

# DIGITAL TRANSFORMATION OF ENTERPRISES: THE ROLE OF ARTIFICIAL INTELLIGENCE IN ENHANCING COMPETITIVENESS

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**Abstract:** *This paper analyzes the process of digital transformation with a special focus on the role of artificial intelligence (AI) as a key driver of modern business. The aim is to examine how the integration of AI technologies into marketing, production, finance, and sales functions contributes to process optimization and strengthening companies' competitive advantage. The research is based on a theoretical analysis of contemporary scientific sources and practical examples of artificial intelligence application in global and regional business environments. The results indicate that artificial intelligence significantly increases operational efficiency and personalization of the customer experience. However, successful implementation requires overcoming challenges such as high costs, lack of skilled workforce, and employee resistance to change. The paper concludes that digital transformation is not only a technological issue but a strategic necessity for long-term survival in the digital market.*

**Key words:** *digital transformation, artificial intelligence, competitiveness, automation, personalization, business processes, ethics*

**JEL classification:** *O33, M15, L25*

## 1. INTRODUCTION

In the modern business environment, an increasing number of companies recognize the necessity of digital transformation as a key factor for achieving and maintaining success and market sustainability. This trend results from the rapid development of technology and changes in business practices,

where artificial intelligence (AI) takes on the role of a primary driver of efficiency and innovation.

Previous research indicates that digital transformation represents one of the key factors of modern business development and enterprise competitiveness. According to OECD (2020), and McKinsey & Company (2018), organizations that successfully integrate digital technologies achieve higher operational efficiency, flexibility, and resilience to market changes. Furthermore, Berente et al. (2021) emphasize that the management of artificial intelligence has become an essential component of organizational strategy and decision-making, while Liu and Zhang (2022) highlight that AI technologies significantly contribute to business process optimization and operational improvement. Chui, Manyika, and Miremadi (2018) also point out that artificial intelligence enables companies to increase productivity, reduce operational costs, and create innovative business models. The theoretical foundations of artificial intelligence and intelligent systems in business environments were established by Russell and Norvig (2009), whereas Zhang and Lu (2021) stress that AI is becoming a central element of long-term digital transformation and sustainable competitive advantage.

To effectively respond to these changes, enterprises must integrate digital technologies into all segments of their operations, using the power of data and analytics for real-time decision-making and the improvement of customer experience. Additionally, organizations recognize the importance of aligning technological tools with strategic objectives in order to create a sustainable competitive advantage, where artificial intelligence stands out as a technology that not only automates

routine tasks but also fundamentally transforms organizational culture and market approach.

The aim of this paper is to provide a theoretical and practical analysis of the impact of artificial intelligence on the process of digital transformation, as well as to examine how this technology optimizes key business functions. The paper tests the main hypothesis that the comprehensive implementation of artificial intelligence in key business processes directly leads to increased operational efficiency and strengthened competitive advantage, provided that it is accompanied by adequate management of organizational change and risks.

This paper is divided into the following sections: the first part focuses on the concept and importance of digital transformation in enterprises; the second part examines artificial intelligence in detail as a key technology in the areas of marketing, production, finance, and sales; the third part is dedicated to analyzing the impact of this technology on overall competitiveness, while the fourth part addresses challenges, risks, and practical examples from contemporary business practice. In order to ensure a systematic research approach, the paper defines a methodological framework that includes the research subject and objectives, hypothesis, applied methods, and research limitations.

## **2. RESEARCH METHODOLOGY**

The methodological framework of this paper was set with the aim of systematically examining the impact of artificial intelligence on digital transformation processes within modern organizations. The subject of the research covers theoretical and practical aspects of the integration of digital technologies, with a special focus on artificial intelligence (AI) as the primary catalyst for changes in key business functions: marketing, production, finance and sales.

The main objective of the research is to determine, through the analysis of modern scientific sources and practical examples, how the application of AI solutions contributes to the optimization of operational processes, cost reduction and long-term strengthening of the competitive advantage of the company.

In accordance with the defined objective, the paper sets the main scientific hypothesis (H1): Comprehensive implementation of artificial intelligence in key business processes directly leads to an increase in operational efficiency and strengthening of the competitive advantage of the company, provided that the process is accompanied by adequate management of organizational changes and identified risks. In

order to prove the hypothesis and draw relevant conclusions, the following scientific methods were applied in the paper:

**Analysis and synthesis method:** It was used to decompose complex concepts of digital transformation and AI systems into their functional parts, and to reassemble them into a complete picture of the impact on business performance.

