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IMPACT OF ARTIFICIAL INTELLIGENCE ON BUSINESS MODELS AND COMPETITIVENESS OF ENTERPRISES

The paper is devoted to the study of the impact of artificial intelligence on the transformation of business models of enterprises and ensuring their competitiveness in the digital economy. The authors analyze the main aspects of AI integration into business processes, which allow to increase the efficiency of management decision-making, reduce risks and optimize resources. The key features of building new business models focused on personalization of services, rapid adaptation to market changes, and introduction of innovative approaches to value creation are highlighted. It is noted that the introduction of AI facilitates in-depth analysis of large amounts of data, forecasting consumer needs and forming long-term competitive advantages of enterprises. Examples are given of industries where AI has become a catalyst for radical changes in traditional business models, creating opportunities for generating new sources of income and improving the quality of customer service. It is substantiated that the use of AI is a strategically necessary tool for enterprises to achieve technological leadership in the global market. Particular attention is paid to new business models emerging on the basis of AI and their potential for transforming traditional industries. Challenges associated with the introduction of AI, such as the need to invest in technology and human resources development, as well as ethical aspects of the use of AI, are identified. Based on a generalization of case studies and practice, proposals for the effective use of AI to achieve competitive advantages in the digital economy are formulated.

Keywords: *enterprise transformation, business process automation, competitive advantages*

INTRODUCTION

In a global economic environment that is dynamically changing under the influence of digital technologies, artificial intelligence (AI) has become fundamental for businesses to formulate their development strategy. Integration of AI into business processes not only increases the accuracy and speed of management decisions, reducing costs and risks, but also enables the construction of new business models focused on personalized customer needs and flexible operations. AI enables in-depth analysis of large volumes of data, allowing businesses to track changing trends, respond more quickly to market challenges, and build long-term competitive advantages. In the competitive struggle, when businesses that implement AI are able to predict customer needs and provide higher quality service, a situation is created where market advantages become a matter of technological leadership. In particular, new AI-based business models are driving radical changes in traditional industries, opening up space for innovative approaches to value creation, resource optimization, and risk management. Studying the impact of AI on business models is not just an important but a strategically necessary step to identify new opportunities for development in the digital economy and build competitive resilience on the global stage.

The **PURPOSE** of the paper is to study the impact of AI on business models of enterprises, its role in the digital eco-nomy, and to formulate recommendations for the effective use of AI to achieve competitive advantages.

RESEARCH METHODS

In the paper the methodological framework is defined by the principles of the dialectical method of understanding economic phenomena and processes in their continuous interrelation and interdependence. Empirical research methods were employed, including observation and comparison.

RESULTS

The development of innovative technologies, in particular AI, is central to the strategies of the world's leading visionaries, such as D. Bezos, I. Musk, S. Hawking, and M. Zuckerberg, which emphasizes its importance for the transformation of the global economy. The development of AI is the subject of research by world-class experts such as P. Asaro, A. Andreoni, G. Anzolin, N. Bostrom, R. Kahlo, and K. Schwab, which indicates its crucial role in shaping new areas of technological development. The development of AI tools for the business environment in various spheres of economic activity has been actively studied by a number of domestic scholars, including such authors as O. Baranov, Y. Baulin, O. Bulgakova, M. Velikanov, O. Gilyak, K. Yefremova, A. Zavalnyi, Y. Kryvytskyi, E. Kuptsova, N. Martsenko, O. Muzyka-Stefanchuk, I. Onyshchuk, J. Pavlenko, O. Petryshyn, O. Radutnyi, S. Ramazanov, M. Selivanov, M. Stefanchuk, Y. Sydorchuk, A. Shevchenko, et al. These papers cover various aspects of AI application for optimizing business processes, increasing the efficiency of production and management activities. Among the Ukrainian scholars studying the impact of AI on the competitiveness of enterprises are G. Androshchuk, Y. Nikitin, O. Vyshnevsky, L. Fedulova, et al.

Scientific papers focus on the key aspects of AI implementation, such as basic technological potential, modernization and integration, development of digital infrastructure, as well as the issue of technology accessibility and minimization of gaps in digital development [3; 16].

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The works [5; 19] emphasize the importance of AI for the successful implementation of the Industry 4.0 concept, which is able to provide a comprehensive transformation of industrial enterprises. In particular, we should agree with the author's opinion [17] that breakthrough technologies, including robotics, AI, additive manufacturing and big data processing, offer great opportunities to accelerate innovation development and increase the share of the industrial sector in value added. Studies [6] also emphasize the importance of understanding the relationship between knowledge, algorithms and AI, which forms the basis for creating new business models and determining the directions of competitive advantages of enterprises in the global economy.

