Indonesian Banking Review
Volume 1, Number 2, 2022

The Role of Artificial Intelligence in Banking Service Transformation and Business Strategy

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Abstract

Article history:
Received: August 19, 2022
Revised: September 12, 2022
Accepted: October 14, 2022
Published: December 30, 2022

Keywords:
Accounting Information System,
Artificial Intelligence,
Banking,
Customer Service,
Fraud Detection.

Identifier:
Zera Open
Page: 107-125
https://zeraopen.com/journal/ibr

The digital transformation of the Fourth Industrial Revolution has driven banks to adopt Artificial Intelligence (AI) as a key strategy to enhance efficiency, security, and competitiveness. This study aims to analyze the application of AI in the banking sector through a systematic literature review of some academic articles published last five years. The findings reveal that AI plays a pivotal role in five areas: customer service, fraud detection, robo-advisors, decision support systems, and accounting information systems. AI-powered chatbots improve customer satisfaction and loyalty, while machine learning proves effective in detecting fraud in real time. Robo-advisors expand access to investment opportunities, although they still face trust-related barriers. AI-based decision support accelerates credit analysis, and integration into accounting systems enhances reporting accuracy and transparency. AI is not merely an operational tool but a holistic business strategy. Nevertheless, ethical issues, data protection, and customer resistance remain challenges that must be addressed to fully optimize the long-term benefits of AI in banking.

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1. Introduction

The industrial revolution 4.0 has brought fundamental transformation to almost all sectors of the global economy, including the banking sector. Digitalization, big data, and artificial intelligence (AI) are the main pillars in accelerating business processes, creating new service models, and increasing competitiveness. AI is specifically considered a strategic technology capable of transforming the way banks operate, from customer service, transaction security, to business decision-making. According to Accenture's report, more than 60% of large financial institutions have adopted AI solutions in their operations, and it is estimated that this number continues to increase as the need for efficiency and personalization of services continues.

Globally, the use of AI in the banking sector is increasingly diverse. Natural language processing-based chatbots are used to serve customers in real-time at lower costs and quick responses. Robo-advisors provide investment services that were previously only accessible to premium customers, while machine learning-based fraud detection systems are able to identify suspicious transaction patterns with high accuracy. Wewege et al. (2020) reports that the use of AI in fraud detection reduces losses due to financial crimes by billions of euros every year. This confirms that AI is not only a technical tool, but also a strategic instrument in building customer trust and maintaining financial system stability.

This figure shows that AI adoption is no longer an additional option, but rather a necessity that determines competitiveness. AI is seen as able to overcome the classic challenges of banking, such as high operational costs, the need for

transaction security, and customer demands for fast, personalized, and accessible services (Indriasari et al., 2019).

In addition to improving operational efficiency, AI also plays a role in strengthening service quality and creating a better customer experience. Chatbots, for example, are not only capable of answering basic questions, but also providing personalized suggestions based on transaction history and user preferences. Research by Belanche et al. (2020) found that AI-based interactions can improve customer satisfaction while strengthening the bank's brand image as an innovative institution. Thus, AI integration has dual implications: internal efficiency and increased external value in the form of customer loyalty and brand value.

However, although the literature has extensively discussed the role of AI in banking, most research tends to focus on one specific aspect, for example chatbots or fraud detection. Few studies have reviewed AI in banking comprehensively, covering various aspects at once and positioning it as a holistic business strategy. In fact, AI not only functions as an operational tool, but can also be an instrument of competitive differentiation and a strengthening of banks' business strategies in the digital era. Payne et al. (2021) emphasizes the need to see AI as an integral part of value creation, not just an automation tool. Departing from this gap, this study aims to analyze the use of AI in various aspects of banking services, namely: (1) customer service, (2) fraud detection, (3) robo-advisor, (4) decision support system, and (5) accounting information system. In addition, this study also examines the impact of AI on customer satisfaction, transaction security, brand value, managerial decision-making, and overall bank business performance.

The structure of this article is built systematically. The first part is a literature review which outlines the findings of previous research related to the role of AI in banking. The second part describes the research methods used, followed by results that present the analysis of various studies. Next, the discussion section places the findings in a theoretical and practical framework, before concluding with a conclusion highlighting the research contribution as well as the direction of further development. With this approach, this research is expected to make a theoretical contribution to the academic literature on AI in the banking sector, as well as a practical contribution for banks and regulators in formulating digital strategies that are effective, secure, and oriented towards increasing business value.