**Descriptive method:** It was used for a detailed description of the technological characteristics of artificial intelligence and a chronological overview of the development of digital trends in business.

**Comparative method:** It was applied when comparing traditional work methods with modern, automated processes, as well as for analyzing differences in the application of technologies between global leaders (such as Amazon) and small and medium-sized enterprises (SMEs). **Case Study Method:** Through the analysis of concrete examples from practice and relevant statistical reports (such as those by the AI Chamber and OECD), theoretical assumptions are verified with real indicators of success. Data sources include relevant domestic and foreign scientific literature, studies by leading consulting firms, as well as official reports by international organizations published in the period from 2018 to 2024. The main limitation of the research is the pronounced dynamism of the field of artificial intelligence, where technological standards change faster than scientific validation processes can be fully implemented, which requires continuous data updating.

## **3. THE CONCEPT AND SIGNIFICANCE OF DIGITAL TRANSFORMATION OF A COMPANY**

Digital transformation of enterprises is a comprehensive and complex process of integrating digital technologies into all spheres of business, resulting in fundamental changes in the way organizations operate and deliver value to their customers. According to the OECD definition (2020), this process is not only technical in nature, but primarily serves to improve performance and create new economic value through innovative approaches. It is crucial to understand that digital transformation goes beyond the mere purchase of modern software; it requires fundamental changes in the organizational structure, corporate culture and, most importantly, in the mindset and digital literacy of employees (McKinsey & Company, 2018). Unlike traditional models that often relied on reactive decision-making, transformed enterprises become proactive systems that use data to make decisions in real time.

In professional literature and practice, it is necessary to clearly distinguish three concepts that are often mistakenly identified: digitalization, automation and digital transformation.

**Digitization:** Refers to the transition from analog to digital format, such as scanning documents or introducing electronic databases for easier storage and search (European Commission, 2019).

**Automation:** Focuses on the application of technological solutions (such as software robots or algorithms) to perform specific, repetitive tasks without human intervention, thus minimizing human errors and drastically increasing operational speed.

**Digital transformation:** Represents the broadest term that integrates the previous two, but goes beyond them because it redefines the entire business strategy and model of survival in the market (World Economic Forum, 2020).

The importance of this process is reflected in multiple benefits, primarily through a drastic increase in efficiency and precision in the execution of business operations. By optimizing processes, companies achieve significant savings and better allocation of resources. One of the most important aspects is the ability to analyze massive data (Big Data), which allows management to more accurately predict market trends. Digital transformation also directly impacts the improvement of the customer experience. Through personalized services, faster two-way communication, and customized digital channels, companies build long-term customer loyalty.

The role of digital technologies in this process is fundamental. Technological pillars such as artificial intelligence (AI), cloud computing, the Internet of Things (IoT), and advanced data analytics enable organizations to become more flexible and resilient to external shocks. These tools not only help optimize existing ones, but also serve as a catalyst for the development of completely new products and services. Ultimately, the successful implementation of digital transformation provides companies with a strong competitive advantage, allowing them not only to survive, but also to take a leading position in a highly dynamic and unpredictable digital environment.

In practice, digital transformation is best seen in global companies such as Amazon and Netflix, which use advanced algorithms to analyze user behavior and personalize services. For example, Netflix shows each user different content based on previous viewing, while Amazon uses purchase data to recommend products.

It can be said that digital transformation is no longer a matter of choice, but a necessity for every modern company that wants to grow in the long term and successfully integrate into the modern trends of the digital economy.

#### **4. ARTIFICIAL INTELLIGENCE AS A KEY TECHNOLOGY OF DIGITAL TRANSFORMATION**

Artificial intelligence is a branch of computer science that deals with the study and creation of computer systems capable of displaying some form of intelligence. These are systems that can learn new concepts, make their own conclusions about the world around them, understand natural language or recognize and interpret complex visual scenes, as well as perform other types of tasks that require intelligence inherent to humans. The rest of this chapter will analyze the area of application of artificial intelligence in modern business.

##### **4.1. MARKETING**

Artificial intelligence in marketing plays a key role in market analysis, understanding consumer behavior, and creating personalized campaigns. This technology collects and processes large amounts of data from various channels, including social networks, websites, email, and CRM systems, which allows companies to more precisely sort their target groups and tailor messages to individual users. In addition, automated ad management systems and AI assistants for email marketing significantly reduce the time required to create and distribute content, increasing the efficiency of marketing teams.

An example in practice is the use of AI tools such as the Google Ads system that automatically optimizes ads according to user behavior. Also, many companies use chatbots on websites that respond to customers in real time.