AI is becoming a key factor in the transformation of modern business models, which defines new horizons for the innovative development of enterprises. Thus, the introduction of AI into production practice helps to increase efficiency, create competitive advantages and develop digital infrastructure. Studies conducted at both the international and national levels emphasize the importance of integrating AI into the industrial sector, which allows enterprises to adapt to the conditions of Industry 4.0. In this context, a special role is played by theoretical and applied developments aimed at eliminating digital barriers and creating platform business models that will determine the competitiveness of enterprises in the global economic environment.

The definition and understanding of AI in the context of its impact on modern business models and competitiveness of enterprises is the subject of intense debate among scientists and practitioners, as its application in various sectors of the economy opens up new opportunities for transforming traditional business processes and enterprise development strategies. Despite the widespread use of AI, there is no single, generally accepted definition of this phenomenon. On the one hand, AI is often viewed as a computing system designed to perform specific tasks based on predefined algorithms. Such a narrow interpretation emphasizes the instrumental nature of AI. On the other hand, there is a broader understanding of AI as a system capable of self-learning, adaptation, and decision-making in a dynamic environment, similar to human intelligence. This vision of AI envisions the development of systems that can not only perform tasks but also display creativity and intuition.

Google's AI Lab defines AI as a software and hardware complex capable of making effective decisions under conditions of incomplete and inaccurate information [8; 14]. This emphasizes the ability of AI to work under conditions of uncertainty, which is a characteristic feature of many real-world tasks. It is worth noting that the development of AI is closely related to big data technologies. It is large amounts of data that allow training machine learning models that are the basis of modern AI systems. Thus, AI can be viewed as a wide range of technologies that allow computers to perform tasks that were previously considered the sole prerogative of humans. This includes such functions as the ability of a machine to perform cognitive functions inherent in humans, including reasoning, learning from previous experience, problem solving and interaction, pattern recognition, decision making, and learning.

Thus, the concept of AI is multifaceted and has different interpretations in the scientific literature. In general, it can be defined as a field of research aimed at creating systems capable of performing tasks traditionally considered the exclusive domain of humans, such as learning, reasoning, problem solving, and interacting with the environment. These systems attempt to model human cognitive functions such as speech comprehension, visual perception, and decision-making. According to [3], AI is a set of methods and algorithms that allow computers to perform tasks that require mental effort. Studies [6; 12] emphasize the ability of AI systems to learn and adapt to changing conditions. The introduction of AI into business practices significantly changes existing business models and increases the competitiveness of enterprises, ensuring rapid adaptation to changing market conditions. However, along with significant advantages, such technologies may also carry certain risks that should be taken into account when integrating them. Table 1 summarizes both the advantages and disadvantages of AI's impact on business processes, which allows us to form a comprehensive view of the potential benefits and challenges faced by enterprises when implementing these innovations.

Given the global trends in the development of AI and its integration into business, it is important to note that the use of AI competitors is becoming a major factor in supporting and improving the favourability of enterprises in the modern environment. Forecasts indicate a significant increase in the impact of AI on all aspects of business, from automation processes to improving customer interactions, which emphasizes the need to transform business structures to effectively use intelligent technologies and ensure not only optimization of internal processes but also maintaining competitive advantages in the market. Forecasted changes require companies to adapt to new conditions and use modern tools to achieve operational efficiency. Given the forecasts of AI technologies and their potential to transform the business environment, businesses should integrate these tools to maintain competitiveness and achieve strategic goals. For a better understanding of the key aspects of AI implementtation in business processes and predicted changes in various areas of activity, see Table 2, which presents the main areas of AI use.

The application of AI in business is expected to significantly improve operational efficiency, increase the speed of decisions, and improve personalized services for customers. Forecasts show that the integration of AI allows enterprises not only to remain competitive but also to gain significant advantages in a changing business environment. However, it also requires adapting to new technological and organizational conditions, as well as investing in staff training and infrastructure to support such technologies. The integration of AI is becoming a key factor in transforming business models, adapting them to the requirements of the current market direction and new technological standards. Implementation of such solutions in various sectors can achieve significant benefits in improving efficiency and competitiveness.

