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THE ROLE OF ARTIFICIAL INTELLIGENCE IN OVERCOMING GLOBAL ECONOMIC UNCERTAINTY

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Abstract

Artificial Intelligence (AI) is rapidly changing the global economic landscape, promising greater operational efficiency, product innovation and solutions to long-term economic challenges. However, the broad impact of this technology on the economy varies widely and raises questions about its future implications for labor, economic equality, and global market competition. The study conducted in this research uses the literature research method. The results show that AI plays a key role in advancing innovation, increasing productivity, and addressing some pressing economic challenges such as energy efficiency and climate change. However, it also identifies significant risks in terms of job displacement, increased inequality, and concentration of market power in the hands of large technology companies.

Keywords: Role, Artificial Intelligence, Global Economic Uncertainty.

Introduction

In recent decades, the world has witnessed rapid developments in the field of artificial intelligence (AI). From industrial process automation to sophisticated data analytics, artificial intelligence has become a driving force for innovation and efficiency in various sectors (Abbar & Mokbel, 2021). Parallel to this technological evolution, the global economy is facing unprecedented challenges. Exacerbated by the unprecedented COVID-19 pandemic, this economic uncertainty is compounded by factors such as trade wars between major economies, geopolitical tensions, climate change, as well as technological revolutions that are changing the landscape of work

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and production (Adediran & Swaray, 2023). Financial markets are experiencing high volatility, while governments and companies are trying to adjust to a new fast-paced and often unpredictable reality. Rapid and adaptive responses are critical in managing the impact of these uncertain conditions, reinforcing the importance of innovation and predictive tools in making strategic decisions to minimize risks and capitalize on opportunities in global economic turbulence (Akintande, 2024).

The ability to predict and manage economic uncertainty is key to recovery and long-term growth. This is where artificial intelligence promises tremendous potential (Apostolakoudis, 2022). AI, with its analytic and predictive capabilities, offers unprecedented tools to analyze, understand and respond to complex global economic dynamics. By utilizing big data and machine learning algorithms, AI can assist in making more accurate market predictions, identifying economic trends, and even anticipating crises before they happen (Aspelund, 2021).

AI refers to the simulation of human intelligence in machines designed to learn, analyze, and make decisions, mimicking human thinking and problem-solving abilities (Bajorath, 2022). From speech recognition and computer vision to robotics and natural language processing, artificial intelligence has permeated various aspects of daily life, changing the way we communicate, work and interact with the world around us. Advancements in this field are driven by increased computational capabilities, the availability of big data, and improved machine learning algorithms, which expand AI's capacity to serve a variety of industrial and societal needs (Balcilar et al., 2021).

Beyond the ability to automate tasks, AI offers untapped potential in predictive analytics and decision-making, revolutionizing sectors from healthcare and finance to transportation and energy. AI provides tools capable of processing and analyzing incredible amounts of data, uncovering patterns and insights previously unreachable by traditional methods (Baum et al., 2022). With its ability to learn from given data and improve itself over time, artificial intelligence then not only carries out instructions but also adapts to new situations, offering highly adaptable and dynamic solutions. In the face of global economic uncertainty, AI marks a transition to a new paradigm, where analytical and predictive capabilities can be harnessed to manage risk and maximize efficiency in ways never before possible (Bobrovska, 2023).

However, the role of artificial intelligence in dealing with global economic uncertainty is not yet fully understood or applied. There is a large body of literature exploring various aspects of AI, but comprehensive reviews linking this technology to global economic uncertainty are limited. The fundamental question of the extent to which AI can be an effective tool in managing economic uncertainty raises the need for in-depth research (Carpio, 2023); (Castro, 2020).

Therefore, this study intends to bridge the gap by investigating how artificial intelligence can be positioned as an important tool in the strategy of managing and mitigating global economic uncertainty. By understanding the potential and limitations

of AI, new approaches can be identified to address the challenges of an increasingly complex global economy. This research will explore the possible applications of AI, from market prediction to strategic decision-making, in an effort to formulate ways in which this technology can aid future economic stabilization and growth.