##### **4.2. PRODUCTION**

In manufacturing, AI systems can be crucial in the process of optimizing production. Using this technology, production processes can be analyzed to identify areas where improvements can be made. For example, analyzing production processes using artificial intelligence helps identify areas where it is possible to increase efficiency and reduce costs. In addition, AI systems can help with inventory management and equipment maintenance, which also leads to a reduction in production costs. In addition, artificial intelligence improves the prediction of future production needs, in order to ensure optimal resource utilization and reduce costs. In this way, the application of artificial intelligence in manufacturing can have a significant impact on improving efficiency and reducing costs, which

directly affects the increase in profits and competitiveness of companies (Bradić, 2023).

In the manufacturing industry, companies such as Tesla use AI to predict machine failures and optimize production lines, thereby reducing downtime.

### **4.3. FINANCE**

Artificial intelligence can also be applied to automate processes in the financial sector, such as processing transactions and collecting credit score data.

The algorithms of this technology can quickly and accurately process large amounts of financial data, which significantly improves efficiency and reduces costs. Another advantage of AI systems in finance is that it contributes to the fight against fraud. Artificial intelligence technology can analyze transaction data and identify suspicious patterns and activities, which allows banks and other financial institutions to respond more quickly and effectively to potential threats. However, the use of this technology in the financial sector also brings with it challenges, such as issues related to security and data protection, as well as a shortage of experts in this field.

Despite these challenges, the application of artificial intelligence in finance is likely to continue to grow in the future, with an increasing focus on process automation, business optimization, and improving the user experience (McKinsey & Company, 2018). In the banking sector, AI systems are used to detect fraud in transactions. For example, when an unusual purchase is made from another country, the system automatically blocks the card and sends a notification to the user.

### **4.4. SALES**

Artificial intelligence is significantly changing the way companies approach the sales process, as it enables more precise customer analysis, task automation and personalized communication. This technology collects and processes large amounts of data on purchasing habits, previous transactions and user behavior on digital channels, which allows companies to make decisions and increase sales results.

One of the most important applications of AI systems in sales is predictive analytics, which allows for demand forecasting, identification of potential customers and assessment of the probability of purchase. This gives sales teams the opportunity to focus their efforts on the most promising customers and thus increase efficiency.

E-commerce platforms such as Amazon use AI for a “recommendation system”, where products are

shown to customers based on previous searches and purchases.

## **5. THE IMPACT OF ARTIFICIAL INTELLIGENCE ON THE COMPETITIVENESS OF COMPANIES**

The application of artificial intelligence has become one of the key drivers of digital transformation in modern business and society.

Thanks to its ability to analyze large amounts of data, recognize patterns and make decisions with minimal human intervention, artificial intelligence significantly improves the efficiency, accuracy and speed of various processes. Its application is increasingly widespread – from industry, finance and healthcare, to marketing, education and public administration. This chapter will present the main advantages of using artificial intelligence, which have contributed to a major impact on the competitiveness of companies.

### **5.1. INCREASING EFFICIENCY AND PRODUCTIVITY**

This technology enables significant increases in efficiency and productivity in business processes. By automating routine and repetitive tasks, such as data processing, administration, or quality control, organizations can save time and resources that can then be directed to strategic and creative activities. In addition, systems based on artificial intelligence enable faster information processing and real-time decision-making, thereby reducing errors and increasing work accuracy.

Examples include automated production lines, algorithms for optimizing logistics, and software assistants that support managers in planning and monitoring projects. By using AI systems, organizations not only improve their operational efficiency, but also create a competitive advantage through faster and better task execution.

Companies that use AI in sales and marketing record significantly higher conversion rates compared to traditional companies, because offers are tailored to each customer individually.

Artificial intelligence has a significant impact on the competitiveness of companies through increased efficiency and productivity, reduced operating costs, improved service personalization, and enhanced customer experience.

The greatest contribution of AI technologies is reflected in the ability to adapt products and services to the individual needs of customers, enabling companies to strengthen their market position and achieve a competitive advantage (Chui et al., 2018; Zhang & Lu, 2021).

## 5.2. IMPROVING USER EXPERIENCE

By using artificial intelligence, organizations can improve customer interactions, reduce wait times, increase service accuracy, and create an experience that is intuitive, fast, and personalized. In this way, this technology not only contributes to increasing customer satisfaction, but also strengthens the reputation and competitive position of the company in the market.

