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# Artificial Intelligence for Economic Growth Prediction

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**ABSTRACT**

**Abstract:** This Systematic Literature Review explores the transformative potential of Artificial Intelligence (AI) in economic growth prediction. Drawing on research from Dimension and Scopus databases, published between 2014 and 2024, the review highlights AI's capacity to process complex datasets, uncover non-linear patterns, and provide dynamic responses to real-time economic changes. AI's integration into economic forecasting and various industries is shown to enhance productivity, reduce costs, and foster inclusivity. However, the review identifies several challenges, including overfitting, data access, biases, and the need for ethical frameworks, which hinder its full potential. It suggests that AI should complement traditional economic forecasting methods, creating more robust and interpretable models. The review also emphasizes the necessity of a balanced approach that incorporates workforce adaptation, policy interventions, and ethical considerations to address risks such as job displacement and data misuse. This paper calls for further research on optimizing AI applications in economic forecasting while ensuring equitable and sustainable growth.

***Abstrak****: Penelitian ini mengeksplorasi potensi transformatif Kecerdasan Buatan (AI) dalam prediksi pertumbuhan ekonomi. Dengan mengacu pada penelitian dari basis data Dimension dan Scopus yang diterbitkan antara tahun 2014 dan 2024, ulasan ini menyoroti kemampuan AI dalam memproses dataset kompleks, mengidentifikasi pola non-linear, dan memberikan respons dinamis terhadap perubahan ekonomi real-time. Integrasi AI ke dalam peramalan ekonomi dan berbagai industri terbukti dapat meningkatkan produktivitas, mengurangi biaya, dan mendorong inklusi. Namun, tinjauan ini mengidentifikasi beberapa tantangan, termasuk overfitting, akses data, bias, dan kebutuhan akan kerangka etika, yang menghambat potensi penuhnya. Disarankan agar AI melengkapi metode peramalan ekonomi tradisional, menciptakan model yang lebih tangguh dan dapat diinterpretasikan. Tinjauan ini juga menekankan pentingnya pendekatan yang seimbang yang menggabungkan adaptasi tenaga kerja, intervensi kebijakan, dan pertimbangan etika untuk mengatasi risiko seperti penggantian tenaga kerja dan penyalahgunaan data. Artikel ini menyerukan penelitian lebih lanjut tentang optimalisasi aplikasi AI dalam peramalan ekonomi sambil memastikan pertumbuhan yang adil dan berkelanjutan.*

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## A. INTRODUCTION

The rapid advancement of Artificial Intelligence (AI) has had a profound impact across multiple sectors, particularly in the field of economics. AI technologies, such as machine learning, deep learning, and neural networks, have revolutionized the way data is analyzed and decisions are made (Yan, 2022). These

technologies enable the processing and interpretation of large datasets, uncovering patterns that were previously difficult to detect. In the economic domain, AI is increasingly applied to predict trends, optimize resources, and improve decision-making processes (Zhao, 2024). With the ability to process vast amounts of information in real time, AI supports the development of more accurate economic forecasts, offering a powerful tool for policymakers, businesses, and researchers alike. As AI continues to evolve, its integration into economic analysis is expected to grow, providing enhanced capabilities for predicting economic shifts and guiding strategic decisions.

Economic growth prediction is vital for shaping policies, guiding investments, and planning development (Yan et al., 2023). However, the process is complex due to the interplay of diverse variables such as market trends, geopolitical events, and technological advancements. These challenges highlight the need for efficient solutions capable of analyzing dynamic data and addressing uncertainty (Hijazi et al., 2023). Advanced technologies like AI offer promising tools to enhance the accuracy and reliability of economic forecasts, supporting more informed decision-making.

AI has transformed economic modeling by enhancing predictive accuracy and analyzing complex data patterns. Unlike traditional methods, AI-driven approaches like ARIMA and SARIMAX excel in forecasting key indicators such as GDP and unemployment rates (Bris et al., 2021). Machine learning algorithms utilize diverse datasets, including social media sentiment, to better understand economic dynamics (Sugawara & Nikaido, 2021). Additionally, AI adapts to market shifts, ensuring dynamic models remain relevant and supports policymakers with advanced scenario analysis for sustainable development (Demertzis et al., 2023). Despite its benefits, challenges like over-reliance and algorithmic bias warrant careful consideration.

