© AUG 2024 | IRE Journals | Volume 8 Issue 2 | ISSN: 2456-8880

The Necessity of Artificial Intelligence in Banking: A Literature Review

AGBALAJA, KAYODE ERIC
Member, Nigerian Institute of Management

Abstract- ***The manifold digital innovations and technological advancements in traditional banking came quickly due to changing customer expectations, thanks to the FinTech companies that sprung up the general digitalisation of developing and developed societies. In retrospect, the significant move to the digital economy has been a win for everyone involved: financial inclusivity, customer retention, easier fraud detection and a faster economy. Artificial Intelligence (AI) is transforming multiple industries, including banking. This paper explores the essential role of artificial intelligence (AI) in the banking industry, focusing on improving customer experience, enhancing operational efficiency, reducing risks, and promoting innovation. This study examines the current use of AI in banking and predicts future developments, emphasising AI's crucial role in influencing the banking industry's future. Artificial Intelligence (AI), from its inception, has inspired the idea of many technologies that are in place at present. In recent times, integrating artificial intelligence in banking is necessary to gain a competitive advantage over modern banks and FinTechs and avoid complacency. While AI is not a new aspect of technology, the recent 2022 boom in its use has exposed more opportunities than ever before. This makes it imperative for the banking sector to adopt some of its uses, for example, early fraud detection, 24/7 customer support, personalized banking services, unbiased credit scoring, financial advisory services, and real-time digital payment solutions. This study reviews the necessity for integrating AI in banking, focusing on possible applications, current use cases and potential risks and challenges in adopting artificial intelligence. This paper concludes that while the benefits outweigh the risks, provided measures are in place, it is essential for banks looking to adopt AI-based solutions to perform extensive research.***

Indexed Terms- ***Artificial intelligence, Banking, Digitalisation, Adoption, FinTech.***

I. INTRODUCTION

Artificial Intelligence (AI) has significantly influenced different industries, transforming company operations and customer interactions. In banking, AI can significantly change established procedures and promote innovation. This study intends to investigate the importance of artificial intelligence (AI) in the banking industry, highlighting its crucial role in boosting customer experience, increasing operational efficiency, reducing risks, and promoting innovation. According to Jakšič & Marinč (2018), the banking sector has undergone a crucial transformation, mostly due to the general digitalisation of all aspects of human life and partly due to competition from FinTech startups. Neo-banks are wooing customers with disruptive innovation in the form of unique products. Technologies such as Automated Teller Machines, Point of Sale, debit cards and credit cards, e-banking, mobile banking (Angko, 2013), Cross-country money transfers, Instant payments, Chatbots and advanced KYC methods with biometrics (Fares et al., 2023) have revolutionized the banking system. Some of these technologies are based on artificial intelligence applications (Dobrescu & Dobrescu, 2018).

Artificial Intelligence includes several technologies that allow machines to imitate human intelligence, such as machine learning, natural language processing, computer vision, and robotics (Mehrotra, 2019). Banks use these technologies to analyse large volumes of data, automate tasks, and get valuable insights, leading to the discovery of new opportunities and improvements in efficiency.

The banking sector is crucial in the global economy, acting as the foundation for financial transactions, investments, and economic development. Banks are required to adjust to evolving client expectations, regulatory demands, and competitive challenges due to the emergence of AI. Banks may achieve a competitive advantage, promote sustainable growth,

and provide exceptional value to clients by utilising AI technology.

This paper argues that AI is essential, not just a luxury, for banks aiming to succeed in a progressively digitised and networked environment. Banks can address the changing demands of consumers and stakeholders by utilising AI-powered solutions to personalise services, optimise operations, mitigate risks, and foster innovation. This article intends to analyse AI applications in banking to provide insights into AI's revolutionary potential and its crucial role in determining the future of banking.

Problem Statement

Despite the adoption of technology, the banking industry still faces numerous challenges due to increasing operational costs, information overload, always-revolving customer expectations, cybersecurity threats, increasing regulatory demands and competition from fintech startups and tech giants. These challenges highlight the need for innovative solutions, which certain aspects of AI can offer.

