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The Role of Artificial Intelligence in Improving the Efficiency of Financial Risk Management

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ABSTRACT

Artificial Intelligence (AI) has revolutionized the financial sector by offering sophisticated solutions for financial risk management. This article discusses how AI helps companies improve efficiency in identifying, managing, and minimizing risks in the financial sector, including market, credit, and operational risks. With algorithms such as machine learning, natural language processing, and neural networks, AI can process big data quickly, provide accurate analysis, and support strategic decision-making. Despite challenges such as data security and context understanding, the benefits of AI go far beyond these barriers, making it an essential innovation in the digital age. This research highlights the importance of AI integration to create a more secure, efficient, and competitive financial system.
Keywords: Artificial Intelligence, financial risk management, efficiency

INTRODUCTION

The challenges faced by the corporate world in the financial sector today are very complex, ranging from the need for increased efficiency and accuracy in financial recording and reporting, to the demand for more in-depth and rapid data analysis. Technological advancements, especially in the field of Artificial Intelligence (AI), have provided several potential solutions to overcome the challenges of this digitized era. With the ability to automate routine tasks and provide more sophisticated analytics, AI has the potential to significantly change the financial landscape. The existence of this change is based on a few key elements. First, the volume of financial data that companies must process is growing, demanding more efficient processes. Secondly, changing and increasingly complex regulations demand a high level of compliance, where AI can assist in monitoring and adjusting financial systems in real-time according to the latest regulations, and can prevent fraud. Third, intense business competition requires fast and accurate financial reports and predictive analysis as a basis for strategic decision-making.

Artificial intelligence is a term used to describe the replication of human intelligence in the form of programmed instruments that can perform activities similar to humans. (Sulistyowati et al., 2023) This technology involves computational methods that create artificial intelligence. Another definition states that artificial intelligence is a computer method that is capable of performing tasks normally performed by humans automatically. This is related to the ability to perform

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intelligent actions that are automated. artificial intelligence can be interpreted as the implementation of human intelligence in a scientific method pattern that involves gathering information and making decisions with an approach that is almost the same as humans, but through the medium of machines or computers.(Sulistyowati et al., 2023), AI which has grown rapidly can be used as a medium to relieve various business sectors, including in the financial or banking sector. According to Banking Law Number 10 of 1998, it explains that "Banking is something related to banks, including institutions, business activities as well as methods and procedures in carrying out their operational activities. The first design of activities in banking was carried out through off line face to face. However, this matter is considered ineffective and efficient, requiring a long time, operational effectiveness and safety. Thus, at the time of the industrial revolution, AI contributed as a key factor in the development of AI.

Financial risk management is one of the critical aspects of business and investment activities. Market uncertainty, price fluctuations, operational risks and regulatory changes are some of the factors that can negatively impact the financial performance of a company or financial entity. Therefore, it is important to develop innovations that can help reduce financial risks and increase the resilience of companies amidst the growing challenges. The existence of artificial intelligence has provided new opportunities to address the complex challenges associated with financial risk management, financial risk is also one of the crucial aspects in the operations of financial institutions. The risks faced can vary, ranging from market risk, credit risk, to operational risk. In the face of these challenges, traditional methods are often inadequate to handle the growing complexity and volume of data. Therefore, many institutions are turning to more advanced technologies, such as AI, to improve the efficiency and effectiveness of risk management. These types of risks are common in the industrial sector, they can be identified early and controlled to avoid unexpected problems.(Susilawati et al., 2023)

