

The Role of Artificial Intelligence in Enterprises and the Challenges Associated with Its Implementation*

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Abstract

Artificial Intelligence has become a key driver of digital transformation and competitiveness in modern enterprises. Despite its growing adoption, many organizations continue to face organizational, financial, technological, and human-related barriers that limit the effective implementation of Artificial Intelligence. Although numerous studies discuss the benefits of Artificial Intelligence, there is still a need for a comprehensive review that simultaneously examines its role in enterprise operations and the major challenges associated with its implementation. This study aims to analyze the role of Artificial Intelligence in contemporary enterprises and identify the main benefits and barriers related to its adoption. The research is based on a review of recent scientific literature and international reports concerning the application of Artificial Intelligence in business. The analysis focuses on key areas of enterprise activity, including customer service, logistics, finance, human resource management, business process automation, and decision support. The findings indicate that Artificial Intelligence improves organizational efficiency, enhances decision-making quality, supports business process automation, reduces operational costs, and contributes to the development of innovative products and services. At the same time, successful implementation depends not only on technological investments but also on organizational readiness, employee competencies, digital maturity, effective change management, and appropriate governance mechanisms. The study concludes that enterprises combining technological development with organizational transformation and workforce development are better positioned to achieve sustainable competitive advantage through the effective adoption of Artificial Intelligence.

Keywords: Artificial Intelligence, Enterprise Management, Artificial Intelligence Implementation.

Introduction

Artificial Intelligence is currently one of the most significant trends in technological and innovative development. In recent years, solutions based on Artificial Intelligence have gained widespread recognition among both

individual users and entrepreneurs. Thanks to technological progress, Artificial Intelligence tools have become widely accessible and have found applications in an increasing number of sectors of the economy. Today, the importance of Artificial Intelligence stems primarily from its ability to increase productivity, improve the efficiency of business processes, and, equally importantly, reduce operating costs. The use of advanced algorithms enables enterprises to analyze data more effectively, automate repetitive tasks, and enhance the efficiency of management processes. As a result, the adoption of Artificial Intelligence-based solutions contributes to increased business competitiveness and supports economic growth. The growing importance of Artificial Intelligence exerts increasing pressure on enterprises seeking to maintain their competitiveness in the market. Artificial Intelligence is increasingly recognized by organizations as an important factor supporting development and innovation. Despite the potential benefits associated with its application, many enterprises still refrain from implementing Artificial Intelligence-based solutions. This phenomenon is influenced by a number of barriers, particularly organizational, financial, and technological factors that hinder the effective implementation of such solutions. Consequently, Artificial Intelligence creates opportunities for enterprises to improve efficiency and build competitive advantage while simultaneously requiring them to adapt to dynamic changes occurring in the business environment (Kmita, 2025). The aim of this article is to present the role of Artificial Intelligence in the activities of contemporary enterprises and to analyze the benefits and challenges associated with its implementation. Particular attention is devoted to the impact of Artificial Intelligence-based solutions on organizational efficiency, business process automation, and decision-making support. The paper also discusses the most significant barriers to implementation, including organizational and financial constraints, the need for employee competency development, and issues related to data security and ethical considerations. The scope of the study includes an analysis of the significance of Artificial Intelligence for enterprise operations and an assessment of its impact on management processes and organizational competitiveness. The article is of a review nature. The study is based on an analysis of available scientific publications and reports concerning the application of Artificial Intelligence in enterprises. The analysis focuses on issues related to the role of Artificial Intelligence in business activities, its impact on organizational efficiency, and the benefits resulting from its implementation. Furthermore, the study considers the most important challenges associated with the use of Artificial Intelligence, such as organizational and financial barriers, employee competencies, data security, and ethical issues. The conducted analysis made it possible to determine the significance of Artificial Intelligence for the functioning of contemporary enterprises and to identify the major opportunities and threats associated with its implementation.