Aim of the Paper

The paper aims to outline the necessity of artificial intelligence in banking. This will be achieved by examining its effects on operational efficiency, customer satisfaction, personalised product development, fraud detection, and risk management. Additionally, the paper will address the potential risks and ethical guidelines that need to be followed when adopting AI in the banking industry.

Research Questions

To address the current problems, this paper will answer the following key questions:

i. What are the current use cases of AI in the banking industry, and how are major banks around the world leveraging this technology?
ii. What are the potential benefits and risks associated with integrating AI into banking?
iii. What are the ethical considerations and regulation policies to consider with AI adoption in banking?
iv. What is the future outlook for AI in banking?

Evolution of Banking with AI:

- Historical Perspective

The incorporation of AI in banking is not recent but results from years of research, testing, and technological progress. The origins of AI in banking date back to the early 1950s when initial efforts were made to create computer programmes capable of doing activities that traditionally demanded human intelligence. AI technologies started becoming popular in the banking industry in the late 20th century due to improved processing power, data storage, and algorithmic methodologies.

During the 1990s, the introduction of neural networks, expert systems, and decision support systems led to the first use of AI in the banking sector. Early AI systems primarily focused on automating regular jobs like data entry, transaction processing, and risk assessment. Although basic compared to current standards, these systems established the groundwork for advanced AI applications developed in the following years.

AI technologies in banking expanded in the early 21st century due to the rapid increase in digital data, the emergence of machine learning algorithms, and the introduction of cloud computing. Banks started using AI algorithms to improve fraud detection, credit rating, and customer service, signalling the beginning of a new era in banking technology. Banks increasingly depended on AI-driven solutions to enhance operations, manage risks, and stimulate corporate growth as AI capabilities advanced.

- Emergence of AI in Banking:

The past decade has witnessed a rapid acceleration in the adoption of AI technologies across the banking sector, driven by several key factors:

a) The banking business has experienced a significant increase in data due to the widespread use of digital channels, mobile devices, and IoT sensors. Banks are overwhelmed with extensive volumes of structured and unstructured data, such as transaction records, customer profiles, social media activities, and market trends. AI technologies allow banks to utilise this data to obtain practical insights, recognise patterns, and make decisions based on data analysis.

b) Stringent regulations require banks to implement strong risk management and compliance practices.

AI enables banks to automate regulatory reporting, monitor transactions for suspicious activities, and verify compliance with regulatory standards. By utilising AI-powered solutions, banks may optimise compliance processes, minimise operational risks, and save expensive penalties.

c) The banking business is experiencing a significant change due to technology advancements, evolving customer demands, and the emergence of non-traditional competitors. Fintech startups and large technology companies are revolutionising conventional banking methods through cutting-edge products and services driven by artificial intelligence. Banks must adopt AI technologies to be competitive, stand out, enhance client experiences, and seize new market prospects.

d) Customer expectations include personalised, convenient, and seamless banking experiences across digital and physical channels. AI allows banks to fulfil these expectations through providing tailored product suggestions, proactive customer support, and user-friendly self-service features. Banks can improve customer interaction, increase brand loyalty, and boost revenue growth by using AI-powered chatbots, virtual assistants, and predictive analytics.

- Growth and Adoption Rates:

Banks have significantly increased their use of AI in recent years, investing extensively in AI-driven solutions to enhance competitiveness and facilitate digital transformation. The global AI in banking market is forecasted to reach $41.1 billion by 2026, with a compound annual growth rate (CAGR) of 23.5% from 2021 to 2026, as stated in a report by Research and Markets. The rise is fueled by a rising need for AI-driven solutions to boost customer experience, enhance operational efficiency, and reduce risks.

Leading banks around the world are deploying AI-driven solutions across various business functions, including but not limited to customer service, fraud detection, risk management and personalized marketing.