Table 3 shows the impact of AI on business model transformation. Shows the key areas of implementation of AI technologies in various sectors of the economy, demonstrating their significant impact on increasing operational efficiency and improving the competitive position of enterprises. In the tech sector, companies such as Google, Microsoft, and Amazon increased their AI investments by 40 % in 2023 compared to 2022, and the number of patents for new developments increased by 30% over the past five years [14], indicating the intensive integration of AI as a key strategic asset that reinforces the innovation and technological advantages

Table 1 – **Positive and negative aspects of the impact of AI on business models and competitiveness of enterprises (***compiled by the authors [1; 2; 5]***)**

Aspects of AI impact	Positive	Negatives
Process automation	Reduced production and maintenance costs; increased efficiency and accuracy of operations	loss of jobs due to automation of low-skilled tasks; high costs of integrating new technologies
Improved decision making	fast processing of large volumes of data allows you to make informed and prompt decisions	potential errors in algorithms that can lead to incorrect or unethical decisions
Individualization of services	personalization of products and services allows to increase customer satisfaction and attract new customers	uncertainty about the confidentiality of customer data; risks of misuse of personal data
Innovations in products and services	developing intelligent products that adapt to user needs and opening new markets	high costs of developing and implementing innovations, as well as the need to constantly update technologies
Competitiveness	increasing the speed of adaptation to changes in the market, securing market advantages through innovation	high level of competition with other companies implementing AI
Improving customer service	chatbots, voice assistants, and automated systems support round-the-clock service	risk of losing personal contact with customers and low efficiency in difficult or unusual situations

Table 2 – **Key components of the application of AI technologies in the business sector and forecasts of their impact on economic processes** (*compiled by the authors [1; 3; 7]*)

Components use of AI	Areas of application	Forecasts and trends
Process automation	production, logistics, customer service	reducing production costs, increasing efficiency, optimizing resources
Data analysis and decision-making	marketing, finance, strategic planning	improving forecasting accuracy, speed of decision-making based on big data
Personalize customer experience	trade, online services, financial services	increase customer loyalty through individualized approaches and personalized products
Innovative products and services	IT, financial services, medical technologies	development of new intelligent products, in particular in the areas of health, finance and technology
Improving operational efficiency	resource management, finance, HR	reducing operating costs, optimizing management processes, increasing productivity
Intelligent automation	production, finance, data processing	automation of complex tasks, reducing the need for human resources, increasing the accuracy of tasks
Risk management and security	banking, insurance, energy	increase the efficiency of risk forecasting and management, improve security with the help of algorithms

Table 3 – **The impact of AI on business model transformation** (*compiled by the authors [7; 8; 12]*)

Sector	Leading companies	Application of AI	Quantitative indicators
Technologies	Google, Microsoft, Amazon, OpenAI	Algorithm development, cloud-based AI services, generative AI	Investments in AI increased by 40% in 2023 compared to 2022. The number of patents for AI technologies increased by 30% over the past 5 years.
Finance	JP Morgan, Goldman Sachs, Ant Group	Algorithmic trading, fraud detection, lending	65% of financial institutions use AI for risk analysis. AI systems detect 90% of fraudulent transactions.
Healthcare	Siemens Healthineers, GE Healthcare	Medical diagnostics, drug development, personalized medicine	AI systems have improved the accuracy of disease diagnosis by 15%. The development time for new pharmaceuticals has been reduced by 30%.
Production	Siemens, Bosch, GE	Predictive maintenance, quality control, optimization of production processes	AI has reduced equipment downtime by 20%. Increased labor productivity by 15% in companies using AI.
Retail trade	Amazon, Walmart, Alibaba	Personalized recommendations, price optimization, demand forecasting	70% of consumers prefer companies that provide personalized recommendations. Increase in sales by 10% due to more accurate demand forecasts.
Education	Duolingo, Coursera, Pearson	Personalized learning, adaptive assessment, development of training materials	Increased student engagement by 25% through personalized learning plans. Reduced time to grade assignments by 50% due to automation.
Logistics	DHL, UPS, FedEx	Route optimization, fleet management, demand forecasting	Reduced logistics costs by 18% due to route optimization. Increase in delivery efficiency by 15%.

of leading companies. In the financial sector, more than 65 % of companies have already implemented AI for risk analysis, which allows them to detect up to 90% of fraudulent transactions. This helps to reduce operational risks and improve the reliability of financial systems. In the healthcare sector, AI technologies increase diagnostic accuracy by 15% and reduce the development time of new drugs by 30%, which accelerates their entry into the market.

In the manufacturing sector, companies such as Siemens and Bosch have reduced costs by 20% by reducing equipment downtime and increased labor productivity by 15% using AI. These figures emphasize the value of AI in opti-

mizing production processes and reducing maintenance costs. In retail, AI is actively used for personalization, which contributes to customer engagement: more than 70% of consumers prefer companies that provide individualized recommendations, and sales forecasting reaches 10% [11; 14].