AI techniques, particularly machine learning (ML), deep learning (DL), and neural networks, are transforming economic forecasting by enhancing accuracy, scalability, and adaptability. ML algorithms excel in analyzing large datasets, identifying patterns often overlooked by traditional methods, and improving predictions of key indicators such as GDP and inflation (Bris et al., 2021). These techniques also adapt to shifting market dynamics, providing real-time updates and reducing prediction uncertainty (Altyar et al., 2023). Similarly, DL methods effectively process unstructured data, such as social media and satellite imagery, enabling broader and more scalable economic analyses (Liu & Li, 2019). By integrating AI into macroeconomic models, researchers can address non-linear relationships and complex variables, resulting in more robust analyses and informed policy decisions (Marecki & Czerniawsk, 2021). However, challenges like over-reliance on technology and algorithmic bias remain critical, requiring careful oversight to avoid distorted predictions and policy outcomes.

AI has significantly improved economic forecasting, with methods like soft computing and machine learning outperforming traditional approaches in tasks such as stock market and macroeconomic predictions (Laub, 1999) . Generative AI has introduced tools like the AI Economy Score, accurately forecasting GDP and employment trends (Demertzis et al., 2023). AI models also enhance time series analysis, capturing non-linear patterns for timely predictions. However, challenges like inconsistent data quality and opaque "black box" models persist (Chang et al., 2018). Addressing these issues through hybrid approaches could further optimize AI's potential in economic forecasting.

Artificial Intelligence (AI) holds significant potential for economic forecasting by processing complex data and identifying patterns (Chen, 2024; Damasevicius, 2023). AI techniques like machine learning and deep learning can improve forecasting accuracy and decision-making (Zelisko et al., 2024). However, challenges such as data access, quality, biases, and the need for interdisciplinary skills in AI and economics remain (Yoo & Ahn, 2024). Despite these hurdles, AI can transform regional economic analysis, predict trends, and support strategic decisions. Addressing ethical concerns and ensuring transparency will be key to unlocking AI's full potential in economic forecasting.

This study aims to explore the challenges encountered in the implementation of AI, including data limitations, algorithmic bias, and ethical issues in decision-making. Through this analysis, it is expected that effective strategies will be formulated to optimize the use of AI in supporting more measured and sustainable economic policies.

## B. METHOD

This study employs a qualitative research method using a Systematic Literature Review (SLR) approach to identify, evaluate, and interpret relevant research findings on Artificial Intelligence for Economic Growth Prediction. This method allows researchers to systematically collect and analyze data from various sources, providing a comprehensive understanding of the topic. The data are sourced from the Dimensions (https://app.dimensions.ai) and Scopus (https://www.scopus.com) databases, focusing on publications from the last 10 years (2014–2024) to ensure relevance and timeliness. Data eligibility criteria are established to ensure the inclusion of high-quality literature, including: articles published in reputable national and international journals, studies that specifically address Artificial Intelligence for Economic Growth Prediction, publications issued within the past 10 years, and full-text articles available in English or Indonesian.The research procedure, as shown in Figure 1.

