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THE ROLE OF AI IMPLEMENTATION IN ENHANCING BANKING PERFORMANCE WITH USER EXPECTATIONS AS A MEDIATING VARIABLE: CONCEPTUAL PAPER ON MANAGEMENT CONTROL PERSPECTIVE

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ABSTRACT

The massive development of AI requires companies, especially banking sector companies, to innovate sustainably to remain relevant and compete in the global market. This article suggests a model for assessing the current AI implementations to ensure that they meet the user's expectations for AI services and that their relationship is optimized to improve banking performance. A novel research paradigm can be created by utilizing existing phenomena. This research generates an innovative model discovery that can enhance the banking sector. It suggests a framework that banking company managers can employ to assess the effectiveness of current AI implementation innovations in meeting user expectations and enhancing banking performance. This study establishes a foundation for future research that will investigate the integration of both models to improve the overall performance of Indonesia's banking sector companies and the innovation of AI implementation.

KATA KUNCI
Implementasi AI,
Ekspektasi Pengguna,
Kinerja Perbankan,
Inovasi.

ABSTRAK

Perkembangan AI yang masif menuntut perusahaan, khususnya perusahaan sektor perbankan, untuk terus berinovasi secara berkelanjutan agar tetap relevan dan bersaing di pasar global. Artikel ini mengusulkan sebuah model untuk menilai implementasi AI saat ini guna memastikan bahwa implementasi tersebut memenuhi harapan pengguna terhadap layanan AI dan bahwa hubungan keduanya dioptimalkan untuk meningkatkan kinerja perbankan. Sebuah paradigma penelitian baru dapat diciptakan dengan memanfaatkan fenomena yang ada. Penelitian ini menghasilkan penemuan model inovatif yang dapat meningkatkan sektor perbankan. Penelitian ini mengusulkan sebuah kerangka kerja yang dapat digunakan oleh para manajer perusahaan perbankan untuk menilai efektivitas inovasi implementasi AI saat ini dalam memenuhi harapan pengguna dan meningkatkan kinerja perbankan. Studi ini membangun landasan bagi penelitian mendatang yang akan menyelidiki integrasi kedua model tersebut guna meningkatkan kinerja keseluruhan perusahaan sektor perbankan Indonesia dan inovasi implementasi AI.

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INTRODUCTION

In the current era of disruption, the development of Artificial Intelligence (hereinafter referred to as AI) is growing very massively. AI is a modern innovation that can be described as developing a system's capacity to understand data accurately, gain knowledge from the data, and adaptively apply the knowledge to achieve specific goals(Haenlein & Kaplan, 2019). The concept of AI first appeared in 1956. At that time, scientists had begun to design the development of AI but had not yet produced results. It was only in the 2000s, precisely since 2010, that AI has developed very rapidly.

AI is an exciting innovation today because AI can massively change the technology field by developing intelligent device systems that can operate and interact like humans(Haddad, 2021). The application of AI offers many conveniences. This is proven by the many fields that have begun to adopt AI in their operational activities, such as education, economics, business, health, and even the entertainment world (Asor et al., 2021). So, it is not uncommon for the presence of AI, with all its forms and conveniences, to have the potential to replace human work (Huang & Rust, 2018). This is a challenge or golden opportunity for those who can take advantage of the presence of AI. The development and use of AI still require original human intelligence. However, if humans, especially workers, cannot keep up and adapt to this change, the total replacement of human labor with AI will be possible.

Banking sector companies are one of the sectors that have begun to internalize the use of AI in their operational activities. Banking sector companies are unique in innovating to increase their competitiveness in the global market (Harun et al., 2020). Banking companies have a dominant role in the world of investment and capital markets. This is supported by data released by Bursa Efek Indonesia (Kautsar Primadi Nurahmad, 2024), which states that in the last 5 years, the Financial Services Authority noted that the banking industry in Indonesia has shown good growth. Banking shares listed on the Indonesia Stock Exchange control 33% of the capital market capitalization in Indonesia. Banking sector companies also occupy 45% of companies included in the LQ45 and IDX30 indices. Judging from the historical performance graph released by the IDX Index fact sheet (PT Bursa Efek Indonesia, 2024), the graph shows quite good performance but is classified as fluctuating. This shows a reasonably dynamic condition between banking sector companies. This condition causes quite tight competition between banking sector companies so that they compete to increase their firm value. Banking companies need improvement and innovation to continue to compete and maintain the sustainability of their companies (Zhao et al., 2019).

Figure 1. Historical Performance IDXFINANCE

The existence of banking companies in the global market requires companies to innovate continuously. The implementation of AI in the operational activities of banking companies can be a good investment (Kim & Lee, 2023). Investment in innovative technologies is essential to ensure the creation and dissemination of new technologies, with alternative sources such as venture capital, business efficiency, and effective crowdfunding (Pasko et al., 2022). Innovative investments can also stimulate economic growth, increase company competitiveness, create new jobs, and contribute to developing new technologies and solving complex problems (Mukxibova & Sharifxodjaeva, 2024). This underlies banking companies migrating their work systems from conventional to AI-based.

