to provide their consumers with personalized experiences and digital interaction, which can best be addressed through the digital transformation of business operations.

Companies that do not adopt digital strategies are at high risk of losing their market position. Agile competitors will seize every opportunity to gain a competitive advantage. In order to fully benefit from the technologies applied in business operations, a clearly defined regulatory framework is necessary, particularly regarding the security and safety of customer data (Smith, Rossi and Khan, 2025).

Digital transformation offers numerous opportunities for business success. The opportunities available to a company that decides to digitally transform its operations include (Smith, Rossi and Khan, 2025):

- Acquisition of employees' digital skills
- Agile business models
- Customer-focused digitalization
- Collective ecosystems.

To ensure a successful transition from traditional business methods to operations supported by digital technologies, it is essential to educate employees so that they acquire as many digital skills as possible. Through digital transformation, companies adopt flexible strategies that support a continuous process of innovation and adaptation in a dynamic business environment. Companies also have the opportunity to form partnerships with

tech firms, startups, and research institutes, accelerating the adoption and implementation of new technologies in their operations (Smith, Rossi and Khan, 2025).

The application of AI technologies in the context of digital business transformation offers certain key opportunities for businesses, including (Yusuf, Durodola, Ocran, Abubakar, Echere and Paul-Adeleye, 2024):

- Operational efficiency
- Scalability and growth
- Improved customer engagement.

When it comes to operational efficiency, automation of routine tasks is one of the most significant benefits, as it reduces the likelihood of errors. Additionally, operational costs decrease, which is particularly advantageous for small and medium-sized enterprises that often operate with limited resources. Besides cost savings, it is also possible to detect and mitigate business risks in a timely manner, with the goal of preventing economically damaging events or losses. AI technologies, alongside other digital technologies, provide businesses with tools for scaling and growing their operations. Scalability is a major advantage, as it allows, for example, the expansion of certain digital solutions to support business growth without the need for significant investments in infrastructure. AI platforms based on cloud infrastructure enable companies to increase their resources in order to handle large volumes of data generated by business activities. Customer engagement is enhanced through digital technologies, especially AI-based ones. AI tools analyze customer data to understand their individual preferences, allowing companies to adapt their marketing strategies and create personalized and responsive customer experiences (Yusuf, Durodola, Ocran, Abubakar, Echere and Paul-Adeleye, 2024).

4.2. OPPORTUNITIES IN THE APPLICATION OF ARTIFICIAL INTELLIGENCE IN THE CONTEXT OF DIGITAL BUSINESS TRANSFORMATION

In addition to the advantages a company gains through the digital transformation of its operations, there are also certain challenges, the most significant of which are (Smith, Rossi and Khan, 2025):

- Cybersecurity risk
- Financial constraints
- Resistance to change
- Complexity of integrating digital tools.

The application of digital technologies in the context of business digital transformation can compromise the integrity of company data if adequate security measures are not implemented. Introducing new technologies into a company requires significant investment in order for these technologies to be used effectively in operations. Technological advancement, which occurs on a daily basis, demands that companies adapt to new trends in technological development. The process of adapting and introducing new digital technologies also represents an additional cost for the company. Employees who will be using digital technologies often show resistance to adopting new tools, either due to a lack of skills or fear of losing their jobs. Companies often decide to provide training for their employees so that they are prepared to use the newly introduced digital technologies, but this can be a double-edged sword. When companies send their employees for training, it represents an additional expense related to education. The knowledge employees gain during training is tied to the individual, which means there is a risk of them leaving the company and using that knowledge elsewhere. In such cases, the company that invested in training would suffer a loss, while the new company would gain a "ready-made product" without incurring any training costs. For this reason, companies need to make strategic moves to motivate employees to remain in the organization after completing their training. Furthermore, during the integration of existing systems with digital tools, operational inefficiencies may occur. It is not uncommon for companies to retain traditional systems during the transition period, as employees are not yet ready to use new technologies until they complete the training process. The integration of new technologies is a gradual process, which often gives rise to such challenges when transitioning from traditional to digitally transformed business models.

