The Impact of Artificial Intelligence on the Digital Economy: Advances and Challenges - A Systematic Literature Review

Karen Lissette Matamoros-Echeverria[1], Edwin Roberto Sanchez-Leon[2], Antonio Alejandro Aristega-Zuñiga[3], Mario Manuel Cárdenas-Rodríguez[4], Dennis Alfredo Peralta-Gamboa[5]

Abstract

The digital economy has undergone a significant transformation in recent years due to the impact of artificial intelligence (AI). This study presents a systematic literature review to analyze AI's advances and challenges in the digital economy. A search was conducted in databases such as Web of Science and Scopus, selecting 36 relevant studies published between 2021 and 2025. The findings indicate that AI has optimized process automation, improved operational efficiency, and strengthened transparency in the digital economy. However, challenges related to regulation, data privacy, and inequality in technology adoption persist. This study provides a comprehensive overview of how AI is reshaping the digital economy and highlights the need for regulatory and technological development strategies to ensure ethical and equitable implementation.

Keywords: Artificial Intelligence; Digital Economy; Automation; Technological Regulation; Digital Transformation.

Introduction

In recent years, artificial intelligence (AI) has significantly transformed the digital economy, redefining production processes, optimizing decision-making, and modifying traditional business models (Li & Tang, 2024). The incorporation of machine learning algorithms and emerging technologies has enabled companies to enhance operational efficiency, reduce costs, and increase competitiveness in highly dynamic markets (Hoffmann et al., 2025). In this context, AI has become a fundamental pillar of the digital economy, facilitating task automation, service personalization, and supply chain optimization (Hong & Xiao, 2024).

One of the sectors that has benefited the most from AI implementation is e-commerce. Advanced algorithms have enabled unprecedented personalization in user experience, driving more efficient digital marketing strategies and improving customer loyalty (Aliyev, 2022). Additionally, in the financial sector, AI has enhanced security in digital transactions through the integration of blockchain and machine learning, promoting transparency and trust in the digital economy (Shu

[1] State University of Milagro, Milagro, Ecuador; Email: karen220894@hotmail.com; ORCID: https://orcid.org/0009-0009-0636-0094

[2] State University of Milagro, Milagro, Ecuador; Email: esachezl1@unemi.edu.ec; ORCID: https://orcid.org/0000-0002-4964-7855

[3] State University of Milagro, Milagro, Ecuador; Email: aaristegaz@gmail.com; ORCID: https://orcid.org/0009-0006-3865-073X

[4] Agrarian University of Ecuador, Milagro, Ecuador; Email: mcardenas@uagraria.edu.ec; ORCID: https://orcid.org/0000-0002-1824-8747

[5] State University of Milagro, Milagro, Ecuador; Email: dperaltag2@unemi.edu.ec; ORCID: https://orcid.org/0009-0009-0636-0094

et al., 2024). However, these advances are not without challenges. AI regulation, personal data protection, and the digital divide in developing countries remain obstacles limiting the equitable adoption of these technologies (Hacker et al., 2024).

From a global perspective, research on AI and the digital economy has exponentially increased in recent years, with a notable concentration of studies in countries such as China and the United States, where innovative models of technological integration have been developed (Chen, 2024). In contrast, emerging regions such as Latin America still face structural barriers to AI adoption, highlighting the need to design digital inclusion strategies to prevent technological inequalities (Nadeem et al., 2024).

This study aims to analyze the advances and challenges of artificial intelligence in the digital economy through a systematic literature review. It examines 36 studies published between 2021 and 2025 in indexed databases such as Web of Science and Scopus to provide a comprehensive perspective on AI's impact on various economic sectors. The results confirm that AI has improved process automation and operational efficiency while also identifying regulatory and ethical challenges requiring attention. Based on these findings, this work provides evidence on the evolution of the AI-driven digital economy and the need to establish strategies for its responsible and equitable implementation.

Methodology

The methodology for this systematic literature review followed the guidelines established by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Noor et al., 2024).