Research Methods

The study conducted in this research uses the literature research method. The literature research method is a systematic approach to collecting, reviewing, and analyzing written materials relevant to the research topic. (Abdul et al., 2024); (Alfaisal et al., 2024).

Results and Discussion

Concept of Artificial Intelligence

Artificial intelligence (AI) is a scientific discipline and technology field concerned with creating machines capable of performing tasks that require human intelligence. These include learning (the process of acquiring knowledge and rules for using that knowledge), reasoning (using rules to reach approximate or definite conclusions), problem solving, perception, language recognition (understanding human language in various forms), and other cognitive skills (Chaki, 2023d). AI can be grouped into two main categories, namely weak (or narrow) AI, which is designed to perform specialized activities; and strong (or general) AI, which has the ability to perform intellectual tasks in a flexible and adaptive manner like humans (Chaki, 2023a).

Technology in artificial intelligence has received a major boost from advances in machine learning and artificial neural networks. Machine learning, particularly deep learning, has revolutionized many aspects of AI by allowing systems to automatically learn from big data without being explicitly programmed (Chaki, 2023b). Deep learning algorithms use layered structures inspired by the human brain, known as neural networks. These applications have provided significant advances in image processing and speech recognition, becoming the foundation for applications such as intelligent virtual assistants, facial recognition, and automated sentiment analysis. In addition, the development of hardware such as more powerful and AI-specific graphics processing units (GPUs) has increased the speed and efficiency of training complex AI models (Chaki, 2023c).

In AI, various algorithms have been developed to address specific problems, including classification, clustering, and regression algorithms in machine learning. Algorithms such as Random Forest, Support Vector Machines (SVM), and Gradient Boosting are used for prediction and classification tasks, while algorithms such as K-means and DBSCAN are used for clustering (Chaki, 2023e). Other key algorithms include convolutional neural networks (CNNs) which are particularly effective for visual processing tasks such as image recognition, and recurrent neural networks (RNNs),

including variants such as LSTM (Long Short-Term Memory), which excel in natural language processing and tasks that require memory of previous inputs (Cintio et al., 2023). AI also utilizes technologies such as reinforcement learning, where agents learn to make decisions by trying different strategies and learning from the results, its main applications include the development of game systems and automated navigation (Ciuriak & Rodionova, 2021).

Further developments in AI are expected to lead to broader integration and adaptation of AI in various sectors, from healthcare to automotive and education. Technologies such as natural language processing (NLP) and computer vision are expected to become more sophisticated, allowing machines to understand and interact with the world in a more human-like manner (DeCaprio, 2021). In addition, ethical AI and explainable AI (XAI) are becoming a growing focus, where it is important for AI not only to make intelligent decisions but also to be able to explain that decision-making process to human users. Global initiatives aim to develop standards and frameworks that ensure AI develops in a responsible and sustainable way, taking into account privacy, security, and social impact (Dhillan, 2023).

As such, Artificial Intelligence has come a long way from its initial concept to becoming a key technology that defines the modern digital era. With the development of machine learning algorithms and technologies, particularly deep learning, AI is now a key driver of innovation, from improving operational efficiency in the industrial sector to providing personalized experiences to technology users. As a result, AI is not only changing the way we interact with technology but also promises the potential to solve some of the most pressing global challenges. However, with these great capabilities comes a great responsibility to ensure the ethical, transparent, and fair development and application of AI. While the future of AI is full of untapped potential, it will be important for the global community to navigate these challenges together, ensuring that AI brings the greatest possible benefit to humanity.

Global Economic Uncertainty

Global economic uncertainty refers to the unpredictability of future economic conditions that affect the decisions of economic actors around the world. These phenomena typically include variability in economic growth, exchange rate fluctuations, changes in commodity prices, and changes in government policies that can affect international trade conditions and capital flows (Gao, 2023). This uncertainty is often caused by hard-to-predict events, such as political crises, natural disasters, global pandemics, or geopolitical conflicts, all of which can cause financial market and economic volatility. Investors, companies, and policymakers often attempt to forecast global economic conditions, but high uncertainty makes long-term planning challenging (Ghosh, 2013).

