
ROLE OF AI IN ENHANCING FINANCIAL SUSTAINABILITY OF BANKS

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Abstract:

This paper examines the role of artificial intelligence (AI) in enhancing the financial sustainability of banks. As the banking sector faces increasing pressures from evolving market dynamics, regulatory demands, and consumer expectations, the adoption of AI technologies emerges as a crucial strategy for achieving operational efficiency and resilience. Through a systematic literature review, this study explores various AI applications, including chatbots, Robo-advisors, robotic process automation, and advanced fraud detection systems, highlighting their impact on cost reduction, risk management, and customer engagement. The findings reveal that AI not only facilitates informed decision-making through data analysis but also streamlines processes, thereby contributing to the overall sustainability of financial operations. Ultimately, this study underscores the potential of AI to transform the banking landscape, offering insights into how its integration can foster a more sustainable and resilient financial ecosystem.

Key words: Sustainability, Financial Sustainability, Banking, Artificial Intelligence, operational efficiency.

1. Introduction

1.1 Sustainability of banks

Sustainable banking, or the financial sustainability of banks, is an approach that integrates environmental, social, and governance (ESG) factors into financial decision-making. By aligning business practices with sustainability goals, banks aim to generate profit while promoting positive societal outcomes and minimizing environmental harm. Key aspects of this strategy include Environmental Responsibility where Banks support projects and investments that help mitigate climate change, promote renewable energy, and reduce pollution. This may involve financing green initiatives or adopting internal policies to lower their own carbon footprint, Social Impact that is Financial institutions focus on lending to projects that benefit communities, such as affordable housing, healthcare, education, and small businesses. By doing so, they contribute to economic inclusion and social development and Governance i.e. Sound governance practices ensure transparency, accountability, and ethical behaviour. This includes clear risk management, responsible lending practices, and an emphasis on long-term stability over short-term profit. The overall goal of sustainable banking is to create a balance where banks are profitable while fostering long-term societal well-being and environmental protection. This aligns with the broader global push for sustainable development.

1.2 Financial sustainability of banks

Financial sustainability of banks refers to their ability to maintain financial health over the long term while effectively managing risks and meeting regulatory requirements. Banks must generate sufficient profits to cover operating costs, provide returns to shareholders, and reinvest in their operations. When evaluating the performance of financial institutions, two key aspects of financial sustainability are commonly examined: operational self-sustainability and financial self-sustainability (Wafula, 2017). Operational self-sustainability measures whether the institution generates sufficient revenue to cover its direct costs, excluding capital costs but including financing expenses (Nyamsogoro, 2010). In contrast, financial self-sustainability reflects the overall financial stability and health of the institution.

- In survival mode, financial institutions struggle to cover their costs.
- In sustainability mode, institutions rely on donations and grants to meet their expenses.
- In self-sufficiency mode, the institution's income is enough to cover all its costs (Reid, 2010).

1.3 AI and financial sustainability of banking

AI is playing a transformative role in helping banks achieve sustainability across various dimensions, from operational efficiencies to better customer engagement and risk management. By leveraging AI, banks are able to reduce costs, manage risks more effectively, and tap into new revenue streams, all of which contribute to their financial resilience in a competitive market. Banks use artificial intelligence to save on the cost of front office, middle office and back office (Anil Suresh, 2020). The ability of AI to quickly process and analyse vast amounts of data is a game-changer across various fields, particularly in sustainability. AI can analyse data from satellites, sensors, and IoT devices to monitor environmental changes, such as deforestation, air quality, and water resources. This enables quicker responses to environmental issues. Reza Farishy (2023) highlights that AI can greatly enhance the banking industry in several key ways. First, by automating routine tasks, AI increases operational efficiency, allowing banks to process transactions and manage customer inquiries more quickly. Second, AI improves precision through advanced data analysis, enabling banks to make more accurate risk assessments and financial forecasts. Finally, AI enhances decision-making procedures by providing insights derived from large datasets, allowing banks to respond more effectively to market changes and customer needs. Overall, these improvements can lead to better customer experiences and increased profitability for banks.

Neha Garg's study (2024) found that various artificial intelligence applications in banking significantly enhance customer satisfaction, particularly through chatbots, wealth management tools, and Robo-advisors. Additionally, AI applications like predictive analytics, cybersecurity, and risk management also provide substantial benefits for bank employees.