Information Sources

The selected databases for literature searches were: Web of Science (WoS), known for its extensive coverage in health and social sciences (Singh et al., 2023); and Scopus, recognized for its interdisciplinary focus and high indexing of relevant articles across various fields of knowledge (Singh et al., 2023; Guo et al., 2023).

Search Strategy

A specific search equation combining keywords on artificial intelligence, digital economy, and automation was used. TS=("artificial intelligence" AND "digital economy") for WoS and TITLE-ABS-KEY("artificial intelligence" AND "digital economy") for Scopus, while in Google Scholar, open keywords such as "artificial intelligence" and "digital economy" were explored.

For the WoS database, the SCI EXPANDED and SSCI collections were selected.

Inclusion and Exclusion Criteria

Included documents were original scientific articles in any language published between 2021 and 2025 that address AI's impact on the digital economy.

Non-original records, such as commentaries, editorials, reviews, and bibliometric analyses, were excluded.

Selection Process

Two researchers jointly conducted a pilot screening of 15 records to clarify and specify the

inclusion and exclusion criteria. After duplicate removal, titles and abstracts were independently reviewed. In cases where available information was insufficient or agreement was not reached, a full-text evaluation was necessary. Full texts were assessed for eligibility, and disagreements between researchers were resolved through discussion with a third researcher.

Data Extraction

Data on publication year, country of study, AI algorithm used, and key results were extracted. The pilot test included 15 full texts, refining categories and documentation requirements. Data extraction was independently performed by two researchers.

Risk of Bias Assessment

Bias risk assessment was conducted using the Joanna Briggs Institute's critical appraisal checklists (Barker et al., 2024). Bias was assessed individually, and discrepancies were resolved through discussion without needing a third researcher. This assessment did not result in additional inclusion or exclusion decisions (Figure 1).
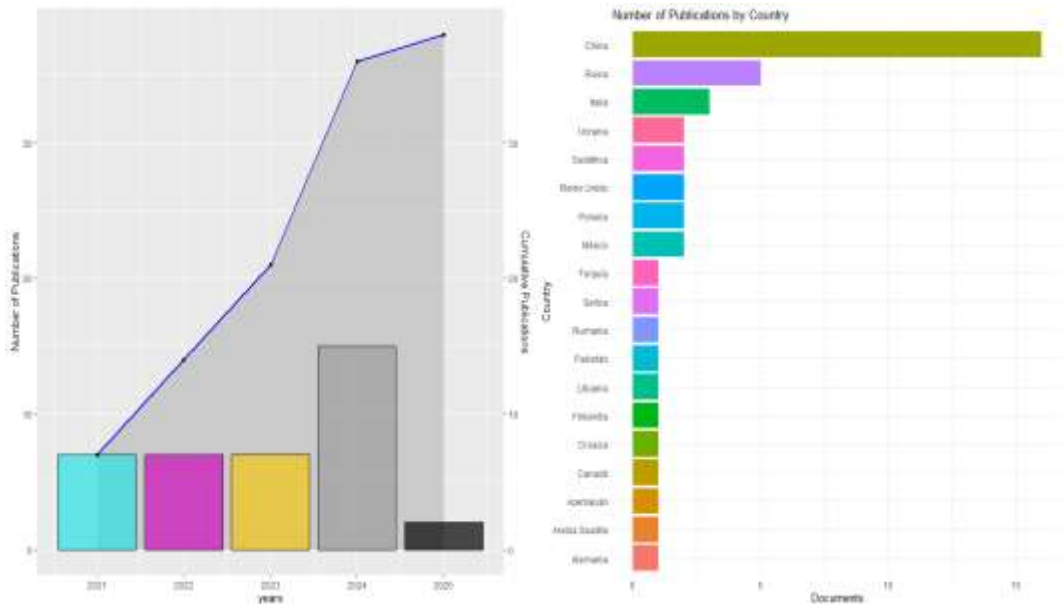
Figure 1 Flowchart of the study selection process based on PRISMA

In Table 1, a summary of the selected studies is presented, allowing for a visualization of their impact on the digital economy. The characteristics of the included studies are shown in Figure 2.