AI offers faster and more accurate data analysis capabilities compared to traditional methods. By using machine learning algorithms and big data analysis, financial institutions can identify patterns and trends that were previously difficult to see. This allows them to make more informed decisions and be responsive to market changes. This research aims to explore the role of AI in improving the efficiency of financial risk management and identify specific applications that have shown significant results. In this context, it is important to understand how AI can be applied in various aspects of financial risk management. As such, this research will not only highlight the benefits of AI, but also the challenges that may be faced in its application. Through a better understanding of the role of AI, financial institutions can leverage this technology to improve their competitiveness and operational sustainability.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Existing literature shows that AI has an important role in optimizing financial risk management and has been widely used in financial risk management. The use of artificial intelligence (AI) has brought about a revolution in various aspects of human

life in recent years, and finance is no exception. AI technology is able to process data quickly, make accurate predictions, and automate processes that were previously time-consuming (Tiwari, 2023). Maintaining a balance between technological innovation and regulatory compliance is important and needs to be addressed by financial companies today (Lee, 2020) There are several previous studies that discuss the integration of artificial intelligence (AI) in business. AI has a significant impact in business process management (BPM) to improve performance, innovation, and operational efficiency (Ardiansyah et al., 2021).

Risk is a system process of identifying, analyzing, and responding to risks that can affect the success of an organization or project. The main objective of risk management is to minimize the negative impact of undesirable events and maximize opportunities that can support the achievement of organizational goals. The process begins with risk identification, where various potential threats to the organization's operations and sustainability are identified in detail. These risks can be internal, such as human error or system failure, or external, such as market changes or natural disasters.(Santana et al., 2023) Once the risks are identified, the next stage is risk analysis, where each risk is evaluated based on its likelihood of occurrence and impact on the organization. This analysis helps in risk prioritization so that the organization can focus on the most critical risks. The next stage is to plan the risk response, which includes developing strategies to avoid, reduce, transfer or accept the risk. Avoidance strategies aim to eliminate the risk completely, while reduction strategies focus on measures to reduce the likelihood or impact of the risk. Risk transfer, for example through insurance, shifts the burden of risk to a third party, while risk acceptance means the organization decides to accept and manage the risk.(Fikra Terisha Azzikra et al., 2023)

In this journal, we will analyze and discuss various case studies, research, and best practices related to the application of artificial intelligence in improving the efficiency of financial risk management. We will also describe various artificial intelligence techniques and methods that can be used in this context. It is hoped that this journal will provide valuable insights for finance professionals, academics, and practitioners interested in the application of artificial intelligence as an innovation in managing financial risk in the digital era.

METHODS

The research approach used in this research is descriptive qualitative, which is an approach that emphasizes the aspect of in-depth understanding of a problem. The method used in this research is literature analysis, in which the author collects and analyzes data from various sources, including academic journals, industry reports, and case studies. The data collection process was carried out by searching for relevant articles through academic databases such as Google Scholar, JSTOR, and ScienceDirect. Article selection criteria included relevance to the topic, year of publication, and quality of research methodology.

After collecting the data, analysis was conducted by identifying patterns and trends that emerged from the application of AI in financial risk management. This

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research also compares results from various studies to evaluate the effectiveness of AI application in various contexts. Furthermore, the author will summarize the key findings and provide recommendations based on the analysis.

The analysis is conducted using qualitative methods to understand the impact of AI implementation in financial risk management. In addition, the author will also use quantitative data available in industry reports to support the resulting arguments and findings. With this approach, this research aims to provide a comprehensive picture of the role of AI in improving the efficiency of financial risk management.

RESULT AND DISCUSSION

The results show that Artificial Intelligence (AI) is a technology capable of performing tasks that usually require human intelligence, such as the application of Artificial Intelligence (AI) in financial risk management has a significant impact in improving the efficiency and effectiveness of the decision-making process. Artificial intelligence technology is an aspect of technological development that has entered the financial services sector around the world. The application of this technology allows financial service providers to automate business processes by utilizing available data sources to overcome several barriers, including the high cost of serving customers, establishing customer identity, as well as to assess creditworthiness. In addition, the adoption of AI technologies will provide financial inclusion benefits and it is contingent on good AI adoption from enterprises, competitive market settings, and continued investment in the necessary infrastructure (Biallas & O'Neill, 2020).

