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The Role of Artificial Intelligence in Financial Forecasting: A Systematic Literature Review

Peran Kecerdasan Buatan dalam Peramalan Keuangan: Tinjauan Literatur Sistematis

Ahmad Nur Budi Utama[1], Muhammad Hidayat[2]
Universitas Jambi[1], STIE Persada Bunda[2]
*buddieutama@unja.ac.id[1], m.hidayat2901@gmail.com[2]

**Corresponding Author*

ABSTRACT
This research examines the impact of using Artificial Intelligence (AI) in real-time financial forecasting on risk management strategies during the global financial crisis. By using a systematic literature review approach, this research aims to comprehensively evaluate existing literature regarding the application of AI in financial prediction and its impact on risk mitigation. The research process involved collecting data from various academic sources, applying the PRISMA method to ensure the quality and repeatability of the results, and thematic analysis to identify key themes and patterns. The main findings show that AI-enhanced real-time financial forecasting can improve prediction accuracy and speed up responses to financial risks, but it is also faced with challenges such as limited data and the risk of overfitting. This research makes a significant contribution to both academic literature and industry practice by offering guidance for financial institutions in leveraging AI for risk management. Practical implications include investment in technology infrastructure, staff training, and integration of AI with existing risk management systems. It is hoped that this research will enrich understanding of the role of AI in financial forecasting and provide a strong basis for further research in this area.
Keywords: *Artificial Intelligence, forecasting financial real-time,* risk management, global financial crisis, risk mitigation, financial technology.

ABSTRAK
Penelitian ini mengkaji dampak dari penggunaan Artificial Intelligence (AI) dalam forecasting finansial real-time terhadap strategi manajemen risiko selama krisis keuangan global. Dengan menggunakan pendekatan systematic literature review, penelitian ini bertujuan untuk mengevaluasi secara komprehensif literatur yang ada mengenai aplikasi AI dalam prediksi finansial dan dampaknya terhadap mitigasi risiko. Proses penelitian ini melibatkan pengumpulan data dari berbagai sumber akademik, penerapan metode PRISMA untuk menjamin kualitas dan keterulangan hasil, serta analisis tematik untuk mengidentifikasi tema dan pola utama. Temuan utama menunjukkan bahwa AI-enhanced real-time financial forecasting dapat meningkatkan akurasi prediksi dan mempercepat respons terhadap risiko keuangan, namun juga dihadapkan pada tantangan seperti keterbatasan data dan risiko overfitting. Penelitian ini memberikan kontribusi signifikan baik untuk literatur akademis maupun praktik industri dengan menawarkan panduan bagi lembaga keuangan dalam memanfaatkan AI untuk manajemen risiko. Implikasi praktis termasuk investasi dalam infrastruktur teknologi, pelatihan staf, dan integrasi AI dengan sistem manajemen risiko yang ada. Penelitian ini diharapkan dapat memperkaya pemahaman mengenai peran AI dalam forecasting finansial dan memberikan dasar yang kuat untuk penelitian lebih lanjut di bidang ini.
Kata Kunci: Artificial Intelligence, forecasting financial real-time, manajemen risiko, krisis keuangan global, mitigasi risiko, teknologi keuangan.

1. Introduction

The emergence of Artificial Intelligence (AI) technology has significantly changed the financial sector, especially in the realm of financial forecasting. Traditional methods of financial analysis often rely on historical data and linear models, which can limit predictive accuracy and responsiveness to market changes. In contrast, AI technologies, especially machine learning (ML) and deep learning (DL), have demonstrated extraordinary capabilities in processing very large data sets and uncovering complex, non-linear patterns that traditional methods might miss. For example, research by Heaton et al. (2016) discuss how deep learning models can be applied effectively to financial prediction problems, producing better results compared to conventional approaches. This is also supported by Wei et al. (2017) who highlighted the usefulness of stacked autoencoders and long-short term memory networks in improving the accuracy of financial time series predictions.

Furthermore, the integration of AI in financial forecasting is not just a technological advancement; this represents a paradigm shift in the way financial institutions approach risk management. The global financial crisis of 2008 highlighted the inadequacy of traditional forecasting models that failed to provide timely warnings of possible market crashes. In this context, AI's ability to provide real-time analytics becomes invaluable. The transformative impact of AI on financial institutions is further emphasized by Zohuri (2023), who explains the evolution of AI technology and its application in creating more resilient financial systems. This adaptability is especially important in today's volatile markets, where fast response times can effectively reduce risk.

AI's real-time predictive capabilities enable financial institutions to better forecast market fluctuations, stock prices and currency exchange rates. As noted by Kumar et al. (2017), the complexity of financial markets requires sophisticated algorithms that can outperform simple models in terms of prediction accuracy. Additionally, the use of reinforcement learning (RL) in finance, as discussed by Zohuri and Rahmani (2019), illustrates how AI can optimize decision-making processes in trading and risk assessment. AI's ability to continuously analyze incoming data and adjust predictions as needed improves the decision-making framework within financial institutions, making them more agile and responsive to market dynamics. In conclusion, the shift from traditional financial forecasting methods towards AI-based approaches marks a significant evolution in the financial sector. The integration of advanced AI algorithms not only increases the accuracy and speed of predictions but also equips financial institutions with the tools necessary to navigate the complexities of modern markets. As AI continues to develop, its role in financial forecasting and risk management will likely expand, further reinforcing AI's importance in the financial landscape.