Results

Our searches conducted on February 6, 2025, yielded 451 documents, 304 from Scopus and 147 from WoS. After removing duplicates (n=107), 344 titles and abstracts were screened for eligibility, of which 99 full-text articles were reviewed. We identified 36 studies on assistance or guidance for children and adolescents with chronic illnesses (see Fig. 1).

Figure 2: Temporal and geographical distribution of publications on artificial intelligence in the digital economy.

Distribution of Studies by Country

The reviewed studies reveal an uneven geographical distribution in research on AI and the digital economy. China leads academic production in this area, with studies analyzing the application of AI in productivity and digital commerce. Europe, on the other hand, focuses on AI regulation and its ethical impact on the economy. Latin America and other emerging regions have a lower presence in the analyzed literature, highlighting the need to expand research in these contexts to better understand AI's effects on developing economies.

Author	Title	Algorithm or AI Applied	Main Results
(Beaumier & Kalomeni, 2022)	Ruling through technology: politicizing blockchain services	Blockchain	Companies use blockchain to reinforce their authority over digital transactions.
(Chen, 2024)	Research on the impact of the digital economy on the level of industrial structure: An empirical study of 280 cities in China	Machine Learning	The digital economy improves industrial structure, with an inverted U-shaped impact.
(Z. Li & Tang, 2024)	Pathways of the Digital Economy's Impact on Green Total Factor Productivity in the Construction Industry	Artificial Intelligence, Internet of Things	The digital economy enhances green total productivity in construction through innovation and regulation.
(Aliyev, 2022)	Problems of Regulation and Prospective Development of E-	AI, Big Data	Post-pandemic e-commerce has transformed economic growth with AI and Big

	commerce Systems in the Post-coronavirus Era		Data.
(Guardado et al., 2022)	Opportunities and applications of smart contracts: A vision from the business, academic and scientific literature	Blockchain, AI	Smart contracts in blockchain enable secure transactions but face legal challenges.
(Hacker et al., 2024)	Regulating Gatekeeper Artificial Intelligence and Data: Transparency, Access and Fairness under the Digital Markets Act, the General Data Protection Regulation and Beyond	Machine Learning, Classification Algorithms	EU regulations impact the transparency and fairness of AI use in digital markets.
(Zatsarinnyy & Shabanov, 2023a)	Methodological Approach to Controlling the Degree of Intentions about Novel Knowledge for the Digital Economy	Classification based on semantic databases	Development of a digital platform to manage knowledge control in the digital economy.
(Han & Gu, 2021)	Linkage Between Inclusive Digital Finance and High-Tech Enterprise Innovation Performance: Role of Debt and Equity Financing	Use of big data and econometric analysis	Positive relationship between digital financial inclusion and innovation performance in tech companies.
(Borandag, 2023)	A Blockchain-Based Recycling Platform Using Image Processing, QR Codes, and IoT System	Deep Learning (CNN, YOLO v4, YOLO v8) for object identification	Development of a blockchain platform for recycling with AI-based object recognition.
(H. Wang et al., 2024)	An Empirical Assessment of the Influence of Digital Transformation on Sports Corporate Sustainability	Big Data and digital transformation analysis in sports enterprises	Digital transformation significantly enhances sports enterprise sustainability, with heterogeneous effects depending on region and company type.
(Liu et al., 2024)	Artificial Intelligence and Food Processing Firms Productivity: Evidence from China	Machine Learning and production automation	AI improves business performance and productivity, stimulating demand for highly skilled workers.
(Bucea-Manea-Țoniş et al., 2022)	Artificial Intelligence Potential in Higher Education Institutions: Enhanced Learning Environment in Romania and Serbia	Artificial Intelligence for personalized learning and educational data analysis	Identification of barriers and opportunities for AI implementation in higher education, with an emphasis on the development of transversal skills.