2. Literature Review

2.1. AI in Customer Service Banking

The use of AI in banking customer service has increased significantly, especially through the application of chatbots and virtual assistants. Natural language processing-based chatbots, such as the "Cora" used by NatWest, are able to automatically serve thousands of customer queries every day. Research by Belanche et al. (2020) shows that chatbots play a role in improving service efficiency, reducing employee workload, and strengthening the bank's brand image as an innovative institution. Another study highlights the impact of AI on the customer experience. Cheng and Jiang (2020) found that chatbots can improve customer satisfaction because they provide quick responses and personalization based on customer preferences.

This shows that AI is not only a technical tool, but also a strategic instrument in increasing loyalty and brand value. However, resistance from some customers remains. Chen's research (2021) reveals that customers with high-value transactions tend to still trust human services more. Therefore, a hybrid model of combining human interaction and AI is necessary for banks to meet the different needs of different customer segments. Thus, while AI is accelerating communication and efficiency, a technology-based approach and human touch integration is still key to the success of digital banking services.

2.2. AI dalam Fraud Detection

Fraud detection is one of the most critical areas in the implementation of AI in banking. With the rise of digital transactions, cybercrime and financial fraud are also on the rise. AI is present as a solution by utilizing machine learning to detect anomalous patterns in financial transactions. According to the Wewege et al. (2020), the use of AI has succeeded in reducing potential losses due to fraud by up to billions of euros every year. Research by Alghofaili et al. (2020) proves that AI is able to increase fraud detection accuracy by up to 30% compared to traditional methods. AI works by studying normal transaction patterns and recognizing deviations that indicate indications of fraud.

This allows the banking system to carry out prevention in real-time, before greater losses occur. In addition, Trivedi et al. (2020) emphasized that AI-based fraud detection not only functions technically, but also builds customer trust in the banking system. This trust is important to maintain the bank's reputation, considering that undetected fraud cases can have a serious impact on the institution's

image. Therefore, the implementation of AI in fraud detection has a dual impact: improving transaction security while strengthening public reputation and trust.

2.3. AI in Financial Advisory and Decision Support Systems

The role of AI in financial advisory is increasingly prominent through robo-advisors that provide automated investment advice. Robo-advisors offer services with low fees, transparency, and ease of access, thus opening up opportunities for retail investors to participate in the capital market. According to Shanmuganathan (2020), robo-advisors are able to provide personalized and objective investment recommendations, increasing investor trust and participation. In addition to investment services, AI also plays a role in the decision support system in the banking sector, especially credit assessment and capital needs. Vanneschi et al. (2018) reported that the use of an AI-based expert system can speed up the credit analysis process by up to 40% compared to manual methods, while improving decision accuracy.

This helps banks reduce the risk of bad loans and improve operational efficiency. On the other hand, the integration of AI in Accounting Information Systems (AIS) is also growing. Askray et al. (2018) found that AI can improve the accuracy of financial reporting, support risk management, and strengthen business performance. Thus, AI plays a role not only in customer service and security, but also in strategic decision-making and management of accounting information that has direct implications for bank performance.

3. Methods

This study uses a qualitative approach with a systematic literature study method to understand the role of Artificial Intelligence (AI) in the banking sector. This approach was chosen because it allows researchers to comprehensively explore the trends, benefits, and challenges of AI implementation based on empirical findings from previous research. With the literature study method, research not only collects fragmented information, but also synthesizes various research results to produce a more complete understanding. The main focus of the research is to explore how AI is used in various aspects of banking services, including customer service, fraud detection, robo-advisor, decision support system, and accounting information system, as well as examine its impact on operational efficiency, customer satisfaction, transaction security, and bank competitiveness.