AI-based service innovation has been widely adopted by banking companies in Indonesia. The forms of service are also diverse. The first example of AI implementation is using chatbots and Virtual assistants to provide customer services 24/7. This chatbot can help customers check balances, transactions, and bank product information. Several banks package this in a beautiful and very humanistic way. Such as Bank Central Asia (BCA), which has "Vira," Bank Rakyat Indonesia (BRI), which has "Sabrina," Bank Mandiri, which has "Kate," and Bank Syariah Indonesia, which has "Aisyah." This can provide an enjoyable experience for customers and speed up customer service.

Other forms of AI are Fraud Detection and Security. In this case, AI is used to detect suspicious transactions that have the potential to be fraudulent. A machine learning system is applied to recognize abnormal transaction patterns and provide early warnings. The following example is Credit Scoring and Risk Analysis, in which case AI plays a role in helping banks assess customer creditworthiness using big data and machine learning systems. For administrative activities, there is also AI in the form of Back-Office Process Automation using Robotic Process Automation (RPA) to automate administrative tasks such as data verification, document processing, and report analysis.

There are many forms of AI innovation that can be applied in banking companies. The ability to innovate varies from company to company, considering that making a massive change by moving conventional processes to AI-based ones requires great cost and effort. Company size plays an important role in this. Large companies with greater resources are considered more capable of innovating than small companies (JAHAN & SAZU, 2022). However, this is still controversial among researchers.

Of the many AI-based innovations that banking companies have carried out, the company has expectations regarding the results of the AI implementation. Starting from a need to improve the quality of service and operations of the company so that AI-based innovations are carried out, the expectations of the banking company management arise regarding the positive impact of the innovations carried out. Implementing AI in the company requires enormous costs and efforts until it can be realized. In the shorter term, investing in innovative things has relatively high efficiency, but in the long term, expectations will change based on the company's financial results, which often hurt investment efficiency (Nawrocki, 2018). Not many companies take further steps to review the impact of implementing innovations on the company. This review is needed to ensure that all the needs and expectations of the banking company are met with the innovations that have been realized. This evaluation is also needed to maintain the quality of AI-based innovations and remain relevant to current needs and conditions. Moreover, to see the more significant impact of answering the needs of banking companies and to test how the efficiency of AI-based innovations can affect banking performance from an economic dimension.

This research is interesting because there are not many studies that examine the proposed model. This research will test the further evaluation of AI implementation on fulfilling AI user expectations, in this case, the Company's management. This research also wants to see the impact of AI implementation on banking performance and user expectations as a mediating variable. This research will also consider the size of the Company as a control variable. This is done to contribute to the Company and increase awareness to continue to innovate sustainably by considering how far

the existing implementation can answer the expectations of AI users. This research will use two main theories: Expectation Confirmation Theory (ECT) and signaling theory. Data will be collected using the questionnaire method, taking information from the Company's financial statements. The results of this study are expected to become the basis for decision-making for management to increase their innovation through AI implementation or to see things that need to be reviewed. In addition, the results of this study can also increase insight into the development of current AI implementation and become material for future developments. This study will also try to answer several research questions:

RQ 1: How far can the existing AI implementation answer the expectations of AI users?
RQ 2: How can AI implementation affect banking performance?
RQ 3: How can AI user expectations affect banking performance?

LITERATURE REVIEW

Signal Theory

An explanation of how information can be transmitted through signals, which subsequently influence decisions made by parties involved, such as investors, is provided by the theory of signaling, a notion found in economics and finance. In 1973, Michael Spence was the first to present this idea in the context of the labor market. In 1977, Stephen Ross further expanded this concept(Connelly et al., 2025). In an open scenario, the signaling theory holds that one party, such as a firm, will send a signal to another party, such as an investor, who does not have complete information. This signal will show the quality of the information that the company possesses. For instance, in the realm of investing, businesses can communicate with investors about their current financial situation or prospects using specific method(Connelly et al., 2011). These methods include the payment of dividends, the reporting of increasing profits, and the purchase of shares.

According to this hypothesis, Market prices are susceptible to being impacted by signals corporations communicate to investors. For instance, if a company gives a favorable signal (for example, increased earnings), investors will infer that the company has strong prospects, which might lead to an increase in the stock price of the company(Yasar et al., 2020). On the other hand, if the signal being delivered is negative (for example, a decrease in earnings or a reduction in dividends), investors will react by selling their company shares, resulting in a stock price reduction. Additionally, this theory highlights that asymmetric information between the signal sender (such as the corporation) and the signal receiver (such as investors) can result in moral hazard or adverse selection difficulties, affecting investment decisionsBrian L. Connelly et al., “Signaling Theory: State of the Theory and Its Future,” Journal of Management 51, no. 1 (January 3, 2025): 24–61, https://doi.org/10.1177/01492063241268459.