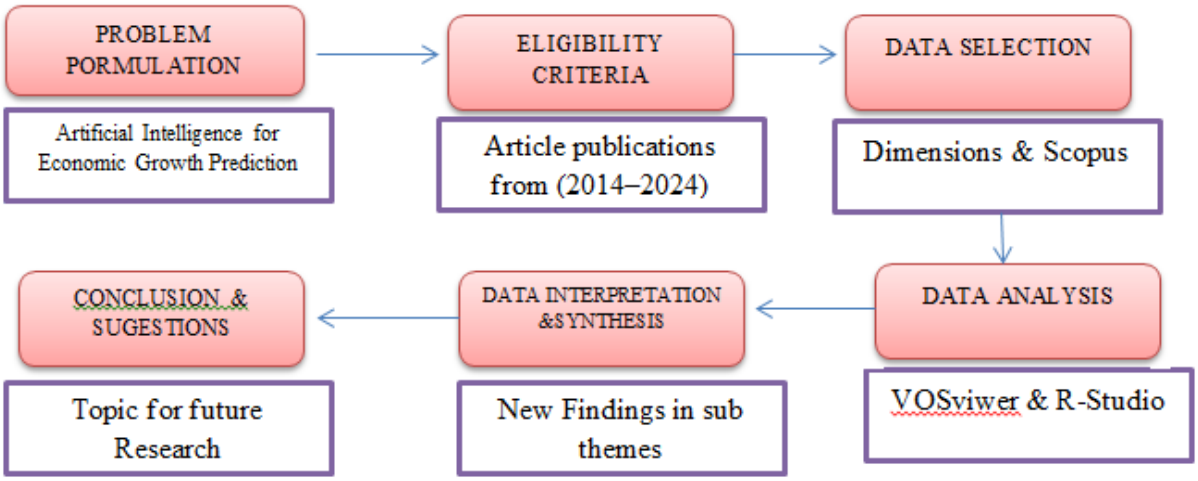


**Figure 1.** Research Procedures

Figure 1 is conducted in several stages, including problem formulation, eligibility criteria determination, data selection, data analysis, interpretation and synthesis, and conclusion formulation. The problem formulation stage focuses the research specifically on Artificial Intelligence for Economic Growth Prediction. Eligibility criteria are applied to filter relevant studies using keywords such as "Artificial Intelligence," "Economic Growth," and "Prediction." Data selection is performed by retrieving studies from the Dimensions database, filtered for publications from the last 10 years (2014–2024). The selected data are then imported into VOSviewer software to visualize the relationships between keywords and research themes. Additionally, R-Studio is utilized to perform descriptive statistical analysis and deeper exploration, such as identifying the frequency of themes and analyzing trends. The results of the visualizations and analyses generated through VOSviewer and R-Studio are interpreted to explain key variables related to Artificial Intelligence for Economic Growth Prediction. These findings provide insights into theoretical and practical implications of the research topic. In the final stage, conclusions are drawn, and recommendations are proposed to guide further research on Artificial Intelligence for Economic Growth Prediction in the future.

## C. RESULTS AND DISCUSSION

### 1. Result of Data Selections

The search conducted in the Dimensions database yielded 337,628 data entries related to the research topic. After data selection, 137,167 relevant articles meeting the eligibility criteria were identified. Of this total, 120,908 were journal articles and 16,259 were conference proceedings. The distribution of the data by publication year is shown in Figure 2, which illustrates the growth in the number of studies related to Artificial Intelligence for Economic Growth Prediction over the past decade.