(Nadeem et al., 2024)	Barriers and Strategies for Digitalisation of Economy in Developing Countries: Pakistan, a Case in Point	Machine Learning, advanced data analysis for economic digitalization	Identification of key barriers to economic digitalization in Pakistan and AI-based strategies to overcome these challenges.
(Skvarciany & Jurevičienė, 2021)	An Approach to the Measurement of the Digital Economy	Big Data and methodologies for digital economy analysis	Development of an improved methodology based on OECD for measuring the digital economy, including key financial indicators.
(Mohamed et al., 2024)	Can the Digital Economy Outperform the Oil Economy in Terms of Achieving Human Development?	No specific AI algorithm mentioned, study based on econometrics	In the short term, the impact of the digital economy on the Human Development Index (HDI) is negative or insignificant. In the long term, digitalization positively impacts education but negatively affects income and has no significant impact on health. The oil economy continues to have a significant impact on human development, mainly by increasing income. The relationship between the digital economy and human development appears to be stronger in the sense that human development drives digitalization rather than vice versa.
(Mohamed et al., 2024)	Data-driven business models, programmatic advertising, artificial intelligence, and regulation: some reflections	Artificial Intelligence in programmatic advertising and ad personalization	Data-driven business models are essential in the digital economy but create tensions regarding privacy and citizens' rights. The study analyzes European regulations (DSA, DMA) and their impact on data protection and targeted advertising. AI and Big Data influence consumer behavior through microtargeting. The study discusses risks of extreme personalization and ethical challenges in exploiting personal data.

(Gaffley & Pelser, 2021)	Developing a digital transformation model to enhance the strategy development process for leadership in the South African manufacturing sector	Machine learning and data analysis algorithms	Development of a digital transformation model for CEOs in the South African manufacturing sector, highlighting the importance of data management, technology investment, and cultural adaptation to facilitate digital transformation.
(Wu & Shi, 2024)	Development and Digitalization of Cultural Industry Marketing Based on Big Data	Hadoop, Spark, Random Forest, Neural Networks	Digitalization is key to the sustained growth of the cultural industry. A framework for cultural industry digital transformation based on big data is proposed. The need to strengthen independent innovation in the industry is emphasized. The government's role in creating an adaptive service system for the sector is highlighted.
(Sergushina et al., 2021)	Digital economy as a factor in increasing the competitiveness of countries and industries: A quantitative analysis	Machine Learning, Big Data, Econometric Models	The transition to digital technologies enhances the competitiveness of national economies. Business models based on databases, artificial intelligence, and machine learning have been identified. Labor productivity is expected to increase by 40% due to digitalization. Differences in digitalization levels across economic sectors and their impact on global competitiveness are highlighted.
(Z. Wang et al., 2023a)	Digitalization Effect on Business Performance: Role of Business Model Innovation	Big Data Analytics, Cloud Computing, Artificial Intelligence	Digitalization improves business model innovation and company performance, positively impacting profitability and competitiveness.
(Hong & Xiao, 2024)	Digital economy structuring for sustainable development: the role of blockchain and artificial intelligence	Blockchain, Artificial Intelligence	The use of Blockchain and AI improves supply chain transparency and traceability, reducing environmental impact and

	in improving supply chain and reducing negative environmental impacts		fostering circular economy models.
(Savastano et al., 2024)	Digital economy: towards a conceptual research framework based on bibliometric and in-depth analyses	Not specified	Research on the digital economy is still in its infancy, requiring more solid theoretical and methodological studies to guide public policies and business strategies.
(Z. Wang et al., 2023b)	Digitalization Effect on Business Performance: Role of Business Model Innovation	Big Data, Cloud Computing, AI	Digital capabilities significantly enhance business performance and business model innovation.
(Sandstrom, 2021)	Distributed Ledger Technologies and Social Machines: How to 'Smartify' the Economy with Blockchain-based Digital Extension Services?	Blockchain	Explores the synergy between distributed ledger technologies (DLT) and 'social machines' for digital economic development.
(Magoutas et al., 2024)	Digital Progression and Economic Growth: Analyzing the Impact of ICT Advancements on the GDP of European Union Countries	Digital Technologies Data Analysis	Demonstrates a positive correlation between ICT development and GDP growth in the EU, emphasizing AI's importance in business sectors.
(Shu et al., 2024)	Enhancing trust transfer in supply chain finance: A blockchain-based transitive trust model	Blockchain, Transitive Signature Algorithms	The blockchain-based trust model improves supply chain finance, facilitating SME credit access.
(Liang et al., 2024)	Does artificial intelligence technology enhance green transformation of enterprises: based on green innovation perspective	Industrial Robots with AI	Industrial robots enhance companies' green transformation by increasing innovation and energy efficiency.
(Emmert-Streib, 2021)	From the Digital Data Revolution toward a Digital Society: Pervasiveness of Artificial Intelligence	Deep Learning, Natural Language Processing	AI has permeated multiple industries, but ethical challenges and algorithmic biases need to be addressed.
(Hoffmann et al., 2025)	Entrepreneurship through Acquisition in the Digital Age: Exploring Website Ownership Patterns and Motivations for Selling	Evaluation of AI impact on SEO and content generation	Digital companies present acquisition opportunities with diversified revenue models, and AI is impacting their evolution.