The data collection process is carried out by searching for academic articles through the Google Scholar, Research Gate and Elsevier as a database. The keywords used include "artificial intelligence in banking," "AI chatbot customer service," "fraud detection machine learning banking," "robo-advisor financial advisor," "AI decision support system banking," and "AI in accounting information system." To ensure the up-to-date of information, only articles published are included. From the initial search results, relevant articles were found, then filtered based on inclusion criteria, namely articles published in peer-reviewed journals, focusing on banking, and explicitly discussing the role of AI. Articles that do not meet the criteria, for example discussing non-banking sectors such as e-commerce or insurance, are excluded from the analysis. After the selection process, some main

articles were obtained which were used as research data sources. All of these articles are stored in Mendeley's reference management software to facilitate citation and bibliography management according to APA standards.

Data analysis was carried out using a thematic analysis approach. In the initial stage, the researcher read in depth each article to identify the themes that emerge. The themes found were then grouped into five broad categories, namely AI-based customer service, fraud detection systems, robo-advisors, decision support systems, and accounting information systems. Once the main themes were identified, the researchers conducted a synthesis process by comparing the findings across studies, so that the general patterns, practical benefits, and challenges of AI implementation could be seen more clearly. For example, the effectiveness of chatbots in improving customer satisfaction was analyzed by reviewing the consistency of results from several studies that addressed similar topics. This approach helps reduce single-interpretation bias while reinforcing the validity of the research findings.

The next stage is interpretation, which is to place the findings in the conceptual framework of digital transformation and banking business strategies. In this stage, researchers not only view AI as a technical tool that functions to increase efficiency, but also as a strategic instrument that can strengthen customer loyalty, increase brand value, and build long-term competitiveness. In addition, this study also seeks to identify gaps in the literature, especially the lack of studies that look at AI comprehensively in various aspects of banking. To maintain the validity of the data, this study applied the principle of source triangulation by comparing the results of various articles for the same theme. Thus, this research method is believed to be

able to provide a comprehensive overview of the use of AI in banking while strengthening the theoretical and practical contribution of the research.

4. Results

The results of this study show that the use of Artificial Intelligence (AI) in the banking sector has a very significant role and has been growing in recent years. An analysis of fifteen key articles selected from the last 5-year period shows that AI has transformed the way banks operate and deliver services, both in terms of internal efficiencies and increased added value for customers. In general, the results of this literature study confirm that AI is not only an operational tool, but also a strategic instrument that can strengthen banks' competitive positions in the face of digital disruption. AI and Machine learning can be used to anticipate and detect fraud, suspicious transactions, defaults, and the risk of cyberattacks, resulting in better risk management. The application of AI and Machine learning is urgently needed to identify mitigation measures against contemporary global economic and financial challenges, including those caused by COVID-19 (Permatasari et al., 2021)

One of the key findings has to do with the application of AI to customer service. The majority of the articles analyzed agreed that chatbots and virtual assistants based on natural language processing have had a real impact on improving the quality of interactions with customers. Chatbots such as "Cora" used by NatWest are a concrete example of how banks can serve thousands of queries every day without directly involving human staff. Research by Belanche et al. (2020) shows that chatbots increase customer satisfaction because they are able to provide fast,

accurate, and consistent answers. The same thing is also affirmed by Cheng and Jiang (2020) who found that AI plays an important role in creating personalized customer experiences, for example by providing product recommendations based on transaction history and individual preferences. The operational efficiency of banks has also increased significantly as employees' workloads can be reduced, allowing them to focus on more complex value-added services.

However, some studies have also highlighted the limitations of the application of AI in customer service. Chen et al. (2021) noted that there is resistance from certain customer segments, especially those who make high-value transactions or who need more complex financial services. They tend to trust human interaction more than AI. Thus, banks are advised to adopt a hybrid service model that combines the speed and efficiency of chatbots with a personal touch of human power. These findings show that AI is not a total replacement for human resources, but can instead be a complement that strengthens the quality of services.

The second dominant aspect in the literature is the use of AI in fraud detection. The significant increase in digital transactions has made the banking system more vulnerable to cybercrime. To overcome this challenge, banks use machine learning algorithms that can detect abnormal transaction patterns in real-time. Wewege et al. (2020) reports that the adoption of AI has reduced fraud losses by billions of euros every year. Research by Alghofaili et al. (2020) confirms that the use of AI increases detection accuracy by up to 30% compared to conventional methods. AI-based systems are able to learn normal transaction patterns and identify suspicious deviations, so that prevention can be done before greater losses occur.