Although various studies have examined the use of Artificial Intelligence (AI) in financial predictions, many of them only focus on increasing the accuracy of predictions or the technical capabilities of AI in analyzing financial data. These studies generally highlight the technological advantages of AI compared to traditional predictive models. However, there is a significant gap in the existing literature regarding a deeper understanding of the concrete impacts of the use of AI, particularly in the context of financial risk management during the global crisis. In particular, research linking real-time AI-based predictions and risk management responses during the global financial crisis remains limited. In many cases, research on risk management tends to focus on using historical data to anticipate market fluctuations, but rarely has anyone examined how AI-based prediction models that can process data in real-time help financial institutions respond to high uncertainty and volatility during crises. Financial crises are dynamic, with rapid and often unpredictable market changes, requiring a more adaptive approach.

The lack of research that explicitly highlights the relationship between real-time AI-based financial forecasting and risk mitigation strategies amidst global crisis conditions creates opportunities for further research. Thus, this study aims to fill this gap, by providing a

deeper understanding of how financial institutions can utilize AI in decision making during a crisis, as well as how AI-based predictions can influence faster and more precise risk management responses. This research aims to systematically review the existing literature on the role of Artificial Intelligence (AI) in financial forecasting, with a particular focus on how AI technology, especially in the context of real-time predictions, influenced risk management strategies during the global financial crisis. In an effort to answer the problems that have been identified, this research will analyze various AI approaches used in financial forecasting, including real-time prediction models which are increasingly being adopted by financial institutions. In addition, this research will explore the impact of implementing real-time AI-based predictions on the effectiveness of risk management strategies in highly volatile and uncertain market conditions, as often occurs during periods of financial crises.

This research also aims to identify best practices that have been implemented by financial institutions in utilizing AI to reduce risk during times of crisis, as well as examine the challenges they face in this process. Thus, this study is expected to provide a significant contribution in filling the literature gap regarding the relationship between AI-based forecasting and risk management responses in crisis situations. In addition, this research is also expected to provide practical insights for financial institutions in optimizing the use of AI technology for more effective risk mitigation in the future.

This research has great significance, both from an academic and practical perspective, in the context of utilizing Artificial Intelligence (AI) for financial risk mitigation. From an academic perspective, this research seeks to expand theoretical understanding regarding the role of AI in financial predictions, especially in situations of the global financial crisis. By filling the gap in the literature regarding the impact of real-time AI-based forecasting on risk management strategies, it is hoped that this study can provide a foundation for further research examining the interactions between AI technology and increasingly complex financial systems. The results of this research will also provide new insights that are relevant to the fields of finance and technology, while enriching academic discourse in both disciplines.

From a practical side, this research makes a significant contribution to professionals in the financial sector, especially in terms of applying AI to manage risk more effectively. Amid increasing global market uncertainty, the ability to leverage AI in financial predictions can be a key factor in maintaining financial stability. By understanding how AI can increase accuracy and speed in providing early warnings of potential risks, financial professionals can be more proactive in responding to crises and reducing the negative impacts they cause. Apart from that, this research is also relevant for policy makers, especially in formulating regulations that support the adoption of AI technology in the financial sector, while maintaining the integrity and stability of the financial system as a whole. Thus, this research not only makes a significant academic contribution, but also offers valuable practical implications for various stakeholders in the global financial ecosystem.

In a global financial context that is increasingly dynamic and full of uncertainty, the ability to predict market conditions accurately and in real-time is one of the main challenges for financial institutions. The use of Artificial Intelligence (AI) technology in financial forecasting has shown great potential in increasing the accuracy of predictions and enabling faster responses to market volatility. Despite this, research on the concrete impact of AI in improving risk management strategies during the global financial crisis is still limited. Therefore, this research seeks to answer critical questions regarding how real-time AI-based forecasting can influence risk management strategies in global crisis situations, where time and accuracy are determining factors in the success of risk mitigation. This research question was designed to fill an existing gap in the literature, with the goal of providing a deeper understanding of the role of AI in helping financial institutions respond more effectively during stressful times of crisis. For this reason, the main research questions that will be explored in this study are: "What is

the impact of AI-enhanced real-time financial forecasting on risk management strategies during global financial crises?"

2. Method

2.1. Research Design

This research uses a systematic literature review (SLR) approach as the main method in collecting, evaluating and analyzing relevant literature regarding the use of Artificial Intelligence (AI) in financial forecasting and its impact on risk management during the global financial crisis. The SLR approach was chosen because of its ability to provide a comprehensive and structured analysis of various existing research findings, as well as identifying gaps and future research opportunities. By following a strict and systematic protocol, this research focuses on collecting literature from various scientific sources, including leading international journals indexed by Scopus, to ensure the quality and relevance of the data studied.

The SLR process applied in this study involves several stages, namely identification, selection, critical evaluation, and synthesis of literature appropriate to the research topic. First, literature related to the role of AI in financial forecasting and its impact on risk management in times of crisis is identified using academic databases such as Scopus, Web of Science, and IEEE Xplore. After that, a selection process was carried out based on predetermined inclusion and exclusion criteria, to ensure that only relevant and high quality literature was used in the analysis. Next, a critical evaluation was carried out on each selected article, taking into account the methodology used, main findings, and relevance to the research questions raised.