Applying artificial intelligence (AI) in the banking sector can be a favorable signal to investors and the market. This signal indicates that the bank is adopting innovative technologies to increase operational efficiency, risk management, and customer service. Consequently, this could enhance the bank's financial performance, for instance, by enabling more precise risk projections or by automating services to lower operational costs(Yasar et al., 2020). When applied to the idea of signaling, a bank's adoption of artificial intelligence and the subsequent reporting of increased performance can be interpreted as a signal that the bank would have better prospects in the future(Broby, 2021). In the opposite direction, if a bank does not adopt the most recent technology and its performance remains the same or decreases, this can be interpreted as a negative signal, impacting investment decisions and the bank's stock price(Jadil et al., 2021). As a result, artificial intelligence not only strengthens the operational efficiency of the bank, but it also plays a significant part in influencing how the market perceives the bank's performance(Baltensperger, 1980).

Expectation Confirmation Theory (ECT)

The Expectation Confirmation Theory (ECT) is a theory that describes how consumer or user satisfaction is established based on a comparison between their initial expectations of a product or

service and the experience they obtain after using the product or service(Ambalov, 2018). This comparison is because the ECT explains how consumers or users receive satisfaction. According to this idea, consumers have specific expectations regarding a product before they purchase or use it. These expectations are based on the information they have received, their previous experiences, or recommendations from other people(Brown et al., 2012). Many different variables are included in these expectations, including the quality, pricing, features, benefits, and performance of the product or service that will be utilized. Following the beginning of their use of the product or service, customers will assess whether their experience aligns with the expectations they have developed in the past. This type of contentment, also known as positive disconfirmation, will occur if the event either surpasses or satisfies the expectations set for it(Lee & Kim, 2020). In contrast, consumers will experience negative disconfirmation, characterized by disappointment or dissatisfaction, if the experience is worse than anticipated(Ambalov, 2018).

In banking, Expectation Confirmation Theory (ECT) explains how customers evaluate their satisfaction with bank services by comparing their initial expectations and experience. Before using a service, customers have expectations regarding speed, security, cost, and quality of service. After using the service, they compare these expectations with their experience. If the service meets or exceeds expectations, customers are satisfied (positive disconfirmation), while if the experience is worse than expected, they are disappointed (negative disconfirmation)(Liao et al., 2017). The results of this evaluation will influence customers' decisions to remain loyal to the bank or switch to another bank, as well as their likelihood of recommending the service to others(Lee & Kim, 2020). ECT helps banks understand customer expectations and manage their experiences to increase satisfaction and loyalty(Ambalov, 2018). The relationship between Expectation Confirmation Theory (ECT) and the impact of artificial intelligence (AI) implementation on user expectations can be explained by how AI affects user expectations and experiences of banking services. In ECT, customers have certain expectations before using banking services, and AI implementation can affect these expectations, either increasing or changing them(Brown et al., 2012).

Suppose a bank uses artificial intelligence (AI), such as chatbots or virtual assistants, to enhance customer service or AI-based systems for data analysis and service personalization. In that case, customers may expect AI to expedite operations, deliver more appropriate answers, and improve the entire experience(Lee & Kim, 2020). They will have these expectations before they get the opportunity to encounter the technology. After users have had direct experience with AI-based services, they will evaluate their experience compared to the expectations they had previously brought(Brown et al., 2012). When AI delivers on promises—like quicker responses, more tailored recommendations, or more efficient experiences—customers will feel satisfied because of positive disconfirmation. On the other hand, when AI falls short—like with incorrect recommendations or insufficient interactions—users will be less confident because of negative disconfirmation. So, AI implementation in banking directly impacts customer expectations and satisfaction, which impacts loyalty and future banking service usage behavior(Liao et al., 2017).

Concept of Artificial Intelligence

A subfield of computer science known as artificial intelligence (AI) is concerned with creating computer systems and computers capable of imitating or surpassing human intelligence in terms of their ability to complete complex tasks. In essence, artificial intelligence (AI) attempts to replicate how humans process information by giving machines the ability to think, learn, and make decisions on their own(Haenlein & Kaplan, 2019). Machines can learn from data and experience and adapt to changes without the need to be reprogrammed. This technology is based on various complex algorithms, such as machine learning and deep learning. When put into practice, artificial intelligence can encompass various methodologies, ranging from straightforward rule-based systems to more intricate and advanced artificial neural networks(Morandín-Ahuerma, 1947).