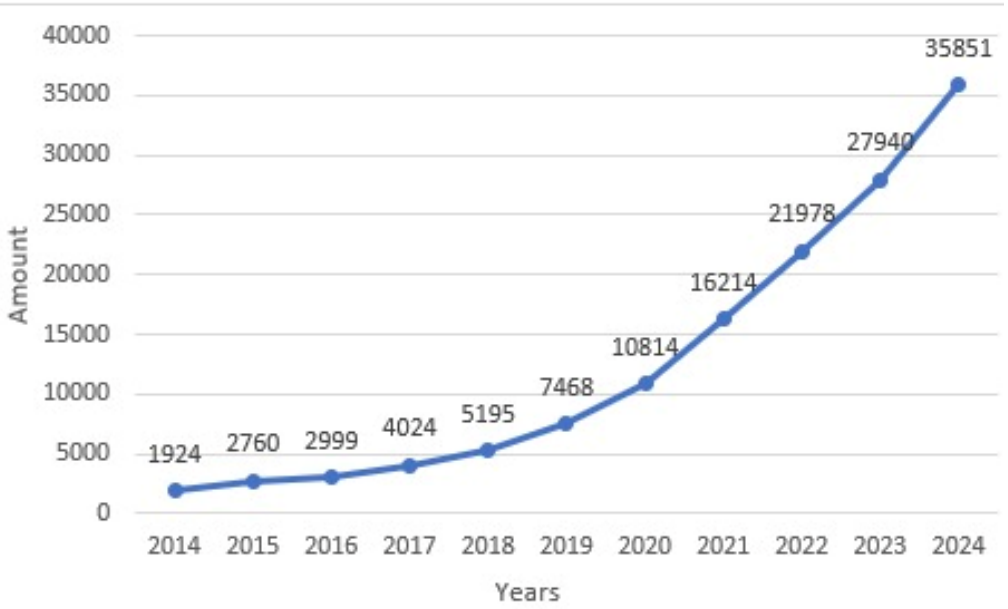


**Figure 2.** Publications in each Year

Figure 2 illustrates the trend in the number of publications related to Artificial Intelligence for Economic Growth Prediction from 2014 to 2024. The data presented in the chart reveals a gradual increase in publications during the earlier years, starting with 1924 publications in 2014, rising to 2760 in 2015, and reaching 5195 by 2018. This period is characterized by steady growth in research productivity, reflecting a moderate yet consistent expansion of interest in the field. Between 2019 and 2021, the publication rate accelerated significantly, with numbers increasing from 7468 in 2019 to 10814 in 2020 and 16214 in 2021. This substantial growth indicates a surge in research activity, likely driven by heightened interest and advancements in Artificial Intelligence (AI) technologies applied to economic forecasting. The trend further escalates during the 2022–2024 period, where the publication count rises sharply to 21978 in 2022, 27940 in 2023, and peaks at 35851 in 2024.

The data trend depicted in the chart signifies rapid growth in research related to Artificial Intelligence for Economic Growth Prediction. The exponential increase observed post-2020 highlights the growing recognition and adoption of AI as a powerful tool for economic forecasting. Contributing factors likely include advancements in computational power, the availability of big data, and continuous improvements in AI algorithms, which have collectively driven the surge in research output. Moreover, the dramatic increase in publications during 2022–2024 may reflect a global demand for more accurate and efficient solutions to predict economic growth, particularly in the aftermath of economic disruptions such as the pandemic. This trend underscores the increasing awareness among researchers, policymakers, and practitioners of AI's potential to address complex economic challenges through data-driven solutions.In conclusion, the exponential rise in publications demonstrates AI's growing influence in the economic domain.

While the quantity of research has surged, it is essential to ensure that the quality of these studies matches their volume, contributing meaningful and practical insights for forecasting, planning, and managing global economic growth.

## 2. Distribution of Research in Several Countries

The researcher further examined the distribution of publications across various countries. Figure 3 shows that the topic of Artificial Intelligence for Economic Growth Prediction has been widely researched and collaborated on in several countries, including Australia, China, Spain, India, Korea, the USA, Iran, France, Malaysia, and Denmark.