By using this approach, research is expected to be able to provide a more in-depth and comprehensive contribution to how AI, especially real-time predictions, played a role in influencing risk management strategies during the global financial crisis.

2.2. Systematic Review Protocol

This research follows the method PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) as a guide in carrying out systematic reviews. PRISMA was chosen because its framework has been widely recognized and proven to be effective in ensuring openness, repeatability, and rigor in the systematic process of literature review. By adopting the PRISMA approach, this research ensures that every step from the identification process to literature synthesis is carried out transparently and can be repeated by other researchers, which is important to ensure the validity and reliability of the findings.

The PRISMA protocol applied in this research consists of four main stages: identification, selection, eligibility, and inclusion. In the first stage, the identification process was carried out by collecting scientific articles from various highly reputable academic databases, such as Scopus, Web of Science, and IEEE Xplore. Keywords used in the search included “Artificial Intelligence,” “financial forecasting,” “risk management,” and “global financial crisis” to ensure coverage appropriate to the research focus.

The second stage is the selection process, where the literature that has been collected will be filtered based on predetermined inclusion and exclusion criteria. Inclusion criteria include articles published in peer-reviewed journals, research conducted in the context of finance and the use of AI, as well as studies relevant to the global financial crisis. Meanwhile, exclusion criteria are used to get rid of irrelevant articles, such as studies that do not discuss financial forecasting or do not use an AI approach.

In the third stage, eligibility, the selected articles will be further evaluated to ensure their methodological quality. This process involves assessing the validity of the methodology, the accuracy of the analysis, and the relevance of the findings to the research objectives. Articles that meet these quality standards will proceed to the fourth stage, namely inclusion, where selected literature is analyzed in depth and synthesized to answer the research questions that have been formulated. By applying the PRISMA method, this research ensures that the entire literature review process is carried out in a transparent and structured manner,

so that the results obtained can be trusted, replicated, and provide a significant contribution in the field of AI and financial forecasting.

2.3. Inclusion and Exclusion Criteria

In an effort to ensure the quality and relevance of the literature reviewed, this study established strict inclusion and exclusion criteria to screen articles for inclusion in the systematic review.

2.3.1. Inclusion Criteria: Articles included in this review must meet several specified inclusion criteria. First, the article must be published in a recognized peer-reviewed journal and indexed in a major academic database such as Scopus, Web of Science, or IEEE Xplore. Second, the article must discuss the use of Artificial Intelligence (AI) technology in financial forecasting, with a focus on relevant methods and applications. Third, articles should examine risk management strategies during the global financial crisis, so relevance to the crisis context is an important element in the assessment. These criteria ensure that only literature that is high quality and appropriate to the research topic is included in the analysis.

2.3.2. Exclusion Criteria: Conversely, articles that do not meet the inclusion criteria will be excluded from review. Articles that will be excluded from this review are those that are not relevant to AI-based financial forecasting, or that do not discuss AI technology in the context of risk management. Additionally, studies that focus on non-AI technologies in risk management, such as traditional methods or techniques that do not use AI, will also be excluded. This exclusion criterion aims to avoid including literature that is not in accordance with the research focus, so that the analysis carried out remains focused and relevant to the study objectives.

By establishing clear inclusion and exclusion criteria, this research seeks to maintain the quality and relevance of the data analyzed, and ensure that the results of the systematic review can make a meaningful contribution to understanding the role of AI in financial forecasting and risk management during the global financial crisis.

2.4. Data source

To carry out this systematic review, this study utilized various well-known and internationally recognized academic databases to ensure comprehensive coverage and high quality of the literature. The databases used include:

1. Scopus: This database was selected for its breadth of coverage and reputation for providing access to peer-reviewed journals and leading international conferences in the fields of science and technology. Scopus offers in-depth data on academic publications, including articles, reviews, and conference documents relevant to research topics.
2. Web of Science: This database is known for its high data quality and accuracy, includes verified journals and has had a major impact in various academic fields. Web of Science provides access to various types of scientific literature that can enrich studies on the use of AI in financial forecasting.
3. IEEE Xplore: As one of the leading sources for publications in the fields of technology and engineering, IEEE Xplore provides access to journal articles, conference proceedings, and technical standards related to AI technology and its practical applications in financial forecasting.

In literature searches, relevant keywords are used to ensure that the articles found are in accordance with the research focus. Keywords used include:

- "AI in financial forecasting": To identify literature that discusses the application of AI technology in the financial forecasting process.
- "Real-time financial forecasting": To find studies that emphasize financial forecasting carried out in real-time, as well as its application in fast decision making.
- "AI and risk management": To look for articles that examine how AI plays a role in risk management strategies, especially in the context of forecasting.

- "Financial crisis and AI forecasting": To find literature that discusses the application of AI-based forecasting during the global financial crisis, and how AI can influence risk management strategies in that situation.

By using relevant databases and specific search keywords, this research aims to collect appropriate and high-quality literature, which will provide a strong basis for analysis and synthesis in this study. This approach ensures that the results of a systematic review reflect a deep and comprehensive understanding of the topic under study.

