

EFFECT OF ARTIFICIAL INTELLIGENCE ON THE ECONOMY

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Purpose: The purpose of this article is to investigate the diverse effects of artificial intelligence (AI) on the economy, with the aim of offering a comprehension of its consequences on different industries and socioeconomic factors. This research endeavours to enhance understanding of the transformative impacts of AI on global economies by investigating the correlation between the adoption of AI and economic dynamics, thereby providing valuable insights.

Design/methodology/approach: The research paper utilizes an interdisciplinary methodology that integrates approaches to examine the diverse impacts of artificial intelligence on the economy.

Findings: The article presented a nuanced analysis of the multifaceted consequences of adopting AI technology in various aspects including macroeconomics, industry-specific implications, labour market dynamics, socioeconomic factors, and policy considerations. The research outcomes emphasized the significance of a comprehensive and equitable approach to the integration of AI, considering ethical considerations, policy frameworks, and targeted initiatives aimed at ensuring the fair distribution of the advantages and opportunities created by AI.

Research limitations/implications: The relationship between the adoption of AI and macroeconomic factors may require a more complex analytical framework. Investigating the possible harmonization and joint efforts between AI and human workers is an avenue that should be explored in future research. To achieve a more thorough comprehension of the multifaceted effects of AI on the economy, upcoming studies should aim to overcome these limitations.

Originality/value: The article offers a distinctive perspective by employing a comprehensive and interdisciplinary approach, as well as by considering the broad socioeconomic implications. Its significance lies in providing guidance to policymakers, businesses, researchers, educators, and the wider public, facilitating a more profound comprehension of the impact of AI on economies, and ultimately promoting responsible and fair integration of AI technologies.

Keywords: artificial intelligence, economy, labour market, socioeconomic factors.

Category of the paper: Literature review.

1. Introduction

In a time marked by remarkable technological progress, the incorporation of AI into different aspects of human existence has emerged as a powerful and transformative influence (Gruetzemacher, Whittlestone, 2021; Littman et al., 2021; West, Allen, 2018; Xu et al., 2021; Bilan et al., 2022). The consequences of AI reach beyond the domains of creativity and ease, extending into the fundamental structure of global economies and society (Bughin et al., 2018; Jason, Seamans, 2019; Szczepański, 2019; Kuzior, Kwilinski, 2022). As AI technologies become more widespread, the complex connection between AI and the economy has garnered the interest of scholars, policymakers, businesses, and society. This article endeavours to thoroughly examine this dynamic connection, aiming to uncover the diverse effects of AI on the economy.

In recent decades, there has been a notable transformation of AI from a theoretical concept to a practical reality, showcasing its capabilities in challenging commonly accepted norms across diverse industries. The combination of machine learning, data analysis, and automation has paved the way for improved productivity, operational efficiency, and accelerated innovation (Tariq, Poulin, Abonamah, 2021; Sakiewicz et al., 2021; Ober, Kochmańska, 2022). However, this technological revolution also prompts critical inquiries regarding its potential to reshape economic structures, redefine labour markets, and impact societal well-being. As AI technologies continue to advance and integrate into various sectors, it is crucial to comprehend not only the opportunities they offer but also the obstacles they present to economic stability, inclusivity, and sustainability (Kuzior, 2017; 2021; 2022; Marszałek-Kotzur, 2022; Postrzednik-Lotko, 2020; Osika, 2022).

The primary goals of this article are two-fold: firstly, to examine the various impacts of artificial intelligence on the economy and secondly, to provide insight into the multifaceted consequences of adopting AI in terms of socioeconomic fairness and employment markets. By employing a multidisciplinary approach that combines quantitative analysis and theoretical synthesis, this study strives to contribute to a comprehension of the complex relationship between AI and economic results.

To achieve these goals, this article explores the theoretical underpinnings, including economic theories related to technological innovation, dynamics of the labour market, and the diffusion of innovation. The paper presents the empirical findings and discussions, offering insights into macroeconomic patterns, industry-specific effects, transformations in the labour market, socioeconomic implications, policy considerations, and global variations.

Overall, the examination of the impact of artificial intelligence on the economy is a significant undertaking in a period characterized by swift technological progress. Through comprehending the intricacies of this intricate association, this paper aims to educate and direct individuals with a vested interest in promoting the responsible implementation of AI, fostering inclusive economic expansion, and ensuring long-term sustainable development.