The main sources of global economic uncertainty can come from within and outside the economic sector. For example, changes in monetary policy by large central banks, such as the Federal Reserve in the United States or the European Central Bank, can generate uncertainty, especially if the policy changes in a way that is not expected by the market (Ginn, 2023). Financial crises, such as the 2008 global financial crisis, are also a significant source of uncertainty, often leading to tightening credit, corporate bankruptcies and job losses, all of which can ripple throughout the global economy. Beyond economic factors, geopolitical events, such as trade wars or military conflicts, can also trigger uncertainty in global markets, disrupting supply chains and hampering international trade (Holton, 2023).

To mitigate the negative impact of global economic uncertainty, countries and international organizations often use various tools, including flexible monetary and fiscal policies, to stabilize the economy. International collaboration, through forums such as the G20 or the World Trade Organization (WTO), is also important to create regulations and cooperation that can minimize the risk of uncertainty (Hyun & Kim, 2024). However, given the global nature of today's economy, it is almost impossible to completely eliminate uncertainty, making it a permanent element that must be managed and navigated by all stakeholders in the global economic arena (Jung, 2023).

Global economic uncertainty has a wide and diverse impact on economic sectors around the world, causing uncertainty for entrepreneurs, investors and consumers. In the financial sector, for example, this uncertainty can lead to high market volatility, with stock indices swaying and currency values fluctuating dramatically over short periods of time. Such uncertainty can reduce investor confidence and restrict capital flows to markets and sectors deemed risky (Lee & Kim, 2021). In addition, banks may become more cautious in lending, limiting access to capital for small and medium-sized enterprises and discouraging long-term investment. Economic uncertainty can also delay purchasing decisions by consumers and firms, affecting everything from the housing market to major equipment sales and corporate capital expenditures (Leksin, 2020).

In the real sector, the impact is often seen in the form of reduced growth, higher unemployment rates and less favorable trading conditions. For example, in manufacturing and export industries, uncertainty can disrupt supply chains and reduce global demand for goods and services, affecting incomes and employment opportunities (Lele, 2024). Companies may delay or cancel expansion plans, while uncertainty related to trade policies may make it difficult for companies to effectively plan their cross-border operations. The impact on the agricultural sector can also be significant, where uncertainty over global commodity prices can affect decisions regarding production and investment (Ley et al., 2022). For service sectors, such as tourism and hospitality, global economic uncertainty can reduce the number of international tourists, affecting revenues and leading to job cuts. Overall, global

economic uncertainty can create a challenging business environment, pushing organizations and individuals to become more resilient and adaptive (Lobo et al., 2023).

Economic uncertainty also encourages governments and central banks around the world to adopt more conservative risk mitigation policies. These efforts often include tariff cuts, liquidity injection into the financial system, and fiscal stimulus programs to stimulate economic growth. However, the use of these tools must be done carefully to avoid creating asset bubbles or increasing public debt that could worsen the situation in the future (Lohrmann & Luukka, 2022). Entrepreneurs and companies may focus more on diversifying risks, strengthening financial reserves and developing flexible business plans to respond to changing market dynamics. These adaptation strategies include opportunities for innovation and digital transformation, with companies and industries seeking new ways to improve efficiency, reach new markets, and leverage technology to create operational resilience (Lysenko, 2024).

In conclusion, global economic uncertainty substantially affects every sector of the economy, dictating market behavior and forcing economic actors to navigate unstable territory. While it is impossible to eliminate uncertainty factors completely, a deeper understanding of these risks and more sophisticated strategies to manage their impact can enhance the resilience of economic sectors. Appropriate policy adoption, international collaboration, and breakthrough innovations are key factors that can help entities at all levels-from individuals to governments-to not only survive economic uncertainty, but also gain a competitive advantage in the ever-changing global economy.