(Shen, 2024)	Future jobs: analyzing the impact of artificial intelligence on employment and its mechanisms	AI in employment and labor productivity	Contrary to traditional beliefs, AI increases employment in labor-intensive industries and improves labor productivity.
(Iskajyan et al., 2022)	Importance of the Information Environment Factor in Assessing a Country's Economic Security in the Digital Economy	Digital methods for economic security assessment	A strong correlation is established between a country's economic security and its digital information environment.
(Sun et al., 2025)	In the era of responsible artificial intelligence and digitalization: business group digitalization, operations and subsidiary performance	Responsible Artificial Intelligence	Business group digitalization improves operational efficiency and HR collaboration but is influenced by technological turbulence.
(Jiang et al., 2023)	Influence of Financial Shared Services on the Corporate Debt Cost under Digitalization	Big Data, Artificial Intelligence	Financial shared services reduce corporate debt costs by improving accounting information quality and decreasing financial risk.
(Y. Li et al., 2024)	Integrating Artificial Intelligence into Service Innovation, Business Development, and Legal Compliance: Insights from the Hainan Free Trade Port Era	Artificial Intelligence applied to services	AI enhances service innovation and legal compliance in digital trade, facilitating business development in free trade zones.
(Zatsarinnyy & Shabanov, 2023b)	Methodological Approach to Controlling the Degree of Intentions about Novel Knowledge for the Digital Economy	Big Data, AI in decision-making	A model is developed to assess the intention to adopt innovative knowledge in the digital economy, using massive data analysis.
(Grekov et al., 2023)	MODEL OF DIGITAL TRANSFORMATION OF CUSTOMS SERVICES AIMED AT MAKING CUSTOMS CONTROL OF GOODS SENT BY INTERNATIONAL MAIL MORE EFFECTIVE WITH REFERENCE TO MEDICAL DRUGS	Blockchain, AI applied to logistics	A digital model is proposed to improve the efficiency of customs control in international drug shipments, reducing fraud and improving traceability.

Table 1 Summary of selected studies on the impact of artificial intelligence on the digital economy.

Impact of Artificial Intelligence on the Digital Economy

The reviewed studies demonstrate that AI is playing a transformative role in the digital economy, highlighting the following key findings:

Automation and Productivity

Artificial intelligence (AI) has optimized key processes in sectors such as manufacturing and e-commerce, significantly improving operational efficiency and reducing costs. A notable example is the study by Huanan Liu et al. (2024), which shows how machine learning has increased productivity in food processing companies in China by optimizing workflows and reducing waste. Similarly, Zhijiang Li and Decai Tang (2024) analyzed the integration of AI and the Internet of Things (IoT) in the digital economy, finding that these technologies have driven total productivity in Chinese industry. These findings reinforce the idea that the adoption of AI-based solutions can optimize business management, improve decision-making, and reduce operational costs, generating a positive impact on the digital economy.