Aim and Objective

The primary objective of this study is to investigate how AI can support sustainability in the finance sector with special reference to banks. It aims to explore ways in which AI technologies can be utilized to better incorporate environmental, social, and governance (ESG) criteria into financial decision-making processes. By doing so, the study seeks to contribute to the broader goals of sustainable development in banking sector.

2. Research Methodology

This study conducted a systematic literature review to examine the role of AI in enhancing the financial sustainability of banks. The research involved a comprehensive and methodical process to identify, select, and evaluate relevant studies from a variety of sources, including academic journals, conference proceedings, and other scholarly publications. Many electronic databases including Google Scholar, EBSCO Host, IEEE and Scopus were utilized to conduct the study. An electronic search was carried out on the selected title using AI, Financial Sustainability, Banking, AI on Banking as keywords.

Inclusion Criteria:

- a. The article must focus on the application of artificial intelligence (AI) in banking, with an emphasis on sustainability.
- b. The submission should be a full-length paper.
- c. The publication must be in the English language.

Exclusion Criteria: studies that did not fit the inclusion requirements and duplicates or irrelevant to the topic.

3. Results of the study

3.1. AI applications in Banking and its financial sustainability.

Jain (2023) highlights the diverse applications of AI in the banking and finance sector, such as fraud detection, credit scoring, customer service, and investment management. These uses have enhanced operational efficiency and contributed to a more sustainable approach to financial services.

Sayiwal (2020) emphasized that AI-powered chatbots are among the most effective strategies for banks, as they can significantly improve customer satisfaction and help retain loyal clients. These chatbots play a crucial role in customer support by addressing queries, assisting with transactions, and offering personalized recommendations. By providing fast responses and around-the-clock assistance, chatbots enhance the overall customer experience. This continuous availability not only streamlines banking services but also boosts customer satisfaction by making interactions more efficient and responsive.

According to Ambika et al. (2020), the study found that private banks are increasingly leveraging various AI technologies to enhance customer satisfaction. These AI services are aimed at improving not only the financial services provided but also the overall customer experience. The implementation of AI is intended to address customer dissatisfaction with

banking services by making them more efficient and effective. As a result, private banks are seeking to offer more tailored and responsive services to meet customer expectations and improve their overall satisfaction.

In their study, Serge et al. (2020) explained that the rise of AI is driven by two key factors: first, the digitalization of the economy and the automation of current processes, and second, a disruption in the way services are delivered, which is made possible by utilizing the data and insights generated through AI technologies. This dual influence is pushing industries to adopt AI, both to enhance operational efficiencies and to transform the way services are offered to consumers.

Suresh Raghavan et al. (2021) highlighted the impact of AI applications adopted by banks and examined the performance improvements resulting from the integration of AI techniques. Their study found that the implementation of digital banking and AI technologies led to a positive increase in HDFC Bank's financial performance, profitability, customer growth, and net promoter score.

Leonard Shambira (2020) concluded in his study that the key factors driving AI adoption in the banking sector are cost reduction, improving customer satisfaction, and the need to effectively address the challenges associated with adopting AI.

3.2 Impact and effectiveness of AI Applications on financial sustainability of Banks.

Majad Mohammed et al. (2022) stated that AI applications play a crucial role in driving organizational innovation, particularly in Jordanian commercial banks. Among the most important AI applications in these banks is the fuzzy logic system.

Rashmi R et al. (2021) conducted a study to analyze and assess the impact of AI on bank performance. The findings indicated that AI significantly enhances banking processes, providing better customer satisfaction compared to traditional banking services. Additionally, the application of AI improves the operational performance of banks and contributes to reducing operational costs.

Krunoslav Ris et al. (2020) conducted a study to emphasize the need for improving the efficiency and effectiveness of service delivery in financial institutions, as well as increasing their profits. The study highlighted the potential of replacing human roles with automated virtual assistants and chatbots. The research concluded that over time, technologies such as virtual assistants, chatbots, holograms, and physical robots would evolve and dominate the market due to their affordability. Furthermore, the study confirmed that customers prefer using virtual assistants and chatbots over visiting bank branches..

Abdallah Abusalma (2021) concluded in his study that artificial intelligence directly impacts job performance through the use of Genetic Algorithms and Intelligent Systems, particularly in specific conditions and experiences unique to bank managers. Additionally, the growing interest in AI enhances the efficiency of banks and strengthens their ability to perform banking operations both internally and externally.