2. Methods

The article employs qualitative research methods, literature review and secondary data analysis, to provide a comprehensive analysis of the multifaceted impact of artificial intelligence on the economy. A systematic review of relevant academic literature and industry reports is conducted to gather existing insights into the impact of AI on the economy. Data from existing sources, such as government reports, and industry publications, is analysed to uncover trends related to AI's economic impact.

3. Results

There are theoretical foundations of economic theories related to technological innovation, labour market dynamics, and innovation diffusion. These areas are crucial to understanding the complex interaction between technology, work and innovation in management and organization.

Technological innovation is the cornerstone of economic growth and development (Kuzior, 2014). Several economic theories provide insight into its dynamics. Schumpeter's Theory of Innovation proposed by Joseph Schumpeter emphasizes the role of entrepreneurs in driving economic progress through the introduction of new and disruptive technologies (Sweezy, 1943). Schumpeter's concept of "creative destruction" suggests that innovation leads to the replacement of old technologies, which leads to economic transformation.

Endogenous Growth Theory developed by economists such as Paul Romer posits that technological progress is not just a by-product of economic activity but can be affected and accelerated by factors such as research and development investments, education, and the fallout of knowledge (Schilirò, 2019).

Diffusion of Innovation Theory building on the work of Everett Rogers focuses on the process by which innovations diffuse within a society or market. It highlights the importance of adopters' characteristics, communication channels, and perceived attributes of innovations in influencing their spread (Rogers, Singhal, Quinlan, 2019).

The labour market is highly influenced by technological innovation, which can lead to shifts in job roles, employment patterns, and skill requirements. Several economic theories shed light on these dynamics as follows.

Technological Unemployment theory, often associated with the Luddite movement, suggests that technological progress can displace workers, leading to unemployment in some industries (Jason, Seamans, 2019). However, history has shown that while some jobs may be lost, new ones are also created as technological progress stimulates economic growth.

Skills Biased Technological Change (SBTC) theory proposes that technological innovations tend to supplement high-skilled workers while replacing low-skilled workers. SBTC contributes to wage inequality, as those with relevant skills benefit most from technological advances (Berman, Bound, Machin, 1998).

Job polarization theory suggests that technological innovation can lead to a decrease in medium-skilled jobs, while an increase in demand for both low-skill, routine tasks and high-skill, non-routine tasks (Battisti, Gatto, Parmeter, 2022). This phenomenon has implications for income distribution and the structure of the labour market.

Diffusion of innovation refers to how new technologies, products or ideas spread across markets and societies. Several theories explain this process.

Diffusion of Innovation Theory developed by Everett Rogers classifies innovation adopters into different groups based on their willingness to adopt new ideas (Rogers, Singhal, Quinlan, 2019). It highlights factors such as comparative advantage, concordance, complexity, observability, and experimentability that influence the adoption rate.

The theory of network effects suggests that the value of innovation increases the more people adopt it (Network Effect Theory, 2006). This creates a positive feedback loop, which speeds up the propagation process. Social media platforms and communication technologies often exemplify the power of network effects.

Diffusion across the country theory focuses on how innovations spread across different countries (Eaton, Kortum, 1999). It considers factors such as cultural norms, regulatory environments, economic conditions, and the role of multinational corporations in facilitating global outreach.

Exploration of these theoretical underpinnings can provide valuable insights into how organizations address the challenges and opportunities presented by technological innovation, labour market dynamics, and innovation diffusion. Moreover, understanding these theories can help design effective strategies to foster innovation, manage human capital, and adapt to evolving market conditions.

The adoption of artificial intelligence can influence macroeconomic patterns in multiple ways. Empirical evidence indicates that AI can improve productivity and foster innovation, thus contributing to economic growth (Hatzius et al., 2023). The implementation of AI-powered technologies has the potential to generate efficiency improvements across various industries, thereby promoting higher rates of growth in gross domestic product (GDP). According to research conducted by PricewaterhouseCoopers (PwC), the implementation of AI is projected to lead to a potential increase of up to 14% in global GDP by 2030. This increase in economic output is estimated to amount to approximately \$15.7 trillion, thereby positioning AI as the most significant commercial prospect within the contemporary rapidly evolving economy (PwC, 2017). It is anticipated that the most significant benefits from AI will likely be observed in China, with a projected increase of up to 26% in its GDP by the year 2030, and in North America, which has the potential to experience a 14% boost (PwC, 2017). The sectors poised