The role of artificial intelligence in addressing global economic uncertainty

Artificial intelligence (AI) is playing an increasingly important role in addressing various aspects of global economic uncertainty, providing innovative tools and solutions to enable smarter decision-making and responsiveness to changing market conditions (Marino & Stilo, 2023). AI, through big data analytics and machine learning, can assist organizations and financial institutions in identifying unseen patterns, trends and relationships that drive economic dynamics. This allows companies to make more accurate economic forecasts, estimate changes in demand, and respond quickly to shifts in the market, from fluctuations in commodity prices to changes in consumer behavior (Melikidze & Matiashvili, 2022).

In the financial sector, AI provides the ability to improve risk analysis and portfolio management, allowing banks and investors to make more informed investment decisions amid volatile markets. AI algorithms can process and analyze large volumes of market data in real time, better predicting market movements and identifying potential investment opportunities or financial risks that may go unnoticed by human analysis (Miroshnichenko & Proscurina, 2021). Thus, AI helps reduce the impact of uncertainty by facilitating data-driven decision-making và providing

recommendations that can help optimize asset management and risk mitigation strategies.

In the real sector, AI has an important role to play in strengthening supply chains and operations. AI-powered systems can improve supply chain efficiency by monitoring and forecasting product demand, identifying potential disruptions, and optimizing logistics. In manufacturing, AI supports the decision-making process for predictive maintenance of machines and inventory management, reducing downtime and production costs. This not only helps companies better navigate economic uncertainty but also improves operational agility and efficiency in various market scenarios (Monlezun, 2024).

In addition, the application of AI in macroeconomic analysis and research can provide valuable insights for policymakers and economists in formulating strategies that can mitigate the negative impact of economic uncertainty. AI is capable of processing large amounts of complex economic data to generate economic projections, evaluate policy effectiveness, and identify early indicators of changing economic trends (Moore, 2023). As such, AI is becoming an important tool to improve our understanding of the global economy and develop more appropriate policy responses to support economic growth and stability amid global uncertainty.

Challenges and limitations of artificial intelligence in addressing global economic uncertainty

Although Artificial Intelligence (AI) offers various innovative solutions in addressing aspects of economic uncertainty, the limitations of AI algorithms, especially in understanding and reacting to unexpected economic variables, remain an important challenge. One of these key limitations is AI's reliance on historical data for learning and making predictions (Or & Klein, 2023). Since AI learns from past data patterns, its ability to predict or respond to unprecedented events can be severely limited. Unexpected economic situations such as sudden financial crises, drastic government policy changes, or global pandemics, often create conditions that are very different from historical data, making it difficult for AI models to predict outcomes with high accuracy (Özdemir, 2023).

In addition, AI also faces obstacles in reading the socio-political context that affects the economy. Many economic variables are not only influenced by numbers and trends, but also by more difficult-to-quantify factors such as political sentiment, social stability, and changes in government policies (Panwar, 2024). Although advances in natural language processing and sentiment analysis allow AI to derive insights from non-numerical data, algorithms still often fail to understand the full implications of complex political and social events due to the pervasive nuances and context, which often change rapidly and unpredictably (Rashid & Fatima, 2020).

Finally, it is also important to recognize that AI has the potential to amplify biases present in the data used to train it. If the historical data contains biases or does not

represent all possible economic scenarios with equal search, then the predictions and analysis performed by AI may lead to misguided or inefficient decisions (Bajorath, 2022). These inaccuracies not only reduce the effectiveness of AI in responding to unexpected economic variables but can also exacerbate the effects of uncertainty. Therefore, it is important for AI developers and users to critically assess and continuously update their models to better address these limitations (Rathore et al., 2022).