Sustainability and Energy Efficiency

The use of AI in industry has also demonstrated its potential to drive the green transformation of companies. Peng Liang et al. (2024) analyzed the integration of industrial robots with AI and found that this combination fosters innovation and energy efficiency, allowing companies to reduce resource consumption and improve their sustainability. Additionally, artificial intelligence has been a key factor in the evolution of e-commerce, particularly in the post-pandemic context. Alovsat Garaja Aliyev (2022) studied the impact of AI and big data on digital commerce transformation, concluding that these technologies have facilitated service personalization, optimized inventory management, and increased conversion rates on digital platforms. The automation of decision-making through algorithms has allowed companies to enhance consumer experience and strengthen their competitiveness in an increasingly digitalized market.

Trust and Transparency

The application of emerging technologies such as artificial intelligence and blockchain has significantly improved trust in supply chains and security in digital transactions. According to the study by Chang Shu et al. (2024), the combination of AI with blockchain has enabled the implementation of better practices in business financing, ensuring transparency and traceability of processes. These tools have proven particularly useful in sectors where trust and security are fundamental, such as finance and global trade. The integration of these technologies contributes to risk mitigation, improves operational efficiency, and facilitates regulatory compliance in various markets.

Digital Transformation of E-Commerce

Artificial intelligence has been one of the main drivers of e-commerce transformation in recent years. Alovsat Garaja Aliyev (2022) describes how AI and big data have facilitated this process, enabling the sector's economic growth and offering greater personalization of digital services. Thanks to these technologies, companies have managed to adapt their market strategies more efficiently, anticipating consumer needs and optimizing their shopping experience. The automation of processes in e-commerce has not only boosted company profitability but has also

improved efficiency in inventory and logistics management.

Regulation and Equity

As AI becomes a key technology in the digital economy, regulating its use has become crucial to ensuring fairness and transparency in markets. Philipp Hacker et al. (2024) highlight the importance of regulatory frameworks in the European Union, pointing out that establishing clear standards for algorithm use is essential for protecting user rights. The lack of unified global regulations remains a challenge, as the indiscriminate use of AI can generate inequalities and issues related to data privacy. Developing specific regulations will enable a more ethical use of these technologies and foster trust in their application across various sectors of the economy.

Blockchain and Artificial Intelligence: Trust in the Digital Economy

Another relevant aspect identified in the reviewed studies is the combination of blockchain and artificial intelligence as tools to improve security and trust in the digital economy. Guillaume Beaumier and Kevin Kalomeni (2022) analyzed how companies have used blockchain to reinforce transparency and traceability in digital transactions, reducing fraud risks and improving data security. This finding highlights AI's potential, in conjunction with other emerging technologies, to optimize digital asset management and strengthen financial infrastructure. The combination of AI and blockchain not only enables greater information protection but also facilitates more secure and efficient transactions in the global digital ecosystem.

These results underscore the importance of continuing research on the relationship between AI and the digital economy, as well as the need to implement regulatory and technological development strategies that ensure equitable and sustainable adoption of these technologies.

Study Limitations

Despite the relevance of the findings obtained in this systematic review, it is important to acknowledge some inherent limitations of the study's methodology and scope.

Firstly, the selection of articles was limited to publications indexed in Web of Science (WoS) and Scopus, which, while ensuring the quality and rigor of the sources, may have excluded relevant research published in other databases or gray literature. This limitation could affect the representativeness of studies on artificial intelligence in the digital economy in less academically documented contexts.

Another significant limitation is the study's temporal scope, which only covered publications between 2021 and 2025. Since artificial intelligence is a dynamic and constantly evolving field, some recent developments may not have been fully addressed in the reviewed literature. Similarly, this time restriction may have excluded fundamental studies published in previous years, which could provide a broader conceptual foundation on AI's impact on the digital economy.

Additionally, although the systematic review included research from various countries, a geographic concentration was observed in regions such as China, Europe, and North America, with less representation of studies from Latin America, Africa, and other emerging economies. This unequal distribution of scientific production may introduce bias in the results, as the findings mainly reflect AI implementation in contexts with greater technological resources and more advanced regulatory frameworks. Therefore, future research should expand to explore AI's impact on developing economies in greater depth.