2.5. Study Selection Process

The study selection process in this research consists of several critical stages to ensure that the articles included in the analysis meet the established criteria. This screening stage is carried out in stages, starting from initial identification to final evaluation, with the aim of ensuring the quality and relevance of the literature reviewed.

1. Filtering Based on Title and Abstract:

In the initial stage, articles identified through database searches will be filtered based on title and abstract. This process involves an initial assessment to determine whether the article meets the established inclusion criteria. Articles whose title and abstract demonstrate relevance to the topics “AI in financial forecasting” and “risk management strategies during the global financial crisis” will be considered for the next stage. Articles that clearly do not meet these criteria, such as those that discuss topics outside the research focus or are not relevant to AI, will be excluded at this stage.

2. Filtering Based on Full Text:

Articles that pass title and abstract screening will be forwarded to the full text screening stage. At this stage, the article will be evaluated in more depth to ensure that the methodology, findings and discussion meet the inclusion criteria. This process involves a thorough reading of the full text to assess the quality of the methodology, relevance of the analysis, and contribution to understanding of the use of AI in forecasting and risk management. Articles that meet these criteria, including those that discuss real-time forecasting and its impact during the financial crisis, will be included in the final analysis.

3. Use of Tools for Reference Management:

To manage and filter articles efficiently, This research uses reference management software SEPErti Mendeley. Tool bThis tool facilitates reference organization, stores article metadata, and groups literature based on relevant categories. These features enable researchers to sort and prioritize articles based on relevance and quality, as well as facilitate search and quick access to necessary documents. By using reference management software, the study selection process can be carried out in a systematic and organized manner, ensuring that the literature selected is the most relevant and of the highest quality.

By following a structured selection process and using reference management tools, this research aims to ensure that only the most relevant and high-quality literature is included in the analysis, so that the results of the systematic review can provide accurate and useful insights into the role of AI in financial forecasting and risk management strategies during the global financial crisis.

2.6. Data Analysis Methods

To analyze the data obtained from this literature review, approach thematic analysis applied to identify the main themes and patterns that emerge from the analyzed literature. Thematic analysis is a qualitative analysis method that allows researchers to identify, analyze, and report key patterns in data, and to understand how these themes relate to research questions.

1. Thematic Coding Process:

The thematic analysis method starts with thematic coding, ofit's a systematic process for classifying articles and relevant data based on key topics emerging from the literature. This coding involves several key steps:

- Identify Initial Themes: During this stage, the researcher read and reviewed each article carefully to identify initial themes that emerged. These themes can cover various aspects, such as the impact of AI in real-time forecasting, risk management approaches implemented, and responses to global crises.
- Data Encoding: Data from selected articles were coded using labels or categories appropriate to the identified themes. This coding process makes it easier for researchers to group relevant information and organize data into categories that can be analyzed further.
- Category Development: After initial coding, emerging themes and categories were analyzed to develop more detailed and interrelated categories. For example, key themes such as “real-time impact of AI” and “risk management strategies” will be broken down into more specific sub-themes based on findings in the literature.
- Synthesis and Interpretation: The coded data was then synthesized to understand how the main themes relate to each other and to the research questions. This process involves interpreting emerging patterns and how these themes provide insight into the use of AI of financial forecasting and risk management during the global financial crisis.

2. Use of Tools in Analysis:

To facilitate the process of coding and data analysis, qualitative analysis tools such as NVivo can be used. These tools enable researchers to organize and manage qualitative data efficiently, and provide features to assist in coding and synthesis of themes. The use of this tool speeds up the analysis process and increases accuracy in identifying and classifying main themes.

By applying a thematic analysis and thematic coding approach, this research aims to provide an in-depth understanding of how AI influences financial forecasting and risk management, as well as how these strategies were implemented during the global financial crisis. This approach ensures that the analysis performed not only presents comprehensive results but also offers relevant and practical insights for various stakeholders in the financial sector.

3. Results

3.1. Key Findings

In the literature analysis that has been carried out, a number of main findings regarding the impact of real-time AI-based financial forecasting on risk management during the global crisis have been identified. These findings provide an in-depth look at how AI influences financial predictions and risk management responses in the context of crisis situations.

First, most studies show that real-time AI-based forecasting significantly improves the accuracy of financial risk predictions. AI technology is capable of analyzing large amounts of data at very high speeds, enabling predictive models to produce more accurate and up-to-date information. For example, AI can process market data in real-time to identify patterns that may indicate a potential crisis or profound change in market conditions. The result is a model that is more responsive to market fluctuations and able to provide early warning of possible risks.

Second, AI in financial forecasting also allows for faster and more precise responses in crisis situations. During a financial crisis, response time becomes a crucial factor in managing risk. AI not only provides more accurate predictions but also speeds up the decision-making process. With its ability to analyze data in real-time and provide in-depth analysis, AI enables decision makers to respond quickly to changing market conditions and to adjust risk mitigation strategies in a timely manner. This is especially important in crisis situations, where rapid strategy adjustments can reduce negative impacts and increase financial stability.