Machine learning, which is one of the primary subfields of artificial intelligence, is a technique that enables computers to learn from data and recognize specific patterns without the need

for direct human intervention. The training of models to predict or categorize new information based on previously learnt data is accomplished by utilizing vast volumes of data in machine learning. Deep learning is a continuation of machine learning. It employs artificial neural network architectures that are deeper and more sophisticated to handle more complex problems that demand more computing. Some examples of these challenges are speech recognition, natural language processing, and image recognition. Applications that need the processing of vast amounts of heterogeneous data, such as those found in autonomous vehicles and virtual assistants, are familiar places where deep learning is utilized.

Artificial intelligence offers a wide range of applications that have already started to alter how we work and live. Artificial intelligence may be found as virtual assistants within the realm of technology. These assistants, which include Alexa, Siri, and Google Assistant, simplify the process of interacting with various devices employing voice commands and can assist in completing different activities(Morandín-Ahuerma, 1947). The integration of artificial intelligence in social media and e-commerce platforms allows for the creation of recommendation systems that can personalize the user experience, make product suggestions, or tailor content based on the tastes of specific users. Even in entertainment, such as on streaming platforms like Netflix and Spotify, artificial intelligence analyzes a user's viewing history or music tastes to formulate recommendations pertinent to the user's interests(Sestino & De Mauro, 2022).

Additionally, artificial intelligence impacts various businesses, including the transportation sector, which is brought about by introducing autonomous vehicles, commonly known as self-driving automobiles. These vehicles can function without a human driver because they are equipped with sensors and artificial intelligence algorithms that receive information from the environment around them, recognize objects, and make real-time judgments(Haenlein & Kaplan, 2019). In medicine, artificial intelligence is increasingly being utilized to analyze medical images such as CT scans, MRIs, and X-rays to assist in diagnosing diseases in a more precise and expedient manner. Additionally, AI-based systems allow for the development of treatment plans and the prediction of treatment results, both of which can improve the quality of care provided to patients.

When it comes to the world of business and industry, artificial intelligence plays a significant role in boosting both efficiency and productivity. In the manufacturing industry, artificial intelligence is utilized in automation systems that can accelerate production processes, save costs, and enhance product quality. Artificial intelligence in the financial sector allows for the detection of fraudulent activity, the analysis of investment risks, and the intelligent management of portfolios. Artificial intelligence is also used by businesses to forecast market trends, map out marketing plans, and improve supply chain efficiency(Sestino & De Mauro, 2022). It is possible to apply artificial intelligence in the energy industry to monitor and regulate energy usage and maximize the utilization of renewable resources(Morandín-Ahuerma, 1947). However, AI presents several problems that must be overcome, even though it offers many advantages. Concerns regarding ethics and privacy are among the most important of these issues. The gathering and utilizing of enormous quantities of personal data can raise concerns over information security and the possibility of such data being misused by businesses or other third parties. Artificial intelligence's influence on human jobs is another issue that has raised worries. The possibility exists that more efficient machines will take over specific jobs previously performed by people, particularly those that are routine and repetitive. Therefore, it is essential to consider the alteration of skills and training to ensure that the workforce can respond to the changes brought about by this technology(Sestino & De Mauro, 2022).

As artificial intelligence (AI) technology continues to evolve, there is a growing demand for formulating laws and regulations to guarantee AI's equitable and responsible implementation. Consequently, legislators, researchers, and technology corporations must collaborate to develop rules that will ensure that the application of artificial intelligence (AI) will continue to adhere to ethical principles and human rights while minimizing the potential adverse effects it may have on society. Artificial intelligence is anticipated to advance and eventually become indispensable to our everyday lives. Application of this technology has the potential to bring about enormous changes in

how we work, engage, and manage resources worldwide. As a result, we need to prioritize maximizing the advantages of artificial intelligence (AI) while minimizing the potential drawbacks so that AI may be utilized for the betterment of humanity(Morandín-Ahuerma, 1947).

Artificial Intelligence in The Banking Industry

As a result of its ability to enable increased operational efficiency, improved customer service, and better risk management, artificial intelligence (AI) has emerged as one of the most prominent technological advances in the banking industry. Artificial intelligence is utilized in various banking-related domains, including the automation of customer care, the analysis of transaction data, the detection of fraud, and the management of credit risk. Chatbots and virtual assistants powered by Natural Language Processing (NLP) are among the most widespread artificial intelligence applications. These apps enable consumers to receive service around the clock without speaking to a bank officer directly. For instance, Bank of America has developed a virtual assistant called Erica. Erica can assist customers in managing their accounts, offering investment advice, and reminding them about future bill payments. A further application of artificial intelligence is in service customization systems. These systems allow financial institutions to examine customers' transaction data and habits to provide the most suitable products, such as credit card offers that are personalized to the customer's spending patterns(Königstorfer & Thalmann, 2020a).