In addition to opportunities, the application of AI technologies in the context of digital business transformation also presents certain challenges, the most notable being (Yusuf, Durodola, Ocran, Abubakar, Echere and Paul-Adeleye, 2024):

- Strategic and organizational challenges
- Technical and infrastructural barriers
- Financial and market-related obstacles
- Undefined legal regulations
- Sustainability.

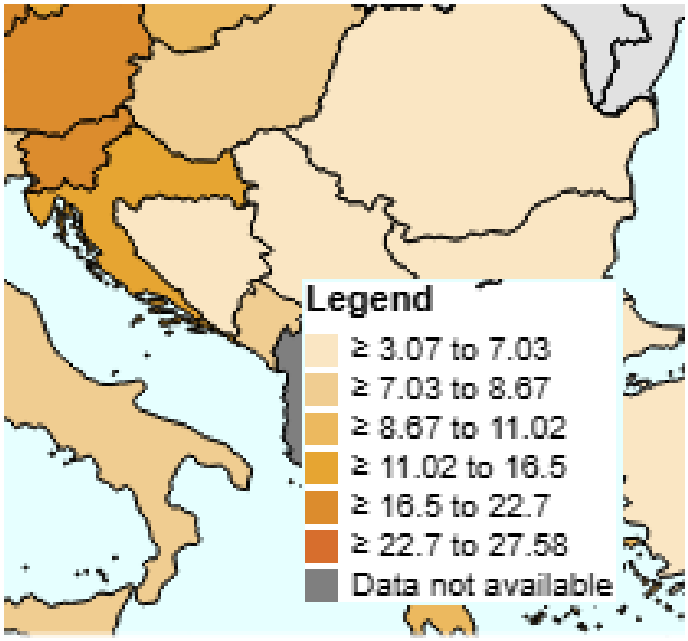
Strategic challenges refer to the lack of a clear AI implementation strategy. These also include a shortage of employees to work with such technologies, limited investment in human capital,

cultural barriers, and employee turnover. Many companies lack the necessary technical infrastructure, including hardware, software, and IT systems required for implementing AI technologies. Limited access to relevant data affects the company's ability to effectively utilize AI for business decision-making. Financial challenges also influence the adoption of AI and other digital technologies. Limited financial resources represent a major barrier since initial investments and maintenance costs can be substantial. Because of these constraints, companies may be unable to take full advantage of the opportunities provided by AI and other digital technologies. Another challenge lies in legal and regulatory issues, which act as a major barrier to AI adoption. It is imperative to ensure data security, compliance with industry standards, and AI-related regulations. These concerns may discourage management from implementing AI and other digital tools. Ethical issues are also very important in the application of AI. The use of AI technologies raises concerns about fairness, bias, and transparency, and any ethical missteps can damage a company's reputation. A damaged reputation can easily result in loss of customer trust. Cybersecurity is a crucial segment of implementing digital technologies, particularly AI. AI technologies can increase the likelihood of cyber-attacks, especially in companies that are not infrastructure-ready to defend against them. This too could serve as an additional reason for management to hesitate in implementing AI technologies (Yusuf, Durodola, Ocran, Abubakar, Echere and Paul-Adeleye, 2024).

5. THE APPLICATION OF AI TECHNOLOGIES IN BOSNIA AND HERZEGOVINA

According to EUROSTAT data, AI technologies are also being used in the operations of a certain number of companies in Bosnia and Herzegovina.

Image 1. The application of AI in Bosnia and Herzegovina



Source: https://ec.europa.eu/eurostat/en/

In Image 1, it is visually presented which interval the countries of the former Yugoslavia belong to regarding the use of AI in their operations in 2024. According to EUROSTAT data, the situation is as follows:

- In Bosnia and Herzegovina, 6.36% of companies use some form of AI technology.
- In Serbia, 6.95% of companies use some form of AI technology.
- In Croatia, 11.76% of companies use some form of AI technology.
- In Slovenia, 20.89% of companies use some form of AI technology.
- In Montenegro, 7.91% of companies use some form of AI technology.
- Data for North Macedonia is not available.