Thus, the role and limitations of Artificial Intelligence (AI) in the context of unpredictable economic variables is that AI provides valuable and innovative tools to address various aspects of economic uncertainty, through advanced data analysis capabilities and learning from historical patterns. AI assists in more informed and responsive decision-making by providing accurate predictions, strengthening operations, and supporting risk management in the financial and real sectors (Rodrigues, 2021). However, reliance on historical data, difficulty in understanding the socio-political context, and potential amplification of biases are key limitations to AI's precision in dealing with unprecedented or rapidly changing economic situations (Sachdev, 2024).

Recognizing that while AI is becoming an important asset in navigating economic uncertainty, it is also important to understand its limitations in responding to complex and unpredictable economic phenomena. This demands a cautious approach in the application of the technology, where human judgment and supervision become key factors to overcome such shortcomings (Sadeghi et al., 2022). Therefore, combining the sophistication of AI technology with human experience, intuition, and knowledge is the best strategy in formulating prudent and responsive economic decisions in the face of future economic uncertainty.

In the use of AI for economic data, ethical and privacy issues are of paramount importance given the sensitivity and enormous impact of such data on individuals and society. The potential for data leakage or misuse of AI can lead to serious privacy issues, including the misuse of personal information without consent leading to manipulation or discrimination (Sakaki, 2020). Therefore, it is critical to implement a strong ethical framework that not only complies with regulations such as GDPR in Europe or CCPA in California but also prioritizes transparency, fairness, and accountability in all data processing. These principles should be integrated into AI systems from the beginning of design to execution to ensure that the use of data is done in an ethical and responsible manner (Sarathamani & Leelavathi, 2024).

Moreover, ensuring safety and privacy in AI requires a collaborative approach between various stakeholders, including policymakers, AI development companies, and the general public. Education on how AI operates, the risks involved, and the rights of individuals is important to build trust and ensure responsible adoption of the technology (Savithri et al., 2023). The need for periodic auditing and testing of AI systems cannot be ignored either, as a way to detect and correct bias, prevent data

leakage, and avoid misuse. Thus, this collaboration not only enhances the credibility and security of AI technologies but also supports efforts to maintain the integrity of economic data and protect the personal rights of users in a broader context (Sharma & Sharma, 2021).

Conclusion

Artificial Intelligence (AI) has an important role to play in addressing global economic uncertainty, especially through its superior analytic and predictive capabilities. AI is able to process and analyze huge volumes of data with great speed and accuracy, allowing companies and economists to gain deep insights into market trends, consumption patterns, and potential risks in real-time. This is invaluable in formulating more informed and strategic economic strategies and decisions, as well as in improving the efficiency and effectiveness of resource management. Furthermore, AI provides the ability to model various economic scenarios and predict the impact of global events, such as pandemics or financial crises, giving institutions and governments the tools to respond more quickly and appropriately to changing economic dynamics.

However, the use of AI in this context also brings challenges, mainly related to limitations in processing unprecedented changes and understanding the nuances of the socio-political context affecting the economy. Therefore, while AI is becoming a key component in navigating global economic uncertainty, its implementation must be done with the understanding that this technology is not a perfect solution. A more holistic approach, combining AI analysis with human insight and macroeconomic considerations, is required to maximize AI's potential in addressing economic uncertainty. This reinforces the importance of collaboration between AI developers, economists, and policymakers in designing systems that are not only sophisticated and accurate but also sensitive to the complexities and uncertainties inherent in the global economy.

The potential impact of Artificial Intelligence (AI) on the future of the global economy is large and multifaceted. AI is expected to drive innovation and efficiency across a wide range of industries, from manufacturing to healthcare, enabling automation that can increase productivity and reduce operational costs. On the other hand, AI has the potential to redefine the global job market through the replacement or transformation of existing jobs, triggering a major shift in the workforce skills required. This will require major efforts in education and retraining to prepare the future workforce. In addition, AI has untapped capacity to address major economic challenges such as poverty, inequality, and climate change, through applications such as big data for real-time monitoring and response to economic, social, and environmental trends. However, its successful implementation requires a solid policy and ethical framework to ensure that the benefits of these AI advancements can be enjoyed widely and equitably

across the world, minimizing risks while maximizing the positive potential to the global economy.

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