In the security field, artificial intelligence is integral to detecting fraudulent activity. Financial institutions can monitor and analyze thousands of transactions in real time through machine learning algorithms to spot potentially fraudulent behavior(Sestino & De Mauro, 2022). For instance, artificial intelligence can identify cases in which a transaction is carried out from a geographical area that is not typical or a spending pattern significantly dissimilar to the patterns that have been seen in the past. Suppose the system identifies any activity that appears to be suspicious. In that case, it will either notify the customer or automatically suspend the transaction to guarantee the security of the funds. An implementation of this technology that is now being used in the real world can be found at JPMorgan Chase. The bank's fraud detection system uses artificial intelligence to analyze transaction patterns and provide early alerts of potential security issues(Noreen et al., 2023).

Artificial intelligence also plays a part in the management of credit risk by undertaking a more in-depth investigation of a customer's creditworthiness. AI can combine alternative data, such as patterns of utility bill payment, activity on social media, and digital transactions, to create more accurate credit assessments. This contrasts traditional techniques, which rely primarily on financial data such as credit scores and loan histories(Farishy, 2023). AI is used by fintech companies such as ZestFinance to evaluate the credit risk of individuals with a low credit history. This allows those who previously had trouble obtaining loans more inclusive access to financial services. Document processing and regulatory compliance are two further areas that use automation powered by artificial intelligence. Banks must handle many daily documents, from identity verification to compliance audits(Mehndiratta et al., 2023). Artificial intelligence equipped with optical character recognition (OCR) technology can read, understand, and process documents automatically. This shortens the time needed for manual administration and reduces the likelihood of human error. For instance, by utilizing artificial intelligence, Citibank can reduce the amount of time it requires to process significant volumes of contracts and legal papers from weeks to just a few hours(Königstorfer & Thalmann, 2020b).

Implementing artificial intelligence in banking, on the other hand, presents several significant problems. Artificial intelligence (AI) requires access to vast volumes of customer data to function at its best, which raises substantial concerns around data privacy and security. In addition, the regulations that govern the application of artificial intelligence in banking are still being developed, and financial institutions are obligated to make sure that the adoption of this technology continues to conform with the legislation currently in effect. It is also necessary to consider the possibility of bias in artificial intelligence algorithms. This is because models trained with unbalanced data might result in unfair choices, such as denying loans to particular groups for no real reason. In general,

artificial intelligence has revolutionized the banking business by enhancing the efficiency, security, and quality of service provided to borrowers. The application of artificial intelligence has the potential to significantly alter the financial scene, although obstacles still need to be conquered. In the future, banks and other financial institutions that can implement artificial intelligence responsibly and prudently will have a competitive advantage in dealing with the dynamics of the financial industry(Farishy, 2023).

The Urgency of Using Artificial Intelligence in Banking

In the framework of digital transformation and in the context of enhancing operational performance and boosting bank competitiveness in the increasingly complicated global market, the use of artificial intelligence (AI) in the banking industry has a very high level of urgency. Artificial intelligence plays a significant part in accelerating various internal operations, including data analysis, fraud detection, and risk assessment. This enables financial institutions to decrease operational costs, maximize resources, and acquire greater precision in their decision-making. Automated procedures driven by artificial intelligence help banks reduce their reliance on human labor for routine and repetitive tasks. This, in turn, increases operational efficiency and decreases the number of errors that humans cause(Farishy, 2023).

Moreover, artificial intelligence significantly contributes to the enhancement of banking performance by enhancing the level of tailored and responsive customer care. Using machine learning algorithms and data analysis allows financial institutions to understand their customers' requirements and preferences better, allowing them to provide more specialized goods and services. Furthermore, artificial intelligence enables financial institutions to manage and improve their credit portfolios, increase the accuracy with which they evaluate possible risks, and forecast market behavior that may impact the bank's financial health. Because of this, financial institutions can preserve their liquidity and profitability even when the economic climate is unpredictable. Implementing artificial intelligence in banking performance has a substantial impact on improving risk management as well. Artificial intelligence enables the system to analyze data in real time and identify potential dangers or irregularities. This provides financial institutions with the time to react and take preventative measures. Additionally, artificial intelligence plays a role in reducing financial risk by recognizing non-typical patterns or behaviors, which may indicate fraudulent activity or carelessness during transactions(Mehndiratta et al., 2023).

In addition, artificial intelligence improves the capacities of banks to innovate their products and services. The use of artificial intelligence (AI) to develop a more advanced digital banking platform enables financial institutions to offer clients services that are more adaptable, rapidly available, and simple to use(Martin, 2024). The use of automated systems powered by artificial intelligence also enables financial institutions to monitor and manage their financial performance in real time, identify possible issues earlier, and develop strategies more adaptable to market changes(Mucsková, 2024). Because of this, the application of artificial intelligence is essential for enhancing operational efficiency and service quality, risk management, and strengthening the competitive position of banks to meet the difficulties posed by an industry that is always going through changes(Rahman et al., 2023).