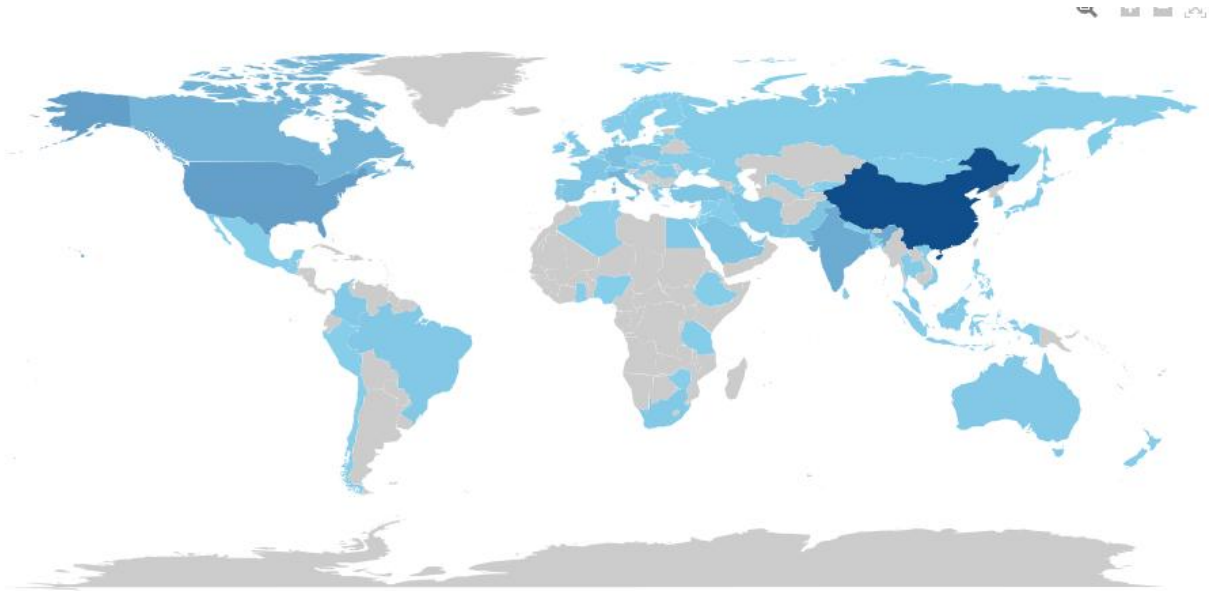

**Figure 3.** Countries' Collaboration World Map

The map illustrates the global distribution and collaboration of research efforts related to Artificial Intelligence (AI), particularly for predicting economic growth. From the visualization, it is evident that collaboration intensity is unevenly distributed across regions. Notably, China emerges as a central hub for AI research, indicated by its darker shading, which highlights a high volume of research and international partnerships. Other countries in North America (e.g., the United States), parts of Europe, and South Asia also exhibit significant contributions, represented by varying shades of blue. Conversely, regions such as Africa and parts of South America are depicted with lighter shades, indicating limited research activities and fewer international collaborations in AI for economic growth prediction. This disparity suggests that while advanced economies heavily invest in AI-driven economic research, developing regions may face challenges such as resource constraints, lack of infrastructure, or lower research prioritization. The map highlights the need for global collaboration to ensure equitable access to AI technologies that drive economic development. Encouraging partnerships

between AI-leading countries and less-represented regions could bridge knowledge gaps and foster inclusive economic growth predictions through AI advancements.

**Table 1.** Most Cited Countries

| Country | TC | Average Article Citations |
|---|---|---|
| Australia | 2025 | 155,80 |
| China | 1659 | 11,20 |
| Spain | 761 | 76,10 |
| India | 741 | 20,60 |
| Korea | 636 | 90,90 |
| Usa | 571 | 47,60 |
| Iran | 468 | 27,50 |
| France | 335 | 67,00 |
| Malaysia | 303 | 21,60 |
| Denmark | 277 | 138,50 |

The Table highlights the ten most-cited countries and their average article citations, reflecting their contributions to advancing research, including the application of Artificial Intelligence (AI) for economic growth prediction. Australia leads with the highest total citations (2025) and an impressive average citation per article of 155.80, indicating that Australian research is not only prolific but also highly impactful in the global scientific community.China ranks second with 1659 total citations; however, its average citation per article (11.20) is significantly lower. This suggests that while China produces a large quantity of research, its global recognition or impact in terms of citations remains relatively modest compared to Australia.Denmark (138.50) and Korea (90.90) demonstrate strong performance with high average article citations, despite lower total citations. This reflects the quality and focused nature of their research, indicating significant contributions to AI methodologies and their economic applications. Conversely, developing countries like India (20.60) and Malaysia (21.60) show lower total citations and average impact, signaling that their contributions to AI-driven economic forecasting are still emerging but hold future potential.Overall, the data underscores the importance of high-quality research in advancing AI applications for economic prediction. Countries like Australia, Denmark, and Korea showcase their leadership through impactful studies that innovate methodologies and enhance data-driven predictions. Meanwhile, countries with emerging research contributions, such as China, India, and Malaysia, must continue to focus on improving research quality to maximize AI's potential in fostering global economic growth.

## 3. Network Visualization of Data

The researcher conducted a visualization of all the research findings using VOSviewer to examine the variables and their interrelationships. The results of the visualization are shown in Figure 4.

