УДК 004.8:330.34

D. K. Podzihun
A.V. Melekh

ARTIFICIAL INTELLIGENCE AS A DRIVER OF THE NEW TECHNOLOGICAL REVOLUTION: CHALLENGES AND PROSPECTS

Vinnytsia National Technical University

Анотація:
Штучний інтелект є одним із ключових драйверів глобальної економічної трансформації: за прогнозами McKinsey & Company, генеративний ШІ щорічно додаватиме від $2,6 до $4,4 трильйона доларів до світового ВВП, а 65% організацій вже використовують його принаймні в одній бізнес-функції. Особливо динамічно розвивається ринок ШІ в охороні здоров'я — у 2025 році він оцінювався в $36,67 млрд із очікуваним щорічним зростанням ~38,9%. Україна активно інтегрується у ці глобальні процеси: кількість вітчизняних ШІ-спеціалістів за останнє десятиліття зросла в 4,4 рази, а 242 компанії формують 20% ринку Східної Європи. Водночас технологія несе суттєві виклики — від алгоритмічних упереджень та ризиків автоматизації зайнятості до регуляторних прогалин, що потребують гармонізації з EU AI Act. Успішне використання потенціалу ШІ залежатиме від збалансованої державної політики, що поєднує стимулювання інновацій із забезпеченням етичності та соціальної справедливості.

Ключові слова: штучний інтелект, технологічна революція, цифрова трансформація, автоматизація, генеративний ШІ, освіта, охорона здоров'я.

Abstract:
Artificial intelligence is one of the key drivers of global economic transformation: according to McKinsey & Company forecasts, generative AI will add between $2.6 and $4.4 trillion annually to global GDP, while 65% of organizations already use it in at least one business function. The AI healthcare market is growing particularly rapidly, valued at $36.67 billion in 2025 with an expected CAGR of ~38.9%. Ukraine is actively integrating into these global trends: the number of domestic AI specialists has grown 4.4 times over the past decade, with 242 companies accounting for 20% of the Eastern European market. At the same time, the technology poses significant challenges — from algorithmic bias and labor market automation risks to regulatory gaps requiring harmonization with the EU AI Act. Successful harnessing of AI potential will depend on balanced policy that combines innovation stimulus with ethical and social responsibility.

Keywords: artificial intelligence, technological revolution, digital transformation, automation, generative AI, education, healthcare.

Introduction

The modern world is undergoing a fourth industrial revolution, the central element of which is the large-scale adoption of artificial intelligence technologies across all areas of human activity. This transformation is fundamentally changing the ways of doing business, delivering services, making decisions, and managing the interaction between people and technology.

Global statistics illustrate the scale of these changes: 72% of companies worldwide use artificial intelligence in at least one area of their operations, and the adoption rate of generative AI has reached 65% [1]. This means that AI has moved beyond being an experimental technology and has become an integral part of the corporate strategy of leading companies worldwide.

Ukraine represents a particularly compelling case of AI industry development. Even under wartime conditions, investments in artificial intelligence continued to grow at the fastest pace, reflecting a strategic understanding of the importance of these technologies for the country's international competitiveness [2]

Revolutionary Transformations in Key Sectors

The corporate world is undergoing a genuine revolution: 53% of companies actively use AI to optimize business processes, 51% use it for the automation of routine operations, and 52% integrate AI solutions to optimize digital platform performance [3]. Artificial intelligence enables the creation of fundamentally new business models that deliver competitive advantages and unlock new market opportunities [4].

The healthcare sector is one of the most striking examples of AI's revolutionary impact: the number of robotic surgical procedures increased from 1.8% in 2012 to 15.1% in 2018, and the global AI in healthcare

market was valued at $36.67 billion in 2025 with an expected CAGR of ~38.9% [5, 6]. Personalized treatment is becoming a reality through the analysis of large volumes of medical data.

The education sector is being transformed through the creation of personalized learning pathways for each student [7]. Meanwhile, in the media industry, only 22% of journalists regularly use AI tools, indicating significant untapped potential [8].

Key Challenges and Risks

The "black box" problem — the inability to fully explain the decisions of AI systems — creates a fundamental dilemma between efficiency and transparency, which is particularly critical in healthcare and justice. Algorithmic biases embedded in training data can amplify existing social inequalities [9].

According to McKinsey, generative AI can automate 60–70% of the time spent on typical work tasks, creating risks for traditional forms of employment. Small and medium-sized enterprises are particularly vulnerable due to the high financial barriers to adopting AI technologies [3, 10].

Ukrainian legislation has significant gaps regarding the authorship of AI-generated content, personal data protection, and defining accountability for AI system decisions [11]. In August 2024, the EU Artificial Intelligence Act (AI Act, Regulation (EU) 2024/1689) entered into force — the world's first comprehensive legal act in this domain, providing a clear reference point for harmonizing Ukrainian legislation [12].

Economic Opportunities and the Current State of Implementation

At the global level, leadership is held by the United States, China, and the United Kingdom. In 2024, OpenAI raised $6.6 billion at a valuation of $157 billion, and private investment in generative AI reached $33.9 billion — 18.7% more than in 2023 [13, 14]. AI opens new opportunities for sustainable development through the concept of "green AI": optimizing energy consumption, improving logistics, and resource management [4].

In Ukraine, approximately one-third of companies in the healthcare sector already apply AI technologies. At the same time, the public sector lags significantly behind: official statistical systems remain fragmented and technically outdated [11].

The education sector also shows significant potential for AI adoption. According to Demand Sage, more than 60% of higher education institutions worldwide have already integrated artificial intelligence tools into their educational processes. AI-powered personalized learning platforms improve student academic performance by an average of 20–30%, and the AI-driven EdTech market is valued at over $20 billion with a projected annual growth rate of approximately 40% through 2030 [15]. For Ukraine, this opens opportunities both for training highly qualified AI specialists and for improving the overall digital literacy of the population.

Strategic Recommendations

For the successful development of the AI ecosystem in Ukraine, the following are critically necessary: 1) establishing a legal framework harmonized with the EU AI Act; 2) developing ethical codes for AI developers; 3) phased integration of AI into the business sector with effectiveness testing; 4) advancing digital literacy in education; 5) systematic modernization of public institutions [3, 7, 12].

Conclusions

Artificial intelligence is a key factor of the new technological revolution; however, its impact is characterized by considerable unevenness. Revolutionary changes occur most rapidly where large volumes of structured data and minimal regulatory barriers exist. Ukraine requires a dual strategy: supporting the private sector and systematically modernizing public institutions through harmonization with EU standards. Success will depend on the ability to strike a balance between stimulating innovation and ensuring ethical conduct and social justice.

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Подзігун Дмитро Костянтинович – студент групи СА-24б, факультет інтелектуальних інформаційних технологій та автоматизації, Вінницький національний технічний університет, м. Вінниця, e-mail: dmitropodzigun@gmail.com.
Мелех Анна Василівна – викладач англійської мови, кафедра іноземних мов, Вінницький національний технічний університет, м. Вінниця, e-mail: a.melekh@vntu.edu.ua.

Podzihun Dmytro Konstantinovych – student of group SA-24b, Faculty of Intelligent Information Technologies and Automation, Vinnytsia National Technical University, Vinnytsia, e-mail: dmitropodzigun@gmail.com.
Melekh Anna Vasylivna – English language instructor at the Department of Foreign Languages, Vinnytsia National Technical University, Vinnytsia, e-mail: a.melekh@vntu.edu.ua.