Apart from that, AI also plays a role in increasing the effectiveness of risk management strategies. By providing more accurate predictions and more comprehensive analysis, AI helps companies and financial institutions design and implement more effective risk mitigation strategies. The studies analyzed show that AI can identify potential risks that traditional methods may miss, providing additional insights useful for planning and implementing risk mitigation strategies.

However, it is important to note that while AI offers many benefits in financial forecasting and risk management, there are challenges and limitations that need to be overcome. Several studies note that reliance on incomplete data or bias in the data can affect the accuracy of AI predictions. Additionally, implementing AI technology requires significant investment and careful management to ensure its effectiveness.

Overall, the key findings from this literature underscore the critical role of AI in improving prediction accuracy and risk management responses during the global financial crisis. AI technology not only speeds up the forecasting process but also provides deeper analysis, enabling faster and more precise responses in stressful situations. These findings highlight the enormous potential of AI in improving risk management practices and strengthening the global financial system in the face of crisis challenges.

3.2. Challenges and Limitations

Although the potential benefits of AI in financial forecasting during the global crisis have been identified, the implementation of this technology is not free from challenges and limitations. Some of the main problems faced include limited data, complexity of AI models, and the risk of overfitting, which can affect the effectiveness and accuracy of AI-based forecasting models.

First, data limitations are one of the significant challenges in implementing AI for financial forecasting. The quality of the data used to train AI models greatly influences the prediction results. Incomplete, inaccurate, or distorted data can produce less reliable output. During a financial crisis, the availability of relevant and up-to-date data may be limited, and existing data is often not deep enough to capture the full dynamics of rapidly changing markets. This can cause difficulties in developing AI models that can provide accurate and useful predictions.

Second, the complexity of AI models is another challenge in its application for financial forecasting. AI models, especially those using machine learning and deep learning techniques, are often very complex and require deep understanding and regular maintenance. This complexity can make implementing and managing the model difficult, especially for financial institutions that may not have sufficient technical resources. Additionally, interpreting results from complex models can be challenging, hindering decision makers' ability to understand and effectively utilize AI predictions.

The risk of overfitting is also an important problem in the context of AI-based forecasting. Overfitting occurs when an AI model overfits the training data, reducing its ability to accurately predict new data. In crisis situations, where market data can fluctuate extremely, the risk of overfitting can be greater. Models that over-adapt to historical data patterns may be unable to capture new dynamics or profound changes in market conditions, resulting in inaccurate predictions and less effective risk mitigation strategies.

In addition to technical challenges, there are also limitations in the existing literature. Many existing studies tend to be theoretical or simulation-based, with a lack of empirical research directly observing the use of AI during specific major financial crises. More concrete empirical research on how AI functions in real crisis situations is still limited, making it difficult to generalize the findings from these studies to a broader context. These limitations indicate the need for further research that can provide empirical insight into the effectiveness of AI in different crisis situations.

Overall, while AI has great potential to improve financial forecasting and risk management during a crisis, these challenges and limitations must be overcome to maximize the benefits of this technology. Further research is needed to address data gaps, simplify model complexity, reduce the risk of overfitting, and expand understanding of AI applications in real crisis situations.

4. Discussions

4.1. Interpretation of Findings

In this discussion, we will interpret the findings regarding the impact of real-time AI-based financial forecasting on risk management strategies during the global financial crisis. This research question aims to explore how AI technology in forecasting can influence risk management, especially in the context of a complex and dynamic global crisis.

The findings of this study indicate that Real-time financial forecasting enhanced with Artificial Intelligence (AI) technology has emerged as an important tool in improving risk management capabilities, especially during the financial crisis. One of the most significant impacts of AI in this context is its ability to improve the accuracy of risk predictions. AI-driven models can analyze massive amounts of real-time market data at a speed and depth that far surpasses traditional forecasting methods. This capability enables earlier and more precise risk identification, which is especially important in environments characterized by high uncertainty, such as during the global financial crisis (Jain, 2023; Zakaria, 2023). AI's ability to process and analyze data from multiple sources enables decision makers to make informed adjustments to risk mitigation strategies, thereby increasing the overall responsiveness of financial institutions to emerging threats. Additionally, AI technology plays a critical role in reducing the uncertainty that often accompanies risk forecasting in volatile market conditions. By leveraging machine learning algorithms, AI can synthesize complex data sets, producing more comprehensive and timely analysis. This comprehensive approach allows risk managers to anticipate potential problems more effectively and develop proactive mitigation strategies (Li, 2020). For example, during a financial crisis, the stability of financial institutions may be threatened by market uncertainty; AI can mitigate these risks by providing adaptive forecasting models that respond quickly to changing market dynamics (Chen et al., 2023).

In addition to increasing accuracy and reducing uncertainty, AI-enhanced forecasting significantly increases the speed and effectiveness of the decision-making process. Financial institutions equipped with AI capabilities can respond quickly to market fluctuations, thereby minimizing the negative impact of a crisis. The implementation of AI-based predictions enables faster adjustments to risk mitigation strategies, which is important for maintaining the resilience of the financial system amidst extreme fluctuations (Kamruzzaman et al., 2022). The ability to process real-time data allows institutions to act decisively, ensuring they can navigate crises with greater agility (Jain, 2023).