Artificial Intelligence in Enterprise Operations

Artificial Intelligence is a technology that enables computers and machines to perform tasks that require characteristics typically associated with human intelligence. Its main functions include learning from available data, recognizing and interpreting information, conducting analyses, solving problems, and making or supporting decisions (*Artificial Intelligence in Business and Management*, 2024, p. 2). In the literature, Artificial Intelligence is defined as a system capable of analyzing its environment and taking actions aimed at achieving specific objectives (*Artificial Intelligence Law*, 2020, p. 7). According to the Organisation for Economic Co-operation and Development (OECD), Artificial Intelligence is a machine-based system that generates predictions, recommendations, or decisions affecting both the physical and digital world on the basis of received data. Individual Artificial Intelligence systems differ in terms of their level of autonomy and their ability to adapt to

new situations and operating conditions (OECD, 2024, p. 4). The presented definitions indicate that Artificial Intelligence, to some extent, imitates human thinking. Due to its ability to process large amounts of data and analyze relationships between them, it serves as a useful tool for information analysis, forecasting future events, and supporting decision-making processes. Artificial Intelligence systems can also identify patterns and relationships that may be overlooked during human analysis. Although Artificial Intelligence is often associated with advanced technologies used by experts, it is currently present in many aspects of everyday life. It can be found in virtual assistants, recommendation systems, and navigation applications that analyze data and help determine optimal routes. Artificial Intelligence-based technologies are also widely used in logistics, marketing, and business management. One of the most recognizable examples of modern Artificial Intelligence is ChatGPT, developed by OpenAI. This tool enables users to answer questions, translate languages, and support work and learning activities. Its popularity has significantly increased interest in Artificial Intelligence among both individual users and businesses. Following OpenAI, similar solutions have been developed by other technology companies, including Google, Meta, Anthropic, and xAI, which confirms the growing importance of Artificial Intelligence in the modern economy. Artificial Intelligence is increasingly applied in business operations, offering numerous opportunities to improve organizational and business processes. The dynamic development of Artificial Intelligence technologies contributes to business process optimization, cost reduction, and enhanced decision-making support. As a result, enterprises can improve their efficiency, competitiveness, and capacity for innovation. One of the most important areas of Artificial Intelligence application is the development of products and services. Enterprises use Artificial Intelligence solutions to analyze customer needs, design new products, and improve existing offerings. The implementation of modern technologies enables organizations to respond more quickly to changing market demands and increase their level of innovation. Customer service is another important area of Artificial Intelligence application. Chatbots, virtual assistants, and automated customer support systems are widely used for this purpose. These tools enable round-the-clock customer interaction, reduce response times, and improve service quality. Artificial Intelligence is also increasingly employed in marketing, where it supports consumer behavior analysis, personalized offers, and advertising campaign planning. Artificial Intelligence is also widely used in e-commerce, where it supports product content generation, customer service automation, and data analysis. Although these solutions improve operational efficiency and reduce employee workload, many business processes still require human supervision and verification of AI-generated results (Zhu and Rozan, 2026, p. 18). Artificial Intelligence plays a significant role in logistics and supply chain management. Through the analysis of large datasets, enterprises can forecast demand, plan deliveries, and optimize warehouse operations. Artificial Intelligence-based solutions help organizations reduce costs and improve operational efficiency. Artificial Intelligence is also increasingly used in finance and accounting. Such tools support financial data analysis, anomaly detection, forecasting, and the automation of accounting processes. In the area of human resource management, Artificial Intelligence assists recruitment, candidate selection, employee evaluation, and the identification of training needs. It is important to emphasize that the purpose of implementing Artificial Intelligence is not to replace employees but rather to support their work and improve the efficiency of performed tasks. This is supported by empirical research, which indicates that AI assistance significantly improves problem-solving performance and customer satisfaction among less experienced and lower-skilled employees, while providing only limited benefits to top-performing workers. The findings also suggest that lower-skilled employees begin to communicate in a manner similar to high-performing workers, and some of these improvements persist

even after the AI system is unavailable (Brynjolfsson et al., 2023, pp. 27–28). For this reason, many enterprises invest in developing employees' digital competencies and providing training related to the use of modern technologies. At the same time, Artificial Intelligence is widely used in data analysis and management support. By processing large amounts of information, enterprises can identify market trends more quickly, evaluate organizational performance, and make more accurate business decisions. As a result, Artificial Intelligence has become an important tool supporting organizational management and the achievement of strategic objectives (Szumowska and Bagińska, 2024, pp. 344–345). Artificial Intelligence is playing an increasingly important role in management processes carried out by contemporary enterprises. Solutions based on Artificial Intelligence support managers in decision-making, data analysis, and the coordination of organizational activities. Due to their ability to process large amounts of information within a short period of time, Artificial Intelligence systems enable faster identification of problems and the selection of appropriate solutions. One of the most important applications of Artificial Intelligence in management is the improvement of decision-making processes. Artificial Intelligence-based tools support data analysis and forecasting, reducing the risk of incorrect decisions and increasing organizational effectiveness. Artificial Intelligence also plays a significant role in supply chain management, where it is used for demand forecasting, delivery planning, and logistics optimization. Furthermore, Artificial Intelligence is applied in organizing and delegating employee tasks and managing customer relationships. Through the automation of numerous processes, organizations can improve work efficiency and customer service quality. Artificial Intelligence-based solutions also support the coordination of financial processes by analyzing financial data, identifying irregularities, and assisting budget planning. The use of Artificial Intelligence contributes to the optimization of enterprise operating costs, including labor costs, logistics processes, data analysis, and marketing activities. Consequently, Artificial Intelligence has become an important tool supporting organizational management, increasing operational efficiency, and enhancing the ability of enterprises to achieve a competitive advantage in the marketplace (Kłoczko, 2024, p. 74) .