Artificial intelligence has brought about major transformations by providing a wide range of customer service, reducing costs and creating new business models in the financial sector. The use of AI in the financial industry continues to grow rapidly. Fintech (financial technology) is using AI to improve customer service, evaluate credit, and develop innovative financial products. In addition, traditional companies in the sector are also adopting AI technologies to modernize their operational processes. Artificial Intelligence is often used as an automation tool and is an effective use of technology for business advancement, especially in the financial sector. Through AI technology, major changes have taken place in the financial sector which has created various innovative financial services such as intelligent consultant, intelligent lending, intelligent customer service, and can be used for surveillance (Joshi & Ranjan, 2021).

Major shifts in the financial sector caused by advances in digital technology In this digital era, the application of artificial intelligence (AI) as an innovation can help companies improve the efficiency of financial risk management in various ways. One of them is through sophisticated data analysis to identify preferences more accurately and avoid human error.

Artificial intelligence can be used in various management contexts in the corporate finance and banking sectors. AI can be used to identify, measure, and control risks that can occur, as well as provide more convenient and easier services

for companies. Although AI can simplify and even replace human work, it does not mean that the role of humans will disappear. Humans are still needed to provide critical thinking, analytical power, and creativity so that AI can work optimally. In the financial sector, AI is used to analyze data quickly and accurately, and provide recommendations or predictions that can help make better decisions. One example is the use of AI in stock trading. AI can analyze market data and predict stock price movements more accurately than humans. This can help investors or traders make smarter stock buying and selling decisions.

In addition, artificial intelligence can also be used as a tool to detect and prevent fraud in financial transactions. AI can analyze suspicious transaction patterns and provide early warnings to the authorities. That way, the risk of fraud can be minimized. Strategies that can be used in improving the efficiency of financial risk management with artificial intelligence AI are as follows:

1. Machine learning (ML)

   Machine learning is the most common type of AI used in reducing financial risk. Using machine learning algorithms, systems can analyze historical data and identify patterns that can be used to predict future financial risks. For example, machine learning can be used to identify fraud patterns or suspicious market movement patterns.

2. Natural Language Processing (NLP)

   Neural language processing (NLP) is a type of AI that focuses on understanding and processing human language. In a financial context, NLP can be used to analyze texts such as financial statements or user comments on social media. By analyzing these texts, the system can identify market sentiment, other important information that can affect financial risk.

3. Neural Networks.

   Neural networks are AI models inspired by how the human brain works. In the context of finance, neural networks can be used to predict financial risk by analyzing complex and non-linear data. For example, neural networks can be used to predict credit risk based on historical customer data (Li et al., 2023).

The application of artificial intelligence in reducing financial risk, AI can be used to analyze transaction patterns and suspicious customer behavior. By studying historical data, AI can identify fraud patterns that are undetectable by humans. For example, AI systems can detect unusual transactions, suspicious credit card usage, or other fraudulent activities. AI can provide portfolio diversification or more optimal asset allocation settings. By studying market data and predicting stock price movements, AI can help investors manage risk and optimize returns. In risk management, AI can perform real-time market risk analysis and provide alerts if there are significant changes in the market. Thus, financial institutions can take appropriate actions to mitigate the impact of such risks.(Milana & Ashta, 2021)

The benefit of applying AI as an innovation to reduce financial risk is that artificial intelligence can process and analyze data quickly, saving time and human resources. AI can also help make better decisions in financial risk management. This

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can optimize financial performance and reduce losses. By implementing AI, financial institutions can identify risks more accurately and faster. This can improve the efficiency of financial risk management and reduce human errors that can lead to financial risks.

The application of artificial intelligence can help reduce risk and improve the efficiency of financial risk management in the digital era because AI provides fast and accurate solutions to analyze financial risks, so companies can respond quickly and make the right decisions. AI processes data and detects patterns so that financial risks can be analyzed in more detail and managed better. Artificial intelligence (computer-based intelligence) is a type of advancement in digitization with limits and capabilities that businesses have in completing their business exercises and helping to achieve the most extreme proficiency for businesses. In finance, artificial intelligence exists to expand advanced security systems and limit distant controls or breaches. Artificial intelligence can likewise expand benefit levels by changing people with frameworks to limit costs and further develop items as indicated by client needs.