Thus, statistics confirm that the use of AI is driving significant progress in various sectors, increasing the adaptability and flexibility of business models, improving customer experience, and enhancing the competitiveness of companies in a rapidly changing market environment. The analysis of AI investments in 2021-2023 by country (Fig. 1) shows a significant increase in technological intelligence, which contributes to a high level of development and integration of AI into global business. E.g., in the US AI investments increased from 38% in 2021 to 45% in 2023 [9; 11; 14]. This indicates the constant development of new algorithms and innovative solutions. Businesses are actively implementing AI, particularly in areas such as business process automation, financial technologies, and cloud services. In these areas, AI has helped to increase productivity by 20%, and the number of AI startups has reached 1500. China's AI investments increased from 32% in 2021 to 38% in 2023. China is actively developing AI technologies, particularly in the areas of manufacturing and pattern recognition. There is a high level of patenting, which emphasizes the country's innovation. As a result, productivity in China has increased by 25%, and the number of AI startups has exceeded 1300. Investments in AI in Germany increased from 28% in 2021 to 32% in 2023. German companies are actively investing in production automation and the development of intelligent transportation systems [9; 14].

Their productivity has increased by 18% thanks to AI, and the number of startups is 900. France has shown a gradual increase in AI investments from 25% in 2021 to 30% in 2023. French companies are actively developing solutions for processing big data and improving medical technologies, which contributes to the growth of efficiency. The productivity of medical technologies increased by 15% between 2021 and 2023, and the number of startups reached 800. Investments in AI in the UK increased from 32% in 2021 to 35% in 2023. AI is being actively implemented in the financial and healthcare sectors. Businesses in this country support significant benefits from the use of AI, in particular in improving personalized services. Thanks to AI in the financial and healthcare sectors, productivity has increased by 17%, and the number of startups is 1000. Canadian investment in AI increased from 24% in 2021 to 28% in 2023. Canadian enterprises are actively implementing AI technologies to automate production and financial processes, the productivity of

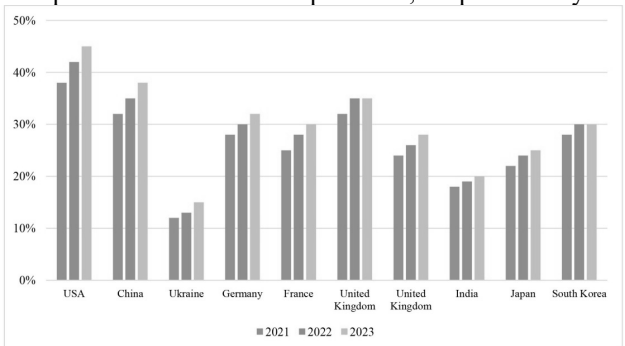

Fig. 1. Dynamics of investments in AI and their impact on the competitiveness of enterprises in the leading countries of the world in 2021-2023 (compiled by the authors [13; 20])

which has increased by 14% due to AI, and the number of AI startups in Canada is 700. In India, AI investments increased from 18% in 2021 to 20% in 2023.

Indian companies offer AI to increase productivity in the agricultural sector, production automation, and financial services, which grew by 13% during this period, and the number of AI startups – 1100. Japan is characterized by an increase in AI investments from 22% in 2021 to 25% in 2023. Japanese companies are actively using AI to improve production processes and develop robotic technologies, whose productivity has increased by 16%, and the number of startups has reached 650. Investments in AI in South Korea increased from 28% in 2021 to 30% in 2023. The main areas are process automation and the introduction of AI in data processing. Although the data on startups and patents is not yet complete, productivity in this area has been increased by 15% with the help of AI [8; 9; 11].

As we can see, in the period from 2021 to 2023, the country's leading in AI investments demonstrated a steady increase in productivity in these areas. In 2023, the United States and China remained the leaders in the implementation of AI startups at a high rate. They are followed by European countries, in particular the UK and Germany, which are also actively investing in AI, but at a slower pace [11; 14]. In Ukraine, we also see a gradual increase in AI investments – from 12% in 2021 to 15% in 2023. The indicators remain lower than in other countries, and Ukrainian companies are just beginning to implement AI in the management of production processes, financial services, and agricultural technologies. Such AI implementations have increased productivity by 12%, and the number of startups in this area has increased to 250 [8; 14].

AI is one of the main drivers of business process transformation in today's environment, opening up new opportunities to optimize operations, develop innovative products and services, and significantly improve the overall efficiency of organizations. The main factors that determine the effectiveness of AI investments are as follows:

– *Strategic focus of companies*. The effectiveness of investments in AI technologies depends on how clearly companies formulate strategies and integrate these technologies into their overall development strategy. A clear definition of goals and suitability with long-term plans of enterprises allows maximizing the efficiency of investments and achieving significant competitive advantages.