The Impact of Artificial Intelligence in The Banking World

Artificial Intelligence (AI) has significantly transformed the banking sector, yielding substantial benefits while presenting specific problems and adverse effects warranting consideration. AI enhances operational efficiency in banks by automating procedures that once necessitated considerable time and human labor(Martin, 2024). AI systems can autonomously scan extensive transaction data to identify suspect trends, enabling banks to expedite fraud detection and mitigate the risk of cybercrime. Moreover, AI, manifested as chatbots or virtual assistants, enables banks to deliver instant customer support without dependence on human personnel, minimizing wait times and enhancing customer satisfaction(Rita Jain, 2023).

Artificial intelligence significantly enhances risk management, particularly in credit evaluation. AI systems can more precisely evaluate creditworthiness than traditional techniques by analyzing diverse aspects, including transaction data and client financial behavior. This enables banks to offer loans with mitigated risks and broaden finance access to previously inaccessible customers. In the investment sector, AI analyzes markets in real time, forecasts market trends, and offers precise recommendations to investors, thereby enhancing investment returns. Moreover, AI technology is employed to improve portfolio management, expedite loan distribution, and refine payment systems for increased speed and security. Nevertheless, specific adverse effects must not be overlooked beneath these numerous benefits. The possibility of employment losses is one of the most critical repercussions(Rita Jain, 2023). Numerous jobs once executed by human personnel, like customer service, risk management, and data analysis, can now be automated using AI. This may result in a diminished requirement for human labor in the banking sector, particularly in customer-facing roles or administrative functions(Mucsková, 2024). While this technology generates new employment opportunities in developing and maintaining AI systems, its effect on the conventional workforce is a significant worry(Narang et al., 2024).

Furthermore, privacy and data security concerns are escalating as the implementation of AI in banking expands. Artificial intelligence necessitates access to vast quantities of personal data and customer transactions to operate effectively. This heightens the danger of data breaches, wherein sensitive consumer information may be compromised if security mechanisms are inadequately handled. The escalating complexity of cyber-attacks poses a significant problem for banks in safeguarding client data. Using AI in decision-making processes, such as credit evaluations or investment choices, may provide ethical dilemmas, particularly if the algorithms employed lack transparency or are subject to certain biases, thus disadvantaging some societal groups(Ashwini T G et al., 2023).

A further detrimental effect is the growing dependence on technology, which may result in operational issues if the AI system encounters disruptions or malfunctions. A bank's excessive reliance on automated systems may compromise service quality and adversely impact clients in the event of system failure. Malfunctions in AI systems may result in transaction inaccuracies, credit rating discrepancies, or heightened risk management challenges. Consequently, although AI can enhance efficiency, banks must balance technological utilization and human participation in intricate decision-making processes(Martin, 2024). Artificial intelligence can revolutionize the banking sector, enhancing ease, efficiency, and precision. Nonetheless, its use must be backed by meticulous supervision, considering potential social ramifications, like employment displacement and privacy concerns, while ensuring that AI systems function safely and openly. Consequently, banks must collaborate with regulators and other pertinent stakeholders to guarantee that new technology is utilized appropriately and advantageous to all parties.

Previous Research

Table 1. Previous Research

Title	Research result	Reference
Continuous intention usage of artificial intelligence enabled digital banks: a review of expectation confirmation model	Research reveals that perceived intelligence and anthropomorphism predict interaction quality. AI-powered digital financial services' interaction quality affects expectation confirmation, user experience, and sustained use. AI design will be key; hence, all interactions must be user-friendly, efficient, and dependable. The success of AI in digital banking will depend greatly on its characteristics.	(Bhatnagr et al., 2024)
Artificial intelligence	The study found that PAN and PIN significantly improve the anthropomorphic views of digital	(Bhatnagr & Rajesh, 2024)