However, it is important to acknowledge the limitations and challenges associated with AI in financial forecasting. The effectiveness of an AI model depends largely on the quality of the data analyzed. Poor data quality can lead to inaccurate predictions and potentially exacerbate risks rather than reduce them (Li, 2020). Additionally, there is a risk of overfitting in AI models, where the model becomes overfitted to historical data and fails to generalize to new, yet unseen data (Zakaria, 2023). Therefore, although AI offers substantial benefits in improving forecasting and risk management, its success depends on the quality of the data and a deep understanding of the underlying models. In conclusion, AI-enhanced real-time financial forecasting has had a profound impact on risk management strategies during the global crisis. By increasing the accuracy and speed of predictions, reducing uncertainty, and increasing the responsiveness of decision making, AI has proven to be a valuable asset in strengthening risk mitigation strategies. Nonetheless, successful AI applications in this domain depend on data

quality and careful forecasting model design, highlighting the need for continued research and development in this area.

4.2. Practical Implications

The findings from this research have significant implications for risk management practitioners and financial institutions, especially in the context of using AI for real-time financial forecasting during the global crisis. Artificial Intelligence (AI) technology has emerged as a transformative force in the financial sector, especially in improving risk management strategies and strengthening the resilience of the global financial system. The integration of AI in financial forecasting provides a variety of practical benefits that can significantly improve decision-making processes, design more effective risk mitigation strategies, and increase the overall resilience of financial institutions.

4.2.1. Improved Decision Making

Real-time financial forecasting driven by AI enables risk management practitioners to make informed and timely decisions. By leveraging the latest data and advanced analytical tools, financial institutions can respond to crisis situations more swiftly. For example, during an economic downturn, the ability to monitor market fluctuations in real-time allows institutions to quickly identify emerging risks and adjust their strategies as needed. The shift from reliance on historical data to real-time analytics not only accelerates decision making but also increases prediction accuracy, as evidenced by the findings of Hajj (2023) discussing the significant impact of AI on trading and risk management. Furthermore, Kureljusic and Karger (2023) highlight the value of AI in financial forecasting, emphasizing its role in improving the decision-making process in financial accounting.

4.2.2. Designing More Effective Risk Mitigation Strategies

AI facilitates the creation of risk mitigation strategies that are data-based and tailored to current market conditions. With sophisticated predictive models, financial institutions can design specific interventions that address the unique challenges posed by volatile market dynamics. For example, portfolio diversification and hedging strategies can be optimized based on AI-generated predictions, thereby reducing potential losses during market volatility (Zakaria, 2023). Zakaria's (2023) comprehensive analysis underscores the transformative effect of AI on financial management, especially in risk management, where AI helps detect patterns and anomalies that may be invisible to human analysts. Additionally, Ranković (2023) discusses the opportunities and challenges facing AI in finance, emphasizing its potential to revolutionize risk management practices.

4.2.3. Increasing Financial System Resilience

AI contributes significantly to the resilience of the global financial system by providing early warnings of potential crises and emerging risks. Implementation of AI-based forecasting systems strengthens risk management frameworks at both institutional and systemic levels, supporting greater financial stability (Sezer et al., 2020). This proactive approach allows financial institutions to prepare for and respond to potential disruptions more effectively. A systematic review by Sezer et al. (2020) shows how the application of AI in financial time series forecasting can improve predictive capabilities, thereby supporting financial system resilience. Additionally, AI's ability to analyze large amounts of data is essential for making informed decisions in real-time (Zianko, 2023).

4.2.4. Integration and Training

To harness the full potential of AI, financial institutions must ensure that this technology is seamlessly integrated into existing risk management systems. This requires comprehensive training for staff to effectively interpret the insights generated by AI. As noted by Meske et al. (2020), successful AI implementation requires not only technology investment but also a commitment to developing the necessary skills among personnel. The importance of training in the use of AI is emphasized in the work of Adams et al. (2021), which highlights the need for organizations to adapt to new technologies to improve their forecasting capabilities.

4.2.5. Ethical and Regulatory Considerations

The application of AI in financial forecasting also raises ethical and regulatory concerns that must be addressed. Financial institutions are tasked with ensuring that their use of AI is complianti ethical standards and relevant regulations. Transparency in AI-based decision-making processes and strict data protection measures are important for building trust and accountability (Yazdani, 2023). The ethical implications of AI highlight the need to maintain high ethical standards in the application of AI to increase consumer trust and acceptance (Yazdani, 2023). Additionally, Cath et al. (2017) highlight the broader societal implications of AI, advocating a comprehensive approach to addressing the ethical challenges posed by AI technologies. In conclusion, AI-enhanced real-time financial forecasting offers a valuable tool for risk management practitioners and financial institutions, especially in navigating the complexities of the global financial landscape. When applied effectively, AI can significantly improve decision-making, design tailored risk mitigation strategies, and strengthen the overall resilience of financial systems, making it a critical component in modern risk management strategies.