In addition to technical benefits, the application of AI in fraud detection also has a significant reputational impact. Trivedi et al. (2020) found that the success of AI systems in preventing fraud increases customer trust in banking institutions. This trust is an important social capital that determines the sustainability of the banking business, considering that the bank's reputation is very sensitive to security issues. Thus, AI-based fraud detection not only serves as a technical tool, but also as a strategy to build long-term credibility and loyalty.

The role of AI in financial advisory is also an important highlight. Robo-advisors emerged as an innovation that facilitated the wider public's access to investment services. Shanmuganathan (2020) shows that robo-advisors are able to provide personalized, objective, and transparent investment recommendations at a low cost. This opens up opportunities for retail investors who were previously constrained by access to professional financial advisors. In addition, robo-advisors are considered to increase financial inclusion because they reach a wider market segment.

However, challenges arise in terms of customer trust in AI in managing high-value investments. Some studies have found that investors with large portfolios still doubt AI's ability to deal with volatile market conditions or economic crises. Psychological factors in the form of the need for reassurance and a sense of security from human advisors remain obstacles to the full adoption of robo-advisors. Therefore, the literature results show that the success of the implementation of robo-advisors is highly dependent on the bank's communication strategy in

convincing customers of the reliability of the system, as well as the possibility of integrating human services into complex investment decisions.

In addition to investment services, AI has also been proven to strengthen decision support systems in the banking sector. Vanneschi et al. (2018) found that the use of AI-based expert systems in credit scoring increased the speed of the analysis process by up to 40% compared to manual methods, while increasing the accuracy of risk assessment. This not only helps banks streamline the lending process, but also reduces the potential for non-performing loans. With the ability to analyze large amounts of data quickly, AI allows banks to make more objective and consistent data-driven decisions. The integration of AI in decision support systems also has implications for capital allocation and risk management. With predictive analytics, banks can plan capital allocation strategies that are more adaptive to market changes. Recent research confirms that AI-based systems are able to provide more accurate projections of capital needs in the future, thus helping management in maintaining institutional financial stability.

In addition, the use of AI in the Accounting Information System (AIS) is an interesting finding in the literature. Askray et al. (2018) shows that the integration of AI in AIS improves the accuracy of financial reporting, reduces the risk of human error, and speeds up the internal audit process. This supports transparency, accountability, and risk management efficiency. In other words, AI not only plays a role in external aspects such as customer service and security, but also strengthens the internal functions of banks that are directly related to business performance. The results of the overall literature analysis confirm that the implementation of AI brings

multidimensional benefits to banking. From an operational perspective, AI improves the efficiency, accuracy, and speed of business processes. Externally, AI strengthens customer satisfaction, loyalty, and trust, which contributes to the bank's brand value.

However, on the other hand, the results also show that there are challenges in the form of customer resistance, ethical issues related to the use of data, and the need for more adaptive regulations. Most research agrees that AI has not been able to completely replace the human role, especially in high-value services that require empathy, flexibility, and moral consideration. Therefore, the most effective AI implementation strategy is to integrate the power of technology with human added value. In general, the results of this study show that AI is not only an operational technology, but also an important part of banks' business strategies in the digital era. Banks that are able to manage AI integration well will have an edge in the face of global competition, strengthen customer loyalty, and create long-term business value. However, in order for the benefits of AI to be maximized, a balanced strategy is needed between technical efficiency, data protection, and a humanist approach to customer needs.

5. Discussion

The findings of this study show that the implementation of Artificial Intelligence (AI) in the banking sector has a significant impact both operationally and strategically. From the analysis of the literature, it can be seen that AI has a major contribution in five main areas, namely first, in the customer service dimension, chatbots and virtual assistants have proven to be effective in improving

communication efficiency and customer satisfaction. This is in line with the theory of service quality which emphasizes the importance of speed, consistency, and personalization of services in shaping customer satisfaction. However, the literature also confirms the resistance of customers to AI-based services, especially in high-value segments that require a human touch. This phenomenon reinforces the view that AI cannot completely replace the role of humans, but rather should be positioned as a complement within the framework of augmented intelligence. In other words, the success of an AI-driven customer service strategy relies heavily on the balance between the efficiency of technology and the warmth of human interaction.