Title	Research result	Reference
features and expectation confirmation theory in digital banking apps: Gen Y and Z perspective	banking apps, which promotes perceived utility, satisfaction, and continued intentions. The impact of these AI traits differs by generation; Gen Y's devotion is focused on AI's benefits, while Gen Z values AI's human-like qualities. This was a generational change in digital banking demand.	
AI-driven banking services: the next frontier for a personalised experience in the emerging market	The authors' study introduced five essential themes and presented those themes properly. The first theme covers the necessity of AI banking and the abilities needed to operate. The second subject is on the importance of AI-mediated banking awareness amongst users. The third is about managers and employees emphasizing the value of AI-driven interfaces. Fourth, the authors stressed the importance of human interaction due to user demographics. The fifth theme was about custom AI financial services.	(Sheth et al., 2022)
Applications of Artificial Intelligence in commercial banks – A research agenda for behavioral finance	Our findings imply that by adopting AI, commercial banks can reduce losses in lending, increase security in processing payments, automate compliance-related labor, and improve consumer targeting. Researchers care about tech benefits, embedding AI in business, user adoption via openness, privacy, and proper documentation. Lastly, we suggest a behavioral finance research agenda.	Florian Königstorfer and Stefan Thalmann, "Applications of Artificial Intelligence in Commercial Banks – A Research Agenda for Behavioral Finance," Journal of Behavioral and Experimental Finance 27 (September 1, 2020), https://doi.org/10.1016/j.jbef.2020.100352.
Artificial Intelligence (ai) in the banking industry: a review of service areas and customer service journeys in developing economies	The report shows that AI is increasingly used in process automation, customer experience, stock market trend prediction, credit risk management, online banking, marketing management, and auditing. It recommends ethical AI use, stakeholder engagement, confidence in data handling, and strong internal control systems to improve banking efficiency and customer service. It also recommends studying the link between organizational culture, leadership, and AI integration in developing economies.	(Abdulsalam & Tajudeen, 2024)

RESEARCH METHOD

The population of this study is banking sector companies listed on the Indonesian Stock Exchange (IDX) from 2018-2025. The sampling technique used is purposive sampling, with mixed primary and secondary data types. The selected banking companies are companies that meet the following requirements: (1) Banking companies that have AI innovation, (2) Banking companies

that publish annual financial reports consecutively during 2018-2025, (3) Banking companies listed on the Indonesian Stock Exchange (IDX) during 2018-2025. This study contains four variables: banking performance as a dependent variable, AI implementation as an independent variable, user expectation as a mediating variable, and company size as a control variable.

Table 2. Operational Definitions and Variable Indicators

Variable	Operational Definition	Variable Indicator	Reference
Banking Performance	Banking performance is the extent to which the company's objectives, both economic and strategic, in relation to banking products to foreign markets, are achieved through planning and implementation.	Operating Expense Ratio: $\frac{\text{Operating Expenses}}{\textit{Net Sales}}$ x 100%	(Sumarta, 1999)
Implementation AI	The process of applying AI technology into business systems or processes to improve efficiency, accuracy, and adaptability.	1. Use of AI in Business Processes 2. Impact on Efficiency and Cost Savings 3. Security and Regulatory Compliance 4. Challenges of AI Implementation	(Abdulsalam & Tajudeen, 2024)
User Expectations	The expectations or assumptions that users have about a product, service, or system before they interact with it.	1. Customer Service Improvement 2. Security and Data Protection 3. Service Personalization 4. Operational Efficiency 5. Compliance and Transparency 6. Relevance and accuracy 7. Timeliness	(Ghufron et al., 2020)
Firm Size	A company's scale can be assessed through its total assets at the year's conclusion. The total revenue achieved might serve as a baseline for assessing the company's size.	Ln (Size)	(Riyanto, 2011)

RESULT AND DISCUSSION

Based on the background described, this study proposes a conceptual framework that examines banking performance by implementing artificial intelligence (AI), considering user expectations as a mediating variable in the relationship. In addition, bank size is also used as a control variable to provide a more comprehensive understanding of the factors that influence banking performance in the context of AI adoption. As follows:

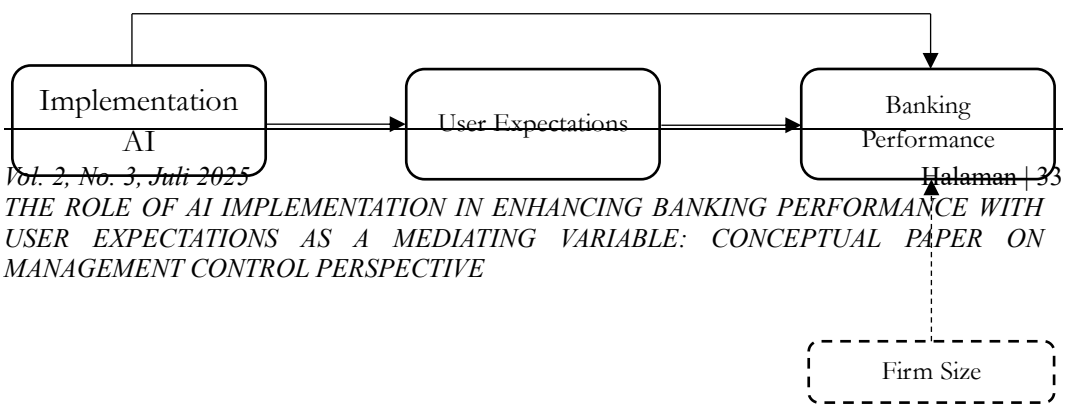

Figure 2. Conceptual framework

The conceptual framework in this study focuses on the relationship between the implementation of artificial intelligence (AI) and banking performance, with user expectations as a mediating variable and size as a control variable. The application of AI technology to enhance various aspects of bank operations is included in implementing artificial intelligence (AI) in banking, representing an independent variable. Process automation is one of the primary applications of AI in the financial sector. Many tasks that previously necessitated human intervention can be automated by applying machine learning and algorithms, including transaction processing, consumer identity verification, and risk management(Mbaidin et al., 2024). This automation not only enhances efficiency and reduces operational costs but also mitigates the risk of human error, enabling institutions to execute processes faster and more precisely. For instance, AI-powered chatbots can autonomously respond to customer inquiries, while other AI systems can expedite the credit application process by verifying and evaluating eligibility in real-time(Agustiawan, 2024).