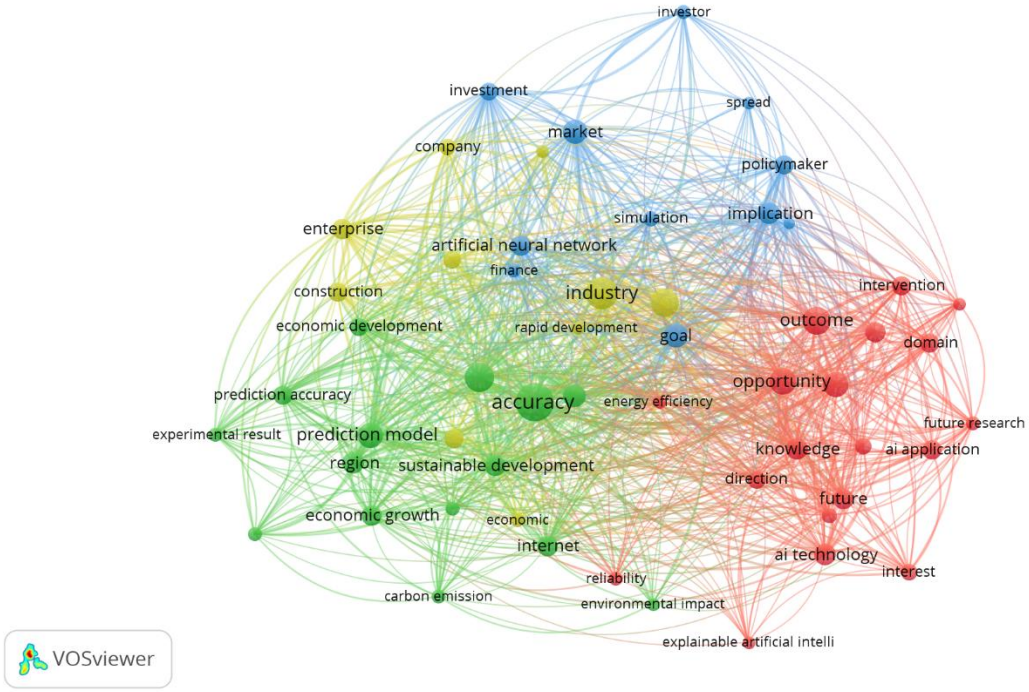


**Figure 4.** Network visualization Artificial Intelligence for Economic Growth Prediction

The figure above presents a network visualization generated using VOSviewer software, focusing on the theme Artificial Intelligence for Economic Growth Prediction. The visualization illustrates the interconnections between keywords in research related to artificial intelligence (AI) and economic growth prediction. The visualization is divided into several color-coded clusters, representing themes or groups of closely related concepts.

The Green Cluster focuses on concepts such as accuracy, prediction model, economic growth, and sustainable development. These keywords emphasize the role of AI in providing accurate prediction models to forecast economic growth and promote sustainable development.

The Red Cluster includes terms like opportunity, outcome, future, AI technology, and application. This cluster highlights the potential of AI implementation and its technological advancements in generating substantial economic impacts.

The Blue Cluster features keywords such as market, investment, implication, and policymaker. This reflects the link between AI, economic policies, market dynamics, and investment implications.

The Yellow Cluster contains terms like industry, rapid development, construction, and economic development, underlining the role of AI in industrial sectors and its contribution to accelerating economic growth.

The connecting lines between keywords represent the strength of relationships between concepts, where thicker lines indicate stronger associations. The size of the nodes reflects the frequency of each term's occurrence in the analyzed body of

research. From this visualization, it can be inferred that AI plays a pivotal role in predicting economic growth by delivering accurate and measurable model-based approaches. Keywords like accuracy and prediction model emphasize that AI models provide effective solutions for forecasting economic trends and supporting data-driven decision-making processes. AI also unlocks significant opportunities for application in industries, investments, and economic policy development through rapidly advancing technologies. Furthermore, AI implementation in economic contexts extends beyond technological development to fostering sustainable growth, as highlighted in the green cluster containing sustainable development. The red cluster, with its focus on future, outcome, and application, underscores AI's potential to create new opportunities that drive long-term economic growth. Overall, this network visualization demonstrates that AI significantly contributes to economic advancement by improving efficiency, enhancing prediction accuracy, and optimizing resource allocation. The strong associations between concepts such as industry, market, and economic growth highlight the need for cross-sector collaboration in integrating AI technologies to achieve sustainable economic development.