Creating a digital customer experience, based on innovation, means that the company has recognized the needs of a specific market segment of customers in a timely manner and, before other market players, has begun to successfully meet them by applying digital tools. The created digital customer experience becomes the standard of business. In this way, the quality of customer service is continuously improved, with the ultimate goal of creating a unique and personalized digital customer experience.

## 5.3. PERSONALIZATION

One of the most important applications of AI systems is content personalization and recommendations, which allows users to be shown products or services that are most relevant to their interests and previous interactions. For example, e-commerce platforms use artificial intelligence algorithms to recommend products based on a user's purchase history or review.

With the help of this technology, marketing is becoming more personalized than ever before. AI system technology allows for the analysis of large amounts of data about user behavior on websites, social networks and other platforms in order to create personalized marketing messages for each individual user.

## 6. CHALLENGES AND RISKS OF IMPLEMENTING ARTIFICIAL INTELLIGENCE IN BUSINESS

The application of artificial intelligence in modern business brings numerous advantages, such as process automation, increased efficiency and improved business decision-making. However, despite significant advantages, the implementation of these technologies faces various challenges and risks that can affect the business operations of the company. (Milutinović & Pilipović, 2017)

The rest of this chapter will analyze the most important challenges and risks of the application of artificial intelligence in business, including economic, technological, organizational and ethical aspects of its implementation.

## 6.1. HIGH IMPLEMENTATION COSTS

High implementation costs pose a serious challenge for many businesses, especially small and medium-sized enterprises (SMEs), which may not have the resources to deploy such advanced technologies. Implementing AI requires significant investments, from infrastructure such as powerful GPUs to high-quality and representative data, to collaboration with data science and software development experts. Given the wide range of investments required, small and start-up businesses often opt for cloud-based solutions, open source software, and platforms that require little or no programming. Such an approach can significantly reduce the cost of implementing AI, but at the same time requires a certain level of technical readiness, as well as adaptation of existing systems and business processes. (Pollák & Markovič, 2021)

## 6.2. LACK OF EXPERT STAFF

The shortage of AI professionals is becoming a major problem in the business environment. Given the complexity of AI technology and the need for experts in mathematics, programming, and computer science, finding and retaining qualified professionals is an increasing challenge. Developing, implementing, and maintaining AI systems requires highly skilled professionals, and a shortage of talented AI engineers and scientists can slow down the implementation process and increase labor costs. Also, as AI technology evolves rapidly, there is a need for ongoing training of existing employees, which further increases overall costs. (Chui et al., 2018)

## 6.3. DATA SECURITY AND PRIVACY

Data security and privacy are among the most important challenges in the application of artificial intelligence in business. The use of artificial intelligence in business requires the collection of large amounts of data, which creates a risk to data security. Inadequate protection can cause data theft, which leads to financial damage, but also to the loss of customer trust. (Russell & Norvig, 2009) According to the Agency for Personal Data Protection (AZOP), personal data can only be collected and processed within a clearly defined, lawful and transparent framework. In practice, artificial intelligence systems often use detailed data on user behavior and preferences, which is why very strict control of their use is necessary. In order to protect data, it is necessary to implement appropriate security measures, such as cryptographic data protection and a data access control system, in order to prevent unauthorized access and misuse of data. In addition, it is necessary to regularly update data protection

systems, as well as educate employees about the importance of information security.

#### **6.4. ETHICAL ISSUES AND RESPONSIBILITY**

Many of the challenges of AI are moral and ethical in nature, including those related to the workforce, consumers in terms of acceptability, discrimination, fairness, and a number of other problematic issues. The use of AI in education is accompanied by a number of ethical issues, such as privacy and security issues, potential bias in algorithms, and the possibility of replacing teachers by automating the teaching process. In essence, ethics and AI are inextricably linked. Their alignment allows us to develop and use AI in a way that is morally acceptable, fair, and beneficial for everyone. (Berente et al., 2021) As with any technology, there is a potential for misuse of AI. In order to overcome these challenges, it is crucial to involve leading experts in the field of AI in the discussion of ethical issues, as well as to develop guidelines for the responsible use of this technology. In addition, it is necessary to establish appropriate regulatory frameworks that will protect users and society from the possible negative consequences of the application of artificial intelligence in the business environment. (Mousa Al-kfairy et al.)