Benefits of Implementing Artificial Intelligence

The implementation of Artificial Intelligence in enterprises brings numerous organizational, operational, and strategic benefits. The development of modern technologies enables companies to increase efficiency, improve business processes, and build a competitive advantage. Artificial Intelligence has become an important tool supporting the achievement of organizational goals and helping enterprises adapt to dynamic changes in the business environment. One of the most significant benefits of Artificial Intelligence is the increase in organizational efficiency. Through the automation of routine tasks, enterprises can improve productivity and reduce the time required to complete various processes. Artificial Intelligence also supports the analysis of large datasets, enabling organizations to identify problems more quickly and make more accurate business decisions. Another important benefit is the optimization of business processes. The integration of Artificial Intelligence with information systems allows enterprises to utilize resources more efficiently and improve information flow within the organization. This contributes to better management of operational, logistical, and financial processes while reducing operating costs. Artificial Intelligence also improves decision-making quality by analyzing data, identifying trends, and generating forecasts that support management activities. Furthermore, it enables the development of more innovative products and services that better meet customer needs. As a result, enterprises can compete more effectively, respond more quickly to market changes, and build a long-term competitive

advantage (Ćwiertniak, 2025, pp. 58–65). One of the most important benefits of implementing Artificial Intelligence is the growth of organizational efficiency. Modern organizations increasingly use Artificial Intelligence-based solutions to improve business processes, analyze data, and support decision-making. Consequently, tasks can be completed more quickly, resources can be utilized more effectively, and overall productivity can be increased. Artificial Intelligence is particularly useful in areas that require the processing of large amounts of information. Advanced algorithms enable real-time data analysis, trend identification, and forecasting of future events. This allows enterprises to respond more rapidly to market changes and make better managerial decisions. The benefits related to increased organizational efficiency are especially visible in customer service, supply chain management, manufacturing, information technology, and software development. In these areas, Artificial Intelligence supports demand forecasting, resource planning, anomaly detection, and the automation of numerous operational processes. As a result, organizations can improve the quality of their activities while reducing operational costs. It should be emphasized that achieving the full benefits of Artificial Intelligence requires not only the implementation of appropriate technological tools but also the adaptation of organizational processes. The greatest benefits are achieved by enterprises that combine Artificial Intelligence with business process modernization, data infrastructure development, and effective collaboration between humans and technology. Consequently, Artificial Intelligence becomes a significant factor enhancing organizational efficiency and supporting enterprise growth (Mierzejewski and Ravshan qizi Dadajonova, 2025). Artificial Intelligence also supports risk management, supply chain optimization, and the development of competitive advantage. To fully realize these benefits, enterprises should combine technological investments with organizational changes, employee competency development, and a data-driven organizational culture (Chrzanowska et al., 2024, p. 440). Business process automation is another major benefit of implementing Artificial Intelligence in enterprises. Contemporary organizations use Artificial Intelligence to improve operational activities and increase the efficiency of business processes. Thanks to its ability to process large volumes of data within a short period, this technology supports the execution of many tasks more quickly and accurately than traditional methods. Artificial Intelligence is particularly valuable in information-intensive areas such as customer service, supply chain management, manufacturing, information technology, and software development. In these fields, it supports demand forecasting, resource planning, anomaly detection, and process optimization. As a result, enterprises can reduce operating costs, increase productivity, and improve the quality of their activities. Generative Artificial Intelligence solutions are also becoming increasingly important. These tools support content creation, customer service, and knowledge-based tasks. They enable faster completion of many activities and relieve employees from repetitive and routine work, allowing them to focus on more complex tasks that require creativity and specialized expertise. However, effective business process automation requires proper organizational preparation. The greatest benefits are achieved by enterprises that implement Artificial Intelligence alongside business process modernization, data infrastructure development, and the promotion of collaboration between employees and new technologies. As a result, Artificial Intelligence becomes an important tool supporting enterprise development and increasing operational efficiency (Mierzejewski and Dadajonova, 2025). The implementation of Artificial Intelligence also contributes to improving the quality of decision-making processes within enterprises. Through the rapid processing of large amounts of data and the generation of analyses and forecasts, Artificial Intelligence supports managers in making more accurate and evidence-based decisions. Modern organizations increasingly utilize Artificial Intelligence solutions in areas such as data analysis, forecasting, customer service, and