Ren et al. (2023) explore the intersection of sustainable finance and blockchain technology through a systematic review that emphasizes the transformative potential of

artificial intelligence in driving technological disruption within the finance sector. Their research outlines future pathways for FinTech, highlighting the role of AI in addressing potential challenges and enhancing the sustainability of financial practices.

The case of special purpose vehicles for sustainable finance in Romania, particularly regarding intelligent robotic systems, as discussed by Bernardini et al. (2021), highlights the role of artificial intelligence in facilitating innovative financing mechanisms such as venture capital and thematic exchange-traded funds. Success in this domain largely hinges on the ability to integrate AI with existing financial structures to improve decision-making and operational efficiency.

4. Discussion

The purpose of this study is to understand the role of AI on financial sustainability of banks. The analysis of literatures of several research papers clearly showed that adoption and implementation of AI on banking helps to increase in operational efficiency as well as profitability. Adoption of Chatbots, Robo advisors, virtual assistants, AI genetic algorithms, intelligent systems contribute in many ways.

AI in banking especially Chatbots can assist customers in making swift and informed financial decisions. Robo-advisors provide real-time market updates and investment suggestions, guiding customers on potential future stock opportunities Madakam (2019). Additionally, they effectively address a variety of customer inquiries. The ability to respond promptly and understand customers' fundamental needs enhances customer attraction, leading to increased transactions and ultimately driving greater profits for the bank Sabharwal, (2018).

With the latest AI technologies, banking tasks have become increasingly automated (De & Tumelero, 2022). RPA technology can enhance various banking processes, including:

- a. **Automatic Report Generation:** Compliance officers typically review numerous daily reports manually, a process that is time-consuming. An automatic report generation system can streamline this by automatically producing suspicious activity reports and large transaction reports, along with providing analysis.
- b. **Account Opening:** Advanced technologies have simplified the entire account opening process, minimizing manual errors. This automation ensures that account opening forms are completely filled out, with all data securely stored in a large database.
- c. **Credit Document Processing:** RPA has streamlined the complex process of managing loan documents. With this technology, bankers can expedite the processing of various loans, including housing, vehicle, personal, and business loans.
- d. **KYC Updates:** The customer onboarding process can be tedious and time-consuming due to the need for verifying multiple documents.

Hence AI reduces the manpower required for routine banking tasks over the long term, leading to lower operating costs and increased operational efficiency. By cutting costs on day-to-day activities, AI ultimately helps maximize profits for the bank.

- e. The rise in bank-related fraud has become a significant and alarming concern within the financial sector. However, fraud detection techniques have enabled banks to respond quickly, which in turn helps build customer trust. AI technologies possess great potential for detecting and minimizing fraud. Using advanced machine learning, AI can identify irregular behaviour patterns and unusual activities in accounts. As a result, it is evident that AI plays a crucial role in detecting fraud and reducing future risks, ultimately contributing to profit maximization (Narula & Narula, 2021).

Limitation of the study

Although this is one of the few comprehensive systematic reviews on the application of artificial intelligence in the banking sector and its impact on financial sustainability, there are some limitations. This review does not include unpublished literature or papers published in languages other than English. While there are numerous articles discussing the application of AI in banking and its effects on sustainability, most of the reviewed literature focuses specifically on AI in banking and the financial sustainability of banks.

Conclusion:

The AI applications discussed in the research articles of this systematic literature review indicate that implementing AI in the banking industry has a range of significant effects. These applications are designed to meet the specific needs of banks and their customers. This paper extensively explores various AI applications and their uses, highlighting the benefits of adopting AI in the banking sector. Tools such as chatbots, Robo-advisors, robotic process automation, and fraud detection applications contribute to increased profitability for banks, which in turn supports their financial sustainability.

By leveraging these technologies, banks can enhance customer service, streamline operations, and effectively mitigate risks, ultimately fostering a more resilient financial environment.

The findings of this study highlight the crucial role of AI in enhancing efficiency, accuracy, and sustainability in financial operations. The use of AI technologies, such as the Financial Maximally Filtered Graph algorithm, has proven to be highly effective in processing and analysing large data sets, enabling more informed and sustainable investment decisions. Furthermore, the exploration of AI's various applications within the banking and financial sector demonstrates its potential to streamline operational processes, reduce costs, and promote a more sustainable approach to financial services.

In conclusion, integrating AI into sustainable finance presents a promising pathway to achieving a more sustainable and resilient financial system.

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Promoting sustainability in finance with AI: A review of current practices and future potential-

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