5. Conclusion

5.1. Summary of Findings

In this research, a systematic review of the literature has been carried out discussing the role of Artificial Intelligence (AI) in real-time financial forecasting and its impact on risk management strategies during the global financial crisis. Based on the analysis of existing literature, several main findings can be summarized as follows:

1. Improved Prediction Accuracy: The main findings show that AI, especially in the form of real-time based forecasting models, significantly improves the accuracy of financial risk predictions. AI technology can analyze market data in real time at a speed and depth that far surpasses traditional methods, enabling earlier and more precise risk identification.
2. Uncertainty Reduction: AI plays a role in reducing the uncertainty that often accompanies risk forecasting during crisis situations. With the ability to process data from multiple sources and provide more comprehensive analysis, AI helps risk managers to better predict potential problems and develop more proactive mitigation strategies.
3. Faster and Effective Response: The implementation of AI in forecasting allows financial institutions to respond to market changes more quickly and effectively. Real-time AI prediction models enable institutions to quickly adjust risk mitigation strategies, reducing the negative impact of the crisis and increasing the resilience of the financial system.
4. Challenges and Limitations: Although AI offers various benefits, this research also identified several challenges and limitations, such as limited data, model complexity, and the risk of overfitting. These limitations can affect the effectiveness of AI-based forecasting models and require attention as well further research to overcome these problems.

Overall, this research confirms that AI-enhanced real-time financial forecasting had a significant impact in improving risk management strategies during the global financial crisis. By leveraging this technology, financial institutions can improve forecast accuracy, reduce uncertainty, and improve response to risk, thereby contributing to greater stability of the global financial system. However, data-related challenges, model complexity, and the risk of overfitting must be taken into account to maximize the benefits of this technology.

5.2. Research Contribution

This research makes a significant contribution from both an academic and practical perspective to the existing literature on the use of Artificial Intelligence (AI) in real-time financial forecasting and risk management during the global financial crisis. The following is an explanation of the main contributions of this research:

1. Development of Academic Literature

This research extends the existing literature by providing an in-depth systematic review of the role of AI in financial forecasting. By identifying and analyzing various related studies, this research fills existing knowledge gaps regarding how AI technology can improve the accuracy of predictions and responses to financial risks in global crisis situations. Additionally, this research provides new insights into the challenges and limitations faced by AI technologies in this context, as well as how these problems can be overcome in the future.

2. Addition of Theoretical Knowledge:

The findings from this research add to theoretical understanding of the mechanisms behind AI-enhanced forecasting and its impact on risk management strategies. By integrating related theories with the practice of real-time forecasting and risk management, this research offers a more comprehensive framework for understanding how AI can be applied effectively in the context of a financial crisis.

3. Practical Implications for Financial Institutions

From a practical perspective, this research provides valuable guidance for financial institutions and risk management practitioners on how to leverage AI technology to improve their risk mitigation strategies. By highlighting the benefits and challenges associated with applying AI in financial forecasting, this research helps practitioners in designing and implementing more adaptive and responsive risk management systems. This information is important to help financial institutions face the crisis with more effective and data-based strategies.

4. Guide to Technology and Policy Development

This research also contributes to technology and policy development by showing how AI can be integrated in risk management systems to increase the resilience of the global financial system. These findings can be used by policymakers and technology developers to design better solutions and policies that support the application of AI technology in the financial sector, taking into account aspects such as transparency, ethics and regulation.

5. Future Research Directions

This research opens up new directions for further research in the field of AI and financial forecasting. By identifying existing limitations and challenges to be overcome, this research encourages future studies to explore innovative solutions and new methodologies in the application of AI. This includes studies that could develop more advanced AI techniques and better methodologies to address problems faced during the financial crisis.

Overall, this research offers a meaningful contribution to expanding academic knowledge and provides practical guidance for the use of AI in real-time financial forecasting. By providing in-depth insight into the benefits, challenges, and implications of this technology, this research enriches the existing literature and provides a strong foundation for further development in this field.

5.3. Practical Advice

Based on the findings of this research, several practical recommendations can be proposed for the financial industry in adopting and implementing Artificial Intelligence (AI) to improve financial predictions and risk mitigation during the global crisis. First, financial institutions must make significant investments in technology infrastructure to support AI deployment. This includes purchasing the necessary hardware and software, as well as increasing data storage and processing capacity. A strong infrastructure will ensure that

AI-based forecasting systems can function optimally and handle the large data volumes required for real-time analysis.

Second, it is important for financial institutions to provide training and skills development for their staff in the use and interpretation of results from AI technologies. This training should include an understanding of AI algorithms, data analysis techniques, and forecasting methodologies. With sufficient skills, staff will be better able to utilize AI technology to make better and faster decisions.

Third, financial institutions need to develop adaptive and flexible AI models that can adapt to rapidly changing market conditions. Models designed to adapt to changes in data and market conditions will be more effective in providing accurate predictions during a crisis. This includes implementing machine learning techniques that can automatically update models based on new data.

Fourth, the integration of AI technology with existing risk management systems must be carried out carefully to ensure that both systems can function in harmony. Financial institutions need to develop processes and procedures that ensure that results from AI models can be integrated with existing risk mitigation strategies and translated into concrete actions.

Fifth, good data management is key to the success of AI models. Financial institutions must implement best practices in data collection, storage, and processing to ensure the quality and integrity of data used in forecasting models. This includes ensuring that the data used is clean, relevant, and free from bias that could affect the accuracy of predictions.