#### **6.5. EMPLOYEES' RESISTANCE TO TECHNOLOGICAL CHANGES**

Despite the great interest in artificial intelligence, it is inevitable that resistance will arise when introducing its tools into an organization, as it happens with any new technology. The reaction of resistance to change is considered a natural and expected human reaction. Employees most often oppose changes when they feel insecure, lose control over work processes, disrupt already established work habits, or threaten their own position. (Daraboš Longin et al., 2021)

Therefore, resistance to change is often seen as an obstacle in the change process, although it can also have a certain constructive role. Theoretical approaches to this phenomenon distinguish several levels at which resistance can occur. The most common are the individual level, where resistance arises from personal beliefs, emotions, and perceptions of employees; the team level, when resistance occurs within work groups and reflects the dynamics of relationships and informal networks; and the organizational level, where resistance arises from the organizational structure itself, culture, or established procedures that make flexibility and adaptation difficult. (Daraboš Longin, 2023)

### **7. EXAMPLE OF APPLICATION OF ARTIFICIAL INTELLIGENCE IN MODERN COMPANIES**

Companies are applying AI in various ways to improve efficiency, save time, and reduce costs. (Zhang & Lu, 2021)

One of the most prominent examples of artificial intelligence application in modern business practice is Amazon. The company uses machine learning algorithms to analyze customer behavior, including previous purchases, browsing patterns, and search history, in order to generate personalized product recommendations (Smith & Linden, 2017). This personalization significantly enhances the customer experience by making it easier for users to discover relevant products, which in turn increases the likelihood of purchase and overall customer satisfaction.

In addition, artificial intelligence plays a key role in optimizing Amazon's logistics and supply chain operations. AI-driven systems are used for demand forecasting, inventory management, and warehouse optimization, helping the company reduce operational costs and minimize the risks of product shortages or overstocking (Amazon Web Services, 2023).

Furthermore, AI technologies are embedded in consumer-facing tools such as Alexa, which enables voice-based interaction, smart home control, and streamlined shopping experiences. Through these applications, Amazon improves accessibility and convenience for users while also strengthening customer engagement.

Overall, the integration of artificial intelligence across recommendation systems, logistics, and user interaction contributes to improved operational efficiency, enhanced customer experience, and increased customer loyalty.

The application of artificial intelligence today is not limited to large international companies. A growing number of small and medium-sized enterprises are also introducing these technologies into their businesses. Thanks to the availability of various digital platforms and software solutions, small businesses can use tools for market analysis, sales planning and customer relationship management. According to the latest report, "The Role of Artificial Intelligence in SMEs", published by AI Chamber, 90% of SMEs in Central and Eastern Europe are already implementing artificial intelligence and machine learning technologies. One in four companies uses these technologies significantly, which indicates the increasingly important role of artificial intelligence in business processes. (Artificial Intelligence..., n.d.)

The results of implementing artificial intelligence in business are reflected in increased productivity, better organization of business processes, more efficient resource management, optimization of the human resource structure and the creation of new job requirements. Automating certain tasks reduces the need for manual work and the possibility of errors, while employees can devote more time to strategic and creative activities. Also, by using advanced analytical tools, companies can more quickly recognize changes in the market and adjust their business strategies.

The effects of implementing artificial intelligence are particularly visible in the areas of marketing, logistics, finance and customer relations. Companies that use these technologies often achieve a higher level of efficiency, better understand consumer needs and achieve a greater competitive advantage on the market. Therefore, it is expected that in the future, the application of artificial intelligence in business will become even more significant and widespread in various sectors of the economy. (Liu & Zhang, 2022).

## CONCLUSION

Digital transformation is an indispensable process of modern business that allows companies to respond to increasingly dynamic market demands. The introduction of digital technologies brings about significant changes in the way business processes are organized, decision-making and interaction with users.

Artificial intelligence plays a particularly important role in this process, standing out as a key driver of innovation and competitive advantage. Its application enables the automation of routine tasks, faster processing of large amounts of data and making more precise business decisions in real time. AI also significantly contributes to improving the user experience through the personalization of products and services.

The research findings confirm the main hypothesis (H1) that the implementation of artificial intelligence in business processes contributes to increasing operational efficiency and strengthening the competitiveness of companies. Companies that successfully integrate these technologies achieve better business results, greater flexibility and the ability to adapt to changes in the market.

However, the application of artificial intelligence also carries certain challenges, including high implementation costs, a lack of professional staff, data security issues and ethical aspects of its use. In addition, employee resistance to technological changes can further slow down the digital transformation process.

Despite the above challenges, it can be concluded that digital transformation, with the appropriate application of artificial intelligence, is a strategic necessity for long-term growth and development of companies. Organizations that recognize the importance of these technologies in a timely manner and successfully implement them will be able to achieve and maintain a competitive advantage in the modern business environment.

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