Based on the interpretation of each cluster, the researcher can formulate several key points as synthesized findings regarding Artificial Intelligence for Economic Growth Prediction, as follows:

a. Artificial Intelligence improve the accuracy of economic growth prediction models

   Artificial Intelligence (AI) enhances the accuracy of economic growth prediction models by utilizing advanced algorithms like machine learning (ML) and deep learning (DL) to analyze complex data. AI improves data analysis by uncovering trends and seasonal patterns that traditional methods may miss and machine learning models, such as neural networks, handle non-linear relationships, leading to better predictions of economic indicators like GDP and inflation (Gupta et al., 2023). AI also excels at processing unstructured datasuch as social media sentiment and news articles, enabling models to adjust dynamically to market shifts (He, 2019). Additionally, AI improves model robustness, addressing non-linearities and adapting to new data, resulting in more reliable forecasts (Bobro, 2024). However, the reliance on large datasets and the risk of overfitting models to historical data highlight the need for a balanced approach, integrating both AI and traditional methods for effective forecasting.

   Artificial Intelligence (AI) significantly enhances economic growth prediction models by improving their accuracy and complexity handling capabilities. AI-integrated macroeconomic models can process vast and diverse datasets, including unstructured data, to uncover intricate patterns and non-linear relationships missed by traditional analyses (Jafarnia et al., 2023). Neural networks have demonstrated satisfactory predictive ability

for GDP growth, outperforming conventional statistical methods (Marecki & Czerniawsk, 2021). AI's capacity to efficiently explore complex knowledge spaces and identify valuable combinations of existing information can accelerate innovation rates, potentially boosting economic growth (Engin & Treleaven, 2019). Furthermore, AI adoption can increase productivity, lower capital prices, and augment wages when complementary to labor. These AI-enhanced models provide more reliable foundations for economic research and policy-making, offering a nuanced understanding of economic dynamics and enabling more effective interventions.

AI significantly enhances economic growth predictions by efficiently analyzing complex, diverse data, addressing limitations of traditional methods. Through ML and DL, AI identifies subtle trends and incorporates unstructured data like social media sentiment, enabling real-time insights aligned with market dynamics. Neural networks outperform traditional models, particularly in GDP predictions, offering actionable insights for policymakers. AI's strengths include precision, adaptability, and capacity for vast data analysis. However, challenges such as computational demands, overfitting risks, and limited model transparency highlight the need for a hybrid approach, integrating AI's analytical power with traditional models for balanced and reliable forecasting.

b. Opportunities Artificial Intelligence offer for driving economic growth and innovation

Artificial Intelligence (AI) offers significant opportunities for driving economic growth and innovation by enhancing productivity, fostering innovation, and enabling global market expansion. AI automates routine tasks, allowing workers to focus on complex projects, which increases productivity, while sectors such as manufacturing and healthcare benefit from optimized supply chains and improved outcomes, leading to cost reductions (Boinapalli, 2020). Predictive analytics powered by AI also improves decision-making, providing a competitive advantage for businesses (Challoumis, 2024). Additionally, AI drives innovation in Small and Medium-sized Enterprises (SMEs) by enabling rapid product development and improved customer engagement, though strategies like government incentives are needed to overcome adoption barriers (Marecki & Czerniawsk, 2021). On a global scale, AI facilitates market expansion through personalized marketing and localized products, particularly enhancing competitiveness in developing economies (Bris et al., 2021). However, challenges such as data privacy, ethical concerns, and job displacement must be addressed to ensure sustainable and responsible AI adoption for maximizing its economic.

Artificial Intelligence (AI) presents significant opportunities for driving economic growth and innovation across various sectors. AI has the potential

to reshape industries, enhance productivity, and catalyze economic expansion (Chaudhary, 2024). As a form of automation, AI can perform tasks previously thought unattainable, from driving cars to making medical recommendations (Bris et al., 2021). AI's capacity to assist in everyday activities, increase productivity, and power shared prosperity offers tremendous potential for economic transformation. However, realizing AI's economic benefits requires purposeful action to address challenges such as job displacement, ethical concerns, and data protection issues. To harness AI's full potential, a collective policy agenda involving developers, deployers, users, policymakers, and workforce trainers is necessary patterns (Damasevicius, 2023). By addressing these challenges and leveraging AI's capabilities, we can work towards sustainable and inclusive economic development in the AI era.