Second, when it comes to fraud detection, AI clearly provides a comparative advantage over traditional systems. Machine learning algorithms allow for real-time identification of abnormal patterns, thus preventing large losses for banks. This is relevant to risk management theory, where risk prevention is more valuable than mitigation after losses have occurred. However, the literature discussion also highlighted ethical and regulatory issues related to the use of customer data in AI model training. If data protection regulations are not strengthened, it will actually pose new risks in the form of data leaks and misuse of personal information. Thus, the main challenge in the application of AI for security is not only a technical issue, but also legal compliance and good data governance.

Third, in the aspect of financial advisory, robo-advisors are considered an innovation that increases financial inclusion and accessibility of investment services. However, the problem of customer trust in AI capabilities is still an obstacle. From

the perspective of technology adoption theory, trust and perceived risk factors have a great influence on the acceptance of new technologies. Therefore, while robo-advisors offer cost efficiency and personalization, banks must still build effective communication strategies to increase trust. The combination of AI-based services and human advisors has the potential to be a hybrid solution that can answer the needs of a segment of investors with different levels of trust.

Fourth, the role of AI in the decision support system shows how technology can accelerate and improve the quality of credit decision-making and capital allocation. This is consistent with decision-making theory that emphasizes the importance of speed and accuracy in a dynamic business environment. However, the literature discussion confirms that over-reliance on algorithms can pose new risks, for example data bias that results in discriminatory decisions. Therefore, algorithmic transparency and regular audits of AI models are essential for decision support systems to truly improve managerial quality without sacrificing the principles of fairness and ethics.

Fifth, the integration of AI in accounting information systems shows that this technology affects not only external aspects, but also internal aspects of banks. AI is proven to improve reporting accuracy, speed up audits, and reduce the risk of human error. This supports the view that AI is able to strengthen corporate governance through transparency and accountability. However, the success of implementation is heavily influenced by the organization's readiness, including the availability of technology infrastructure, human resource skills, and top management support.

This discussion emphasized that AI in the banking sector cannot be seen only as a technical innovation, but also as a business strategy that has an impact on customer satisfaction, brand value, security, and long-term competitiveness. Despite its significant benefits, the application of AI still faces challenges in the form of user resistance, ethical issues, algorithmic bias, and data protection regulations. Therefore, the ideal AI implementation strategy is to integrate technological efficiency and humanist values, accompanied by adaptive regulation and transparent governance. By placing AI as part of a holistic business strategy, banks can maximize the benefits of this technology, not only in optimizing operations, but also in building long-term, sustainable relationships with customers.

6. Conclusion

This research confirms that Artificial Intelligence (AI) has become an important element in the digital transformation of the banking sector. The results of the literature review show that the application of AI has a multidimensional impact: increasing operational efficiency, strengthening security, improving service quality, and building brand value and customer loyalty. The implementation of AI in five main areas of customer service, fraud detection, robo-advisors, decision support systems, and accounting information systems shows that this technology is able to answer the classic challenges of banking while opening up new opportunities in creating sustainable business value. In terms of customer service, AI-based chatbots have been proven to increase customer satisfaction despite the persistent resistance, especially in the high-value segment. When it comes to fraud detection, machine

learning algorithms allow banks to detect abnormal patterns in real-time and prevent large losses, although there are still challenges related to data protection. Robo-advisors provide wider and cheaper investment access, but still face obstacles in the form of user trust. AI-based decision support systems accelerate and improve the accuracy of credit decisions, although the risk of algorithmic bias should be anticipated. Meanwhile, the integration of AI in accounting information systems has been proven to support transparency, accountability, and internal risk management.

Despite its great benefits, the study also reveals that AI has not been able to completely replace the role of humans. The best strategy for banks is to adopt a hybrid model that integrates AI technology with the advantages of human interaction. In addition, adaptive regulations, strict data protection, and transparent governance are absolute requirements for AI implementation to provide optimal benefits without creating new risks. Thus, AI is not only an operational tool, but a holistic business strategy that is able to strengthen the competitiveness of banking in the digital era. Further research is needed to explore the integration of AI within the framework of a bank's long-term strategy, including its implications for organizational culture, business ethics, and the sustainability of the financial industry.

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