management support. Research indicates that Artificial Intelligence is now perceived not only as a technological innovation but also as a strategic tool supporting business operations. Its application increases the speed and accuracy of decision-making while reducing the risk of errors resulting from insufficient information analysis. Consequently, enterprises can respond more effectively to market changes and better adapt their activities to customer needs. Another important benefit of Artificial Intelligence is the improvement of communication and management effectiveness. Artificial Intelligence-based tools support information flow within organizations, enable more precise performance analysis, and facilitate strategic planning. At the same time, Artificial Intelligence does not replace human decision-makers but rather complements their knowledge and experience. Increasingly, organizations adopt a model of collaboration between humans and technology, where managerial intuition is enhanced by analyses generated by information systems. The improvement of decision quality directly contributes to increased business competitiveness. Organizations utilizing Artificial Intelligence can identify market opportunities more quickly, use resources more efficiently, and implement innovations more effectively. As a result, Artificial Intelligence has become an important factor in building competitive advantage and supporting the long-term development of enterprises (Górka et al., 2025, pp. 1143–1145).

Challenges Associated with the Implementation of Artificial Intelligence

Despite the numerous benefits resulting from the implementation of Artificial Intelligence, enterprises face many barriers that hinder the effective use of this technology. One of the most frequently identified challenges is the high cost associated with implementing and maintaining Artificial Intelligence systems. Although some tools are available free of charge or at a relatively low cost, professional business-oriented solutions often require substantial financial investment. Implementation costs primarily include the purchase of appropriate software, the development or modernization of information technology infrastructure, and the integration of new solutions with existing enterprise systems. Additional expenses are related to technical support, system updates, and data security maintenance. In many cases, organizations must also adapt Artificial Intelligence tools to their specific needs, generating further costs. Organizational issues also constitute a significant barrier. The implementation of Artificial Intelligence often requires changes in the way enterprises operate, the redesign of business processes, and the adjustment of organizational structures to new technologies. This process may encounter resistance from employees and managers who are concerned about changes to their existing responsibilities. Furthermore, many organizations lack sufficient experience in implementing advanced technologies, which limits their ability to fully exploit the potential of Artificial Intelligence. Consequently, both financial and organizational barriers may slow down the adoption of Artificial Intelligence in enterprises. Overcoming these obstacles requires careful planning, adequate financial resources, and proper preparation for technological transformation (Ćwiertniak, 2025). Research indicates that successful AI implementation depends not only on technological investments but also on the organizational preparedness of enterprises. Institutional support and cooperation with universities and research institutions can facilitate the implementation process and help enterprises make more effective use of Artificial Intelligence (OECD/BCG/INSEAD, 2025, p. 96). One of the most important factors affecting the successful implementation of Artificial Intelligence is employee competence. Even the most advanced technological solutions will not produce the expected results if employees do not possess the knowledge and skills necessary to use them effectively. Therefore, implementing Artificial Intelligence requires not only investment in technological infrastructure but also investment in the development of employee and managerial competencies. Research