Sixth, in implementing AI technology, financial institutions must pay attention to applicable ethical standards and regulations. Transparency in AI-based algorithms and decisions, as well as strict data protection, must be a priority to avoid ethical and legal violations. Financial institutions must ensure that the use of AI complies with applicable regulations and that decisions taken based on AI results can be justified.

Lastly, financial institutions should regularly evaluate the performance of AI models and make necessary adjustments to improve their accuracy and effectiveness. Regular evaluation and model updates will ensure that AI technology remains relevant and effective in dealing with new challenges that may arise during a crisis. By implementing these recommendations, financial institutions can optimally utilize AI technology to improve financial predictions and risk mitigation strategies, especially in global crisis situations, helping them better cope with uncertainty and increase the resilience of their financial systems to unexpected risks.

6. References

Adams, P., Adrian, T., Boyarchenko, N., & Giannone, D. (2021). Forecasting macroeconomic risks. International Journal of Forecasting, 37(3), 1173-1191. https://doi.org/10.1016/j.ijforecast.2021.01.003

Cath, C., Wachter, S., Mittelstadt, B., Taddeo, M., & Floridi, L. (2017). Artificial intelligence and the ‘good society’: the us, eu, and uk approach. Science and Engineering Ethics. https://doi.org/10.1007/s11948-017-9901-7

Chen, B., Wu, Z., & Zhao, R. (2023). From fiction to fact: the growing role of generative ai in business and finance. Journal of Chinese Economic and Business Studies, 21(4), 471-496. https://doi.org/10.1080/14765284.2023.2245279

Hajj, M. (2023). Unveiling the influence of artificial intelligence and machine learning on financial markets: a comprehensive analysis of ai applications in trading, risk management, and financial operations. Journal of Risk and Financial Management, 16(10), 434. https://doi.org/10.3390/jrfm16100434

Heaton, J., Polson, N., & Witte, J. (2016). Deep learning for finance: deep portfolios. Applied Stochastic Models in Business and Industry, 33(1), 3-12. https://doi.org/10.1002/asmb.2209

Jain, R. (2023). Role of artificial intelligence in banking and finance. Journal of Management and Science, 13(3), 1-4. https://doi.org/10.26524/jms.13.27

Kamruzzaman, M., Alruwaili, O., & Aldaghmani, D. (2022). Measuring systemic and systematic risk in the financial markets using artificial intelligence. Expert Systems, 41(5). https://doi.org/10.1111/exsy.12971

Kumar, D., Taylor, G., & Wong, A. (2017). Opening the black box of financial ai with clear-trade: a class-enhanced attentive response approach for explaining and visualizing deep learning-driven stock market prediction. Journal of Computational Vision and Imaging Systems, 3(1). https://doi.org/10.15353/vsnl.v3i1.166

Kureljusic, M. and Karger, E. (2023). Forecasting in financial accounting with artificial intelligence – a systematic literature review and future research agenda. Journal of Applied Accounting Research, 25(1), 81-104. https://doi.org/10.1108/jaar-06-2022-0146

Li, W. (2020). Financial crisis warning of financial robot based on artificial intelligence. Revue D Intelligence Artificielle, 34(5), 553-561. https://doi.org/10.18280/ria.340504

Meske, C., Bunde, E., Schneider, J., & Gersch, M. (2020). Explainable artificial intelligence: objectives, stakeholders, and future research opportunities. Information Systems Management, 39(1), 53-63. https://doi.org/10.1080/10580530.2020.1849465

Ranković, M. (2023). Artificial intelligence and the evolution of finance: opportunities, challenges and ethical considerations. Edtech Journal, 3(1), 20-23. https://doi.org/10.18485/edtech.2023.3.1.2

Sezer, Ö., Gudelek, M., & Özbayoğlu, A. (2020). Financial time series forecasting with deep learning : a systematic literature review: 2005–2019. Applied Soft Computing, 90, 106181. https://doi.org/10.1016/j.asoc.2020.106181

Wei, B., Yue, J., & Rao, Y. (2017). A deep learning framework for financial time series using stacked autoencoders and long-short term memory. Plos One, 12(7), e0180944. https://doi.org/10.1371/journal.pone.0180944

Yazdani, A. (2023). The impact of ai on trends, design, and consumer behavior. aitechbesosci, 1(4), 4-10. https://doi.org/10.61838/kman.aitech.1.4.2

Zakaria, S. (2023). Has the world of finance changed? a review of the influence of artificial intelligence on financial management studies. Information Management and Business Review, 15(4(SI)I), 420-432. https://doi.org/10.22610/imbr.v15i4(si)i.3617

Zianko, V. (2023). Artificial intelligence in the financial sector of ukraine: a driver of development and a factor of modernization. Innovation and Sustainability, (3), 6-21. https://doi.org/10.31649/ins.2023.3.6.21

Zohuri, B. (2023). The evolution of artificial intelligence: from supervised to semi-supervised and ultimately unsupervised technology trends. Current Trends in Eng Sc, 3(5), 1-4. https://doi.org/10.54026/ctes/1040

Zohuri, B. and Rahmani, F. (2019). Artificial intelligence driven resiliency with machine learning and deep learning components. Journal of Communication and Computer, 15(1). https://doi.org/10.17265/1548-7709/2019.01.001