The challenges faced in applying AI as an innovation to reduce financial risk are ensuring data security and privacy so that it is not misused or hacked by irresponsible parties. And the existence of unstructured data can be a challenge in the AI analysis process, and also although AI has strong analytical capabilities, there are still limitations in terms of understanding the context and rapid changes in the financial environment. AI is also subject to errors if not managed properly.

Based on the results of the above research, it shows that the integration of AI technology in the financial sector is so effective and efficient and makes a significant contribution in increasing the efficiency of financial risk management. Therefore, the integration of AI Artificial Intelligence technology is able to improve the accuracy of financial information. With its ability to analyze data in high detail, AI technology is able to identify errors, manipulations, and mismatches in financial records with a higher level of accuracy than manual approaches, and can detect financial fraud. This reduces the potential for human error that can affect the accuracy of a company's financial statements. In terms of accuracy, companies that apply AI technology have experienced significant improvements. One example of research conducted by Chukwudi et al., (2018), in a Southern Nigerian company, in his research revealed that the company experienced a decrease of more than 50% in human errors in recording transactions. because of this many large companies have made the decision to integrate AI technology in financial management.

In companies that integrate AI technology in financial management, decision-making at the strategic level also undergoes positive changes. AI technology helps in providing deeper insights through historical and real-time data analysis. By understanding patterns and trends, financial managers can make more informed decisions, helping to drive better business strategies. While the integration of AI technology brings many benefits, it is important to remember that training and development of human resources remains essential. Employees need to understand how to manage and work with AI technology, as well as how to troubleshoot in case of technical issues. This also includes understanding the data analysis provided by

AI technologies, so that companies can make informed decisions. In addition, a big challenge in AI integration is the issue of data security. Financial data is a valuable asset that needs to be carefully protected. AI integration must be supported by strong security measures to protect corporate data from cyber threats and unauthorized access, financial report manipulation, complex system integration, the need for higher technical understanding, and data privacy issues. Therefore, companies integrating AI technology in accounting systems should consider capacity building and addressing these issues.

The financial sector can obtain fast, precise and accurate information by using AI. As a result, financial risk management can benefit from artificial intelligence. This is because AI can maximize targets while maximizing regulatory compliance and minimizing fraud and fraud losses so that it can improve the efficiency of financial risk management and compete effectively in this disruptive era.

CONCLUSIONS

This research shows that artificial intelligence (AI) has a significant role to play in improving the efficiency of financial risk management in Indonesian financial institutions. This technology enables fast and accurate analysis of big data. With the application of machine learning algorithms and predictive analytics, financial institutions can improve accuracy in credit risk assessment, detect fraud more effectively, and better manage market risk. While there are challenges to be faced, such as data privacy concerns and the need for new skills, the benefits offered by AI in financial risk management cannot be ignored.

AI enables large-scale data processing quickly and accurately, providing benefits such as:

1. Fraud Detection: AI is able to analyze transaction patterns and identify suspicious activities to effectively prevent fraud.
2. Credit Risk Assessment: Machine learning algorithms help assess customer creditworthiness based on historical data, improving decision-making accuracy.
3. Market Risk Management: AI supports real-time data analysis to anticipate significant market changes.

However, challenges in AI implementation, such as data privacy, technical complexity, and infrastructure investment costs, remain obstacles that need to be overcome. To gain optimal benefits, financial institutions should ensure AI integration is done with strong data security policies and involves training of human resources.

Going forward, financial institutions that successfully integrate AI technologies will have a significant competitive advantage. By adopting AI strategically, financial institutions can improve the efficiency, accuracy and sustainability of their operations. The integration of these technologies is key in facing the challenges of financial risk in the era of digital disruption.

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