indicates that employee competencies and the digital maturity of enterprises are essential for the successful implementation of Artificial Intelligence. A shortage of qualified employees remains one of the main barriers to Artificial Intelligence adoption, particularly among small and medium-sized enterprises. Therefore, the continuous development of digital skills and Artificial Intelligence literacy is crucial for the effective use of these technologies (OECD/BCG/INSEAD, 2025, p. 32). An important challenge is preparing employees to operate in a technology-driven environment. This requires the acquisition of new skills related to the use of Artificial Intelligence tools, data analysis, and cooperation with decision-support systems. Employees should understand both the capabilities and limitations of these solutions in order to use them effectively and responsibly. The literature also emphasizes the importance of organizational culture and readiness for change. The implementation of Artificial Intelligence is often accompanied by employee concerns regarding changes in work practices or the loss of a degree of autonomy. For this reason, effective change management, internal communication, and employee involvement in the implementation process play a crucial role. Acceptance of new technologies by end users is one of the key conditions for successful implementation. Consequently, enterprises should invest in training, the development of digital competencies, and the creation of an organizational culture that supports innovation. Such efforts enable organizations to make fuller use of the potential of Artificial Intelligence and increase the effectiveness of its implementation (Ćwiertniak, 2025). Another major challenge associated with the implementation of Artificial Intelligence is ensuring data security and compliance with ethical principles. Artificial Intelligence systems require the collection and processing of large amounts of information, which is often critical to organizational operations. Therefore, enterprises should pay particular attention to protecting data against unauthorized access, loss, or misuse by third parties. The development of Artificial Intelligence is also accompanied by an increase in cybersecurity threats. The growing number of processes supported by modern technologies necessitates the implementation of appropriate security measures and information protection procedures. Particular importance should be placed on protecting organizational data, customer personal information, and data used in decision-making processes. Insufficient security may result in financial losses, reduced customer trust, and damage to the organization's reputation. Ethical issues related to the use of Artificial Intelligence are equally important. Enterprises face questions concerning responsibility for decisions supported by Artificial Intelligence systems, the transparency of algorithms, and the possibility of errors or unintended outcomes. It is also essential to ensure that implemented solutions comply with existing legal regulations and the principles of responsible management. Therefore, the effective implementation of Artificial Intelligence requires not only technological investments but also the development of employee awareness regarding information security and the responsible use of new technologies. Only a combination of advanced technological solutions and appropriate organizational procedures allows enterprises to fully utilize the potential of Artificial Intelligence while minimizing associated risks (Ćwiertniak, 2025). Based on the conducted literature analysis, it can be concluded that Artificial Intelligence has become one of the most important factors supporting the development of modern enterprises. The reviewed publications indicate that the greatest benefits of Artificial Intelligence implementation include business process automation, improved decision-making quality, and increased organizational efficiency. The analyzed studies emphasize that enterprises using Artificial Intelligence solutions are able to analyze data more rapidly, forecast future events more accurately, and adapt more effectively to changing market conditions. The literature review also demonstrates that the effectiveness of Artificial Intelligence implementation depends not only on the technology itself but also on an organization's preparedness

for digital transformation. The greatest benefits are achieved by enterprises that simultaneously invest in employee competency development, business process modernization, and the establishment of appropriate information technology infrastructure. Otherwise, Artificial Intelligence implementation may fail to deliver the expected outcomes despite significant financial investments. The analysis further indicates that the primary barriers limiting the use of Artificial Intelligence include high implementation costs, insufficient employee digital competencies, and concerns regarding data security. This suggests that successful Artificial Intelligence implementation requires a comprehensive approach that addresses both technological and organizational aspects. Therefore, it can be concluded that in the coming years, competitive advantage will be achieved primarily by those enterprises that effectively combine the potential of modern technologies with adequate organizational and human resource preparation.

Conclusion

The conducted analysis demonstrated that Artificial Intelligence is playing an increasingly important role in the functioning of modern enterprises. Its application covers numerous areas of organizational activity, including management, customer service, logistics, finance, and human resource management. Through its ability to process large volumes of data and automate numerous processes, Artificial Intelligence contributes to increased organizational efficiency and improved decision-making quality. The study indicated that the use of Artificial Intelligence enables enterprises to optimize business processes, reduce operating costs, and strengthen their competitiveness in the marketplace. Particular importance is attached to solutions supporting data analysis, forecasting, and the automation of repetitive tasks. As a result, organizations are able to respond more quickly to changes in the business environment and achieve their strategic objectives more effectively. At the same time, the implementation of Artificial Intelligence is associated with numerous challenges. The most significant include organizational and financial barriers, the need to develop employee competencies, and the requirement to ensure data security and compliance with ethical principles. Effective utilization of the potential of Artificial Intelligence requires appropriate organizational preparation, investment in workforce development, and the implementation of suitable management procedures. The study has certain limitations. Due to the dynamic development of Artificial Intelligence, new technological solutions and research findings may quickly influence the relevance of the presented conclusions. Future research should include comparative analyses of Artificial Intelligence implementation across enterprises of different sizes, industries, and levels of digital maturity. Such studies could provide a deeper understanding of the factors determining the successful adoption of Artificial Intelligence. It can be concluded that Artificial Intelligence is becoming one of the key drivers of modern enterprise development. Its importance is expected to continue growing alongside technological advancement and the increasing adoption of digital solutions throughout the economy.

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