– *Data quality*. AI systems operate on the basis of data, so its quality is the main factor affecting the accuracy and efficiency of results. Technologies built on high quality data allow for more accurate analytics, which allows businesses to make informed and more efficient decisions.

– *Personnel qualification*. To realize the potential of AI, businesses need to hire highly qualified specialists in data analytics, machine learning, and AI. The availability of the right personnel has a significant impact on the speed and quality of the introduction of the latest technologies into business processes.

– *Corporate culture and readiness for change*. The introduction of AI technologies requires significant changes in corporate culture, including the adaptation of personnel to new technological realities.

– *Economic conditions*. The macroeconomic situation has a significant impact on the efficiency of AI investments. Factors such as currency fluctuations, inflation, and political

and economic risks have a direct impact on the ability to finance the costs of developing and implementing innovations.

Despite the significant potential of AI, investments in this technology are associated with a number of risks that businesses should consider when making decisions. The main threats are as follows:

– *High capital intensity of investments*, which is a significant obstacle for businesses with limited financial resources. The high cost of developing and implementing AI technologies makes it difficult for small and medium-sized enterprises to use them.

– *Shortage of qualified personnel capable of working effectively with AI technologies*, which creates difficulties in the process of implementing such technologies and leads to increased costs for training and education of personnel.

– *Ethical and social challenges*, including personal data protection, algorithm transparency, and discrimination prevention. Ethical dilemmas related to automated solutions need to be monitored.

– *Cybersecurity risks*, such as data security and information systems protection, attacks on which can lead to significant economic and reputational losses for companies.

Given these threats, businesses need to develop comprehensive strategies that include both technological and organizational aspects to maximize the effectiveness of their AI investments. This will help mitigate risks, optimize costs, and ensure sustainable development in a rapidly changing technological environment. Thus, investments in AI should be integrated into the overall development strategy of the enterprise, which guarantees not only the achievement of business goals but also the maintenance of long-term competitiveness in the face of global economic challenges.

CONCLUSION

It can be stated that AI is fundamentally transforming the business landscape, acting as a powerful catalyst for innovation and improving the efficiency of economic activity. Integration of AI into business processes allows to optimize operations, provide personalized customer experience, and facilitate informed management decisions. Due to its ability to process large amounts of data and identify hidden correlations, AI opens up new opportunities for the development of innovative products and services. However, the introduction of AI is associated with a number of challenges, such as significant investments, a shortage of qualified specialists, and ethical dilemmas. To successfully integrate AI, businesses need to develop strategies that take into account both the potential benefits and risks associated with this technology.

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ВПЛИВ ШТУЧНОГО ІНТЕЛЕКТУ НА БІЗНЕС-МОДЕЛІ ТА КОНКУРЕНТОСПРОМОЖНІСТЬ ПІДПРИЄМСТВ

Статтю присвячено дослідженню впливу штучного інтелекту (ШІ) на трансформацію бізнес-моделей підприємств і забезпечення їх конкурентоспроможності в умовах цифрової економіки. Проаналізовано основні аспекти інтеграції ШІ в бізнес-процеси, що дають змогу підвищити ефективність прийняття управлінських рішень, знизити ризики та оптимізувати ресурси. Виокремлено ключові особливості побудови нових бізнес-моделей, орієнтованих на персоналізацію послуг, швидку адаптацію до змін ринку та впровадження інноваційних підходів до створення вартості. Відзначено, що впровадження ШІ сприяє глибокому аналізу великих обсягів даних, прогнозуванню потреб споживачів і формуванню довгострокових конкурентних переваг підприємств. Наведено приклади галузей, де ШІ став каталізатором радикальних змін у традиційних бізнес-моделях, створюючи можливості для формування нових джерел прибутку та підвищення якості обслуговування клієнтів. Обґрунтовано, що застосування ШІ є стратегічно необхідним інструментом для досягнення підприємствами технологічного лідерства на глобальному ринку. Особливу увагу приділено новим бізнес-моделям, які виникають на основі ШІ, та їх потенціалу для перетворення традиційних галузей. Виявлено виклики, пов'язані з впровадженням ШІ, такі як необхідність інвестицій у технології та розвиток кадрів, а також етичні аспекти застосування ШІ. На основі узагальнення тематичних досліджень і практики сформульовано пропозиції з ефективного застосування ШІ для досягнення конкурентних переваг у цифровій економіці.

Ключові слова: *трансформація підприємств, автоматизація бізнес-процесів, конкурентні переваги*