AI transforms economies by enabling productivity gains and innovation. It reallocates human resources to higher-value tasks and facilitates competitiveness, especially for SMEs and in developing economies. AI's ability to process data and adapt dynamically empowers industries to innovate and expand globally. Yet, ethical dilemmas and societal challenges require careful management to ensure inclusive growth.While AI enhances economic efficiency and innovation, its uneven adoption, reliance on large datasets, and ethical risks pose challenges. SMEs and developing economies gain significantly from AI, but policies must address workforce displacement and data misuse. Without balanced implementation, AI's benefits risk deepening existing inequalities.

c. Artificial Intelligence impact market dynamics, investment decisions, and policy-making

The integration of Artificial Intelligence (AI) significantly impacts market dynamics, investment decisions, and policy-making by enhancing efficiency, driving innovation, and reshaping strategies across sectors. In market dynamics, AI optimizes operations through predictive analytics, allowing firms to anticipate trends and consumer behaviors, thereby improving competitiveness, while AI-driven personalization enhances customer engagement and loyalty (Chen, 2024). In investment decisions, AI tools provide data-driven insights for better risk assessment and trading strategies, with applications like high-frequency trading improving market efficiency and responsiveness (Altyar et al., 2023). In policy-making, AI aids in informed decision-making through data-driven insights, though ethical concerns such as biases and transparency require careful regulation (Zelisko et al., 2024). While AI offers significant advantages, challenges such as ethical implications and the need for regulatory frameworks must be addressed to ensure responsible and balanced use.

Artificial Intelligence (AI) is significantly impacting market dynamics, investment decisions, and policy-making. AI technologies can enhance policy-making processes by leveraging decision support, optimization techniques, and data mining (Sugawara & Nikaido, 2021). In finance, AI is transforming investment strategies and risk management, though ethical considerations remain (Iyelolu et al., 2024). Companies more susceptible to AI automation are more likely to engage in aggressive corporate investments, such as mergers and acquisitions, potentially contributing to market concentration (Laub, 1999). The widespread adoption of AI is expected to have profound economic implications, affecting growth, employment, and inequality. It also raises concerns about market competition, consumer privacy, and potential algorithmic biases . As AI continues to evolve, policymakers face new challenges in balancing technological advancement with societal and economic impacts across various sectors.

AI enhances competitiveness by predicting trends and personalizing strategies. In investments, it transforms risk assessment and trading, improving responsiveness. For policy-making, AI supports informed decisions but raises concerns about bias and transparency, highlighting the need for ethical governance. While AI drives efficiency and innovation, challenges such as algorithmic bias, market concentration risks, and privacy concerns persist. Without proper regulations, these issues could undermine competition, fairness, and ethical standards.

## D. CONCLUSIONS AND SUGGESTIONS

In conclusion, AI offers transformative potential for economic growth prediction and industry innovation, demonstrating its ability to process complex datasets, uncover non-linear patterns, and provide dynamic responses to real-time changes. Its integration into economic forecasting and various sectors can enhance productivity, reduce costs, and promote inclusivity. However, challenges such as overfitting, data access, biases, and the need for ethical frameworks remain significant barriers. AI should be viewed as a complementary tool, working alongside traditional methods to create more robust and interpretable models. Furthermore, to realize its full potential, a balanced approach that includes workforce adaptation, policy interventions, and ethical considerations is essential to mitigate risks like job displacement and data misuse.

Despite these advancements, there are critical research gaps that need to be addressed in the future. One major gap is the development of more transparent AI models that ensure interpretability without sacrificing accuracy, particularly in economic forecasting. Additionally, the integration of ethical and regulatory frameworks into AI-driven economic systems requires further exploration to ensure equitable growth and to prevent unintended consequences such as market

concentration and privacy violations. Future research should focus on creating AI models that not only enhance forecasting accuracy but also align with social and ethical standards. Moreover, investigating the role of AI in supporting sustainable economic growth in developing economies remains an urgent topic, as this could address both economic disparities and the risks associated with technological advancements.

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