to experience the largest advancements include retail, financial services, and healthcare, as AI is expected to enhance productivity, improve product quality, and stimulate consumption (PwC, 2017). Goldman Sachs Research suggests that the integration of tools that leverage advancements in natural language processing into various sectors of the economy and society may result in a substantial 7% surge in global GDP, equivalent to nearly \$7 trillion, and a corresponding 1.5 percentage point boost in productivity growth over a decade (Goldman Sachs, 2023). According to the recent investigation of McKinsey & Company, the implementation of generative AI across the 63 use cases it analysed could result in an annual increase of approximately \$2.6 trillion to \$4.4 trillion (McKinsey & Company, 2023). The potential influence of Generative AI as a special kind of technology on productivity can contribute trillions of dollars in value to the global economy. Consequently, the overall impact of artificial intelligence could be enhanced by 15 to 40 per cent (McKinsey & Company, 2023). However, there are apprehensions regarding the possibility of job displacement because of automation, which could subsequently lead to alterations in employment trends and modifications in consumer expenditure patterns.

The consequences of AI implementation vary across different industries. For instance, manufacturing and logistics sectors may witness heightened automation of production and supply chain operations. Healthcare could derive advantages from AI-enabled diagnostic tools and personalized treatment strategies. Financial services might experience enhancements in risk evaluation and fraud identification through the utilization of AI algorithms. In accordance with the McKinsey & Company report, Generative AI is a special kind of technology that will make a big difference in many different types of businesses (McKinsey & Company, 2023). PwC outlines healthcare; automotive; financial services; transportation and logistics, technology, communications, and entertainment; retail, energy and manufacturing sectors as ones that provide the greatest opportunity for AI (PwC, 2017). These industries might see the most changes and improvements because of generative AI, which could make up a big part of their money earned. These impacts are reliant on the degree of AI preparedness and the distinctive characteristics of each industry.

The adoption of AI technology is causing significant changes in the labour market. The implementation of generative AI holds the capacity to revolutionize the nature of work, enhancing the abilities of workers by automating certain tasks they perform individually (McKinsey & Company, 2023). Specifically, there is a tendency for routine and repetitive tasks to be automated, which may result in job displacement in specific industries. The implementation of generative AI holds the capacity to revolutionize the nature of work, enhancing the abilities of workers by automating certain tasks they perform individually (McKinsey & Company, 2023). The implementation of Generative AI has the potential to significantly enhance labour productivity in various sectors of the economy. However, for this to be realized, it is imperative to allocate resources towards supporting workers during the transition of their work activities or career changes (McKinsey & Company, 2023).

Conversely, there is a growing need for individuals with expertise in AI development, data analysis, and problem-solving (Hedlund, Persson, 2022). Furthermore, AI platforms are exerting an impact on the gig economy by connecting freelancers with suitable projects (Adolfsson, 2020).

The socioeconomic consequences of integrating AI into society are complex and varied. Although AI has the potential to enhance productivity and improve overall well-being, there are apprehensions regarding its impact on employment, income inequality, and the potential for biased decision-making within AI systems (McKinsey Global Institute, 2018; Andersson, 2022; The White House, 2022; Darvas, Savona, 2022; Varsha, 2023). Consequently, it is crucial to adequately train and prepare the workforce for the changes brought about by AI, as well as to ensure fair and equal access to the benefits it offers (Bühler, Jelinek, Nübel, 2022; Morandini et al., 2023; Manjarrés et al., 2021).

Policy considerations are a central concern for policymakers as they navigate the complexities and possibilities associated with the integration of AI. Striking a delicate balance between promoting innovation and mitigating potential adverse outcomes is paramount. These deliberations primarily encompass matters about the safeguarding of data privacy, ethical implications of AI, protection of intellectual property rights, and the implementation of programs aimed at reskilling and retraining the workforce (Sartor, Lagioia, 2020, pp.79-81; Bankins, Formosa, 2023; Li, 2022).

The adoption of AI differs worldwide due to factors including technological infrastructure, regulatory environments, and investment in research and development. Developed economies with well-established AI ecosystems may encounter distinct outcomes compared to developing economies that are still in the process of enhancing their AI capabilities (Aly, 2020).

4. Discussion

The labour market has experienced substantial disruption and transformation due to the introduction of AI. This research demonstrates that the automation of routine and repetitive tasks has resulted in job displacement, but it has also led to the creation of new roles that demand higher cognitive and creative skills. These changes have far-reaching implications beyond unemployment rates, affecting income inequality, skill requirements, and the need for worker retraining initiatives. To ensure a harmonious integration of technological advancements and workforce resilience, policymakers and business leaders must work together to develop effective strategies (Delponte, 2018; United Nations, 2021).