According to data from the BN television portal, in the Republic of Srpska, Bosnia and Herzegovina, artificial intelligence is used in the JZU General Hospital "Sveti vračevi" in Bijeljina, which is also the first public health institution in the country where the application of AI technologies began. Artificial intelligence in companies in Bosnia and Herzegovina finds its application in warehouses, areas of transport, production, distribution, banking sector and other sectors.

According to data from the Radio Free Europe website, in Serbia artificial intelligence is applied in the field of industry and agriculture. In agriculture, the application of artificial intelligence makes it possible to predict yields, and also to advise farmers on how to increase their yield. In the field of industry, artificial intelligence finds its application in robotics, which achieves the automation of demanding and repetitive processes.

According to data from the Forbes HRV website, in Croatia artificial intelligence is applied in companies in the form of chat bots, as well as in public administration. The goal of introducing chat bots is to improve communication with citizens and provide them with easier access to necessary information. Also, in numerous companies in Croatia, ChatGPT processes large volumes of emails from users, and based on sentiment, it can be concluded whether the users are satisfied with the product or the service provided, or not.

According to data from the Bloomberg Adria portal, in Slovenia, apart from companies, artificial intelligence is also being used in traffic, which enables passengers to predict where and when potential traffic jams and traffic jams might occur. Artificial intelligence in Slovenia finds its application both in the financial sector and in the insurance sector.

According to the bankar.me portal, Oxiom FinBot, an AI system that improves business processes in terms of speed, accuracy and efficiency, was presented in Montenegro. The system is intended to automate repetitive administrative and accounting processes. Oxiom FinBot is envisioned as an AI accountant that books documents, analyzes data and provides real-time financial information.

Each of the countries of the former Yugoslavia has the potential to ensure numerous benefits to its citizens through the application of artificial intelligence. The first and basic step is the adoption of legislation related to the application of artificial intelligence, as well as the development of a national strategy for the implementation of artificial intelligence at the state level. The Government of the Republic of Slovenia adopted the program for the development of a national strategy related to the implementation of artificial intelligence in 2021, and the Government of the Republic of Serbia in early 2025. The Republic of Bosnia and Herzegovina, the Republic of Croatia, the Republic of Montenegro and the Republic of North Macedonia still do not have an adopted national strategy for the implementation of artificial intelligence. Some of these countries are in the process of finalizing this strategy. Considering that artificial intelligence is increasingly finding its application in numerous business segments, it can be concluded that the development of national strategies for the implementation of artificial intelligence must not be an option, but a necessity.

CONCLUSION

Digital business transformation provides numerous advantages to companies that decide to take this step. Various studies indicate that digital transformation is no longer an option but has become a necessity for successfully operating and surviving in today's market. Consequently, business management must choose the best and most efficient strategy to ensure the successful transition from traditional business practices to operations supported by digital technologies. During the digital transformation process, the best option is to combine several different digital technologies to leverage all their advantages while compensating for their shortcomings.

Artificial intelligence (AI) is one of the digital technologies that provides numerous benefits to companies using it, but also presents certain challenges. However, technological progress is something that cannot be avoided or bypassed, and when all technologies are used properly, the advantages they bring far outweigh their disadvantages. Digital technologies, led by artificial intelligence, significantly reduce costs, improve productivity and efficiency, but also reduce the number of jobs as they enable automation of numerous routine tasks. Many jobs are disappearing, and many will cease to exist in the future. However, research into such and similar topics leads to the conclusion that while a certain number of jobs will indeed shrink or disappear, a vast number of new jobs for working with digital technologies, and thus artificial intelligence, will emerge. The only requirement is to educate the workforce to be capable of working with these technologies, which can be an investment for companies or part of regular education if the curricula are designed in accordance with the labor market's needs.

According to EUROSTAT data, 6.36% of companies in Bosnia and Herzegovina use some form of AI in their operations. It is expected that in

the future, the number of companies using AI will increase globally, and thus in our country, as in order to survive and compete with companies worldwide, it is necessary to follow the trends and technologies used in other countries and apply them in the operations of our businesses. Therefore, future research should be directed towards finding ways and areas where AI can be applied to improve business operations and market position while adhering to all key business principles.

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