Furthermore, AI functions to enhance the analysis of data that institutions possess. Banks frequently collect substantial market trends, transactions, and customer behavior data. AI can uncover concealed patterns in the data to offer more profound insights into customer behavior and anticipate their requirements through machine learning and big data analytics. AI can also identify potential deception by monitoring transactions and identifying anomalies suggesting suspicious activity. Additionally, AI allows banks to customize services by offering product or service recommendations based on consumer profiles and preferences. Consequently, implementing AI enhances operational efficiency and the consumer experience by providing more personalized services(Abdulsalam & Tajudeen, 2024).

To understand how AI affects banking performance, it is crucial to consider user expectations as a mediating component. User expectations are the customers' expectations about the bank's service quality after AI is used. These expectations involve several areas that are very significant in deciding customer experience, such as speed of service, where customers expect to obtain a rapid and efficient response without extended waiting times. In addition, there are expectations surrounding the sophistication of the technology employed, where clients demand the usage of contemporary and new technology that can deliver practical and easily accessible solutions(Ambalov, 2018). Accuracy is also vital to client expectations, as customers expect the bank's AI to give correct data free from harmful errors.

Also, banks that use AI must provide accurate, relevant, and real-time data to gain client trust. People seek timely, relevant information and services based on accurate data in the digital age. The confidence in banks developed by using transparent and safe AI is also vital. If banks keep and grow this trust, clients will likely keep utilizing their services. In addition, personalization in customer experience is also a highly expected component, where banks are expected to deliver solutions adapted to the tastes and demands of each customer, which of course can be achieved through data analysis aided by AI(Asor et al., 2021). If banks can meet or surpass these expectations, AI will

boost operational efficiency and customer happiness. High customer happiness will favor banking performance, which may be measured by many metrics such as enhanced productivity, customer satisfaction, and profitability. Banks can automate and analyze data better, increasing efficiency. Better client happiness leads to greater loyalty, which boosts bank revenue and profit. So, user expectations are vital to the link between AI implementation and banking performance(Haenlein & Kaplan, 2019).

Bank size is a key control variable in this framework since it can affect the capability and resources available to execute AI. Bank size, commonly measured by total assets, number of branches, or number of clients served, dramatically affects a bank's ability to embrace and deploy new technologies, including AI. Larger banks usually have better infrastructure and more significant financial, technological, and human resources to support sophisticated, costly tech projects. With these resources, large banks may more easily invest in advanced AI systems, develop and integrate these technologies across different lines of operations, and manage the adjustments required for effective AI implementation.(Nawrocki, 2018)

Smaller banks may lack the budget, tech capacity, and human resources needed to use AI. So, while AI can still help smaller banks, they may have more trouble making a big impact. Larger banks, which are better organized and experienced in managing large tech initiatives, can also adopt AI faster and adapt more easily. By considering bank size as a control variable, this conceptual framework illustrates that the impact of AI implementation on banking performance is influenced not only by the implementation of the technology itself and user expectations, but also by the bank's capacity to manage and implement the technology effectively. In this situation, bank size functions as a moderating element that can improve or diminish the association between AI implementation and banking performance. Larger banks will likely experience more significant impacts on operational efficiency, customer happiness, and profitability than smaller banks, as they have greater resources and infrastructure to support efficient use of the technology(Abdulsalam & Tajudeen, 2024).

CONCLUSION

This article investigates the relationship between AI implementation and user expectations of banking performance. The objective is to comprehensively review the relevant literature to offer valuable insights into the complex dynamics of AI Implementation and financial accounting. This study contributes substantially to the discourse on AI Implementation and its benefits to banking performance by providing theoretical insights into AI implementation and its impact on user expectations. To achieve this, a comprehensive research framework has been established, which has the potential to influence theoretical and managerial perspectives. The conceptual framework theoretically sets the foundation for future researchers to empirically investigate the impact of AI Implementation on user expectations and banking performance outcomes. The results of this study are expected to be the basis for decision-making for management to increase their innovation through AI implementation or see things that need to be reviewed through the evaluation results of how far AI implementation can answer user expectations. In addition, the results of this study can also increase insight into the current development of AI implementation and become material for future developments.

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