The integration of AI into production processes has shown promise in improving productivity and stimulating economic growth. By facilitating more precise decision-making, effective allocation of resources, and streamlined operations, AI technologies contribute to

optimizing business performance. This study highlights the necessity of ongoing investment in research and development to fully harness the transformative potential of AI (QuantumBlack by McKinsey, 2022). At the same time, it emphasizes the significance of addressing potential obstacles such as data privacy issues and ethical considerations.

The transformative effects of AI are reconfiguring various industries and market structures. Conventional business models are being confronted, which has given rise to agile and innovative startups that capitalize on AI-generated insights to attain a competitive advantage (Kuzior, Sira, Brożek, 2023). This discourse highlights the necessity for established companies to adopt AI as a strategic priority, fostering an environment of flexibility and trial and error (Atsmon, 2023). Additionally, regulatory frameworks must adapt to guarantee equitable competition, safeguard intellectual property rights, and protect consumer well-being in this dynamically evolving landscape (European Commission, 2022).

The impact of AI reaches beyond the boundaries of individual nations, exerting influence on global economic dynamics and geopolitical relationships. This research advocates for the implementation of proactive policies aimed at fostering AI research, attracting skilled professionals, and facilitating international cooperation to position countries at the forefront of the AI-driven economy. Additionally, the establishment of ethical considerations and standards is imperative in guiding the global dissemination of AI and mitigating potential adverse effects.

The article illuminates the changing landscape of employment because of the integration of AI. This necessitates discussions regarding the possible displacement of specific job positions and the consequent requirement for retraining and enhancing the skills of the workforce. It is imperative to carefully analyse the ramifications of these changes on income inequality, wage systems, and social welfare initiatives. Additionally, it is crucial to explore the potential emergence of novel job classifications that are directly tied to AI development, upkeep, and supervision to comprehensively comprehend the overall impact on employment.

In the context of economic development, the ethical aspects of implementing AI have significant implications (Leslie, 2019; Stanford University HAI, 2021). The findings of this study emphasize the necessity of adopting responsible practices, promoting transparency, and establishing accountability to cultivate trust among consumers, businesses, and the broader society. It is crucial to take measures such as rectifying biases in AI algorithms, ensuring equitable access to the advantages of AI, and protecting individual rights to effectively leverage the potential of AI while minimizing any unintended negative outcomes.

Analysing the connection between advancements in AI, investments in research and development, and sustainable economic development can provide valuable insights into the potential long-term viability of AI as a catalyst for economic growth (Kuzior, Kwilinski, Tkachenko, 2019; Kwilinski, Tkachenko, Kuzior, 2019). Engaging in discussions regarding the environmental impact of AI technologies and how they align with broader sustainability objectives will be crucial in achieving a harmonious equilibrium between economic advancement and ecological conservation.

To sum up, this article conducts an analysis of the impact of artificial intelligence on the economy, delving into the potential for transformation and the obstacles that arise from integrating AI. The discussions presented to highlight the necessity for cooperative endeavours between governments, industries, and academia to navigate the changing economic terrain and optimize the beneficial effects of AI on society. With AI continuously shaping industries and redefining established economic frameworks, proactive and adaptable approaches will be essential for capitalizing on its potential for long-term economic development and the welfare of individuals.

5. Summary

The article explores the profound influence of AI on various economic facets and the broader implications for society. Highlighting the transformative potential of AI, the article delves into the theoretical foundations of economic theories related to technological innovation, labour market dynamics, and innovation diffusion and into the impact on macroeconomic patterns, industry-specific effects, transformations in the labour market, socioeconomic implications, policy considerations, and global variations. Additionally, the article discusses potential challenges related to labour market disruption and transformation; productivity enhancement, economic growth and sustainability; industry disruption and market dynamics; global competitiveness and technological leadership and ethical and social considerations stemming from the rapid integration of AI into economic systems. By examining both the opportunities and challenges, the article contributes to a comprehensive understanding of AI's role in shaping the economic landscape and offers insights for policymakers, businesses, and individuals navigating this evolving terrain.

Acknowledgements

Publication supported by the pro-quality grant of the rector of the Silesian University of Technology, grant number: 13/020/RGJ22/0071.

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