Another challenge identified in this study is the heterogeneity of methodologies employed in the analyzed articles. Since artificial intelligence is an interdisciplinary field, the studies included in the review address the topic from different perspectives, such as process automation, AI regulation, or its impact on the labor market. The lack of a standardized methodological framework complicates direct comparisons of results, suggesting the need for more standardized approaches in future research on AI and the digital economy.

Finally, it is important to note that ethical and regulatory challenges associated with the implementation of artificial intelligence in the digital economy are still evolving and, in many cases, have not been comprehensively addressed in the reviewed literature. Aspects such as data privacy, algorithmic biases, and equitable AI access require a deeper analysis that goes beyond the systematic review conducted in this study. Consequently, future research should focus on developing regulatory frameworks that enable the ethical and equitable adoption of AI in the digital economy.

Discussion

The results obtained from the 36 selected studies highlight the significant impact of AI across various sectors of the digital economy. One of the most relevant findings is AI's ability to optimize productivity and operational efficiency. Several studies, such as that of Zhijiang Li and Decai Tang (2024), demonstrated that the integration of AI and the Internet of Things (IoT) in the digital economy has boosted productivity in the industry, particularly in China. This confirms the trend that intelligent technologies are redefining production and logistics processes (Chen, 2024; Liu et al., 2024).

In the field of e-commerce, AI has facilitated service personalization and inventory optimization. Studies such as that of Alovsat Garaja Aliyev (2022) indicate that AI-based automation has improved user experience and the efficiency of digital platforms, promoting sustained sector growth (Hacker et al., 2024; Liang et al., 2024). This trend is also observed in banking and finance, where advanced data analysis has improved decision-making and transaction security (Shu et al., 2024; Aliyev et al., 2022).

Furthermore, AI has proven to be key in the green transformation of the industry. Recent studies indicate that the use of industrial robots with AI improves energy efficiency and reduces environmental impact (Beaumier & Kalomeni, 2022; Tang et al., 2024). This finding is particularly relevant in high-energy-consumption sectors such as manufacturing and logistics.

However, AI implementation in the digital economy has also presented challenges. One of the main issues is the need for regulation and oversight to prevent algorithmic biases and ensure fairness in the use of these technologies. The study by Philipp Hacker et al. (2024) emphasizes the importance of establishing solid regulatory frameworks, highlighting the role of the European Union in developing regulations for algorithm transparency and accountability (Trejo Guardado et al., 2022; Chen et al., 2024).

Another identified challenge is the inequality in AI adoption at a global level. While advanced economies have incorporated AI across multiple sectors, the digital divide remains an obstacle in developing regions. The study by Rubén Trejo Guardado et al. (2022) highlights that the lack of technological infrastructure and training limits access to AI benefits in emerging economies (Huanan et al., 2024; Hacker et al., 2024). This finding underscores the need for policies that promote digital inclusion and knowledge transfer to reduce these disparities.

Finally, the combination of AI with other emerging technologies, such as blockchain, has proven to be an effective strategy for enhancing trust and transparency in digital transactions. Studies such as that of Guillaume Beaumier and Kevin Kalomeni (2022) show that integrating blockchain with AI has strengthened payment system security and supply chain traceability, representing a significant advancement in the global digital economy (Shu et al., 2024; Liang et al., 2024).

Conclusions

This study has demonstrated that artificial intelligence is playing a transformative role in the digital economy, with significant impacts on productivity, automation, and transaction security. The systematic literature review has identified that AI not only optimizes business processes but also contributes to service personalization and improved strategic decision-making.

However, critical challenges remain that require attention. The lack of proper regulation and supervision may lead to ethical and equity-related issues in AI implementation. Additionally, the digital divide continues to limit equal access to these technologies worldwide, necessitating digital inclusion and sustainable technological development strategies.

Based on these findings, it is recommended to develop policies that promote AI training, strengthen regulatory frameworks, and encourage research on AI's impact in different economic contexts. The combination of AI with emerging technologies, such as blockchain, represents a key opportunity to enhance security and transparency in the digital economy. Finally, future research should explore AI's impact on specific sectors and analyze strategies to maximize its benefits equitably and sustainably.

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