Outline of Current Research

Integrating AI into the banking industry has garnered significant research interest from academics and professionals. Generally, these researchers are majorly focused on the possible applications and benefits. Ng (2016) explores how AI can help with loan applications. Digalaki (2022) in Business Insider proposes that the uses of AI are beneficial to retail banking and investment banking, fraud detection, and risk management. However, some researchers, for example, Ashta & Herrmann (2021), Ahmed (2022) and Rao et al. (n.d.) explore some risks associated with AI and barriers that need to be overcome. These include, but are not limited to, bias, illegal data collection, wrong choice of algorithms, data privacy and data losses.

Relevance of the Topic

The topic of exploring the necessity of AI in banking is very relevant in today's age, where AI is reshaping old and new industries. The importance of AI in banking extends beyond just the banks themselves. Integrating AI into banking has significant implications for the industry, the global economy, policymakers, and its stakeholders. AI proposes the opportunity to reimagine the industry's current landscape, which has potential benefits for banks, stakeholders, and customers. Banks can gain a competitive advantage, enhance operational efficiency, and retain and expand their customer base. Stakeholders and customers can benefit from personalized financial services, improved security measures, and a seamless banking experience.

Research Process

This research paper is based on a thorough review of existing academic papers, reports, and industry articles related to the implementation of artificial intelligence in the banking sector. It also includes the analysis of case studies of current AI utilization in banking. Furthermore, it examines ethical guidelines and regulatory policies associated with banking to comprehend the wider implications of incorporating AI in this sector.

II. PRIMARY LITERATURE

Potential Benefits of AI in Banking

Many banks globally are tapping into the potential of AI and many researchers on this topic tend to focus on the available uses and untapped benefits. Citibank (Sinha & Davis, 2018) is one of the banks trying to get ahead of the AI curve. They are evaluating AI-based solutions that will detect abnormal transactions for organizations and solutions that will predict and recommend navigations on their portal, based on customers' behaviours. J.P. Morgan Chase has been continuously researching the potential benefits of AI in banking. The company's research goals are to "establish ethically and good AI to predict economic systems, give their clients a perfect experience, enable secure information sharing, eradicate financial crime, empower their employees, and agentize policy compliance." (J.P. Morgan Chase, n.d.).

Best (2023a) tells us that Wells Fargo's Enterprise Open-Source Data Science Platform helps its engineers lay the foundation for building innovative tools for its clients much more efficiently. Many processes in the banks take quite a long time. Wells Fargo wants to make the average user experience (UX) seamless and less annoying by leveraging AI in account creation, card applications, and other urgent customer needs. The bank also wants to adopt AI into its lending and fraud detection processes (Best, 2023c). "The top three trends for AI in financial markets are data intelligence, prediction (combining data exploration and expert knowledge) and AI-based simulators (including constraint propagation)" says Dr. Eunika Mercier-Laurent in Ashta and Hermann (2023, p. 3).

Kochhar et al. (2019) appraised existing literature for probable AI applications in banking. In their paper, they expound that AI can be used to reduce operating expenses, improve customer service, score creditworthiness, and detect credit card fraud. Umamaheswari et al. (2023) briefly state the use of AI in sales, internal audit, asset management, hedge fund investment and management, performing efficient and accurate calculations, assessing employee effectiveness, and detecting customer emotions. Milojević & Redzepagic (2021) focus on using AI in credit risk management to help improve traditional risk management processes and methods. Milojević & Redzepagic (2021) also carefully outline implementation strategies for banks in the adoption of AI, ML and Deep Learning (DL) in credit risk management. To summarize, banks with data storage and technological capacities will benefit from employing AI usage to simplify processes for better UX, and predictive analytics for risk mitigation in fraud and bad loans and prescribe customized solutions to their clients.

III. METHODOLOGICAL PROBLEMS

Risks Associated with the Use of AI

W. Clement Stone says, "To every advantage, there is a corresponding disadvantage." Technology and AI are not without their problems, but companies that must adopt them have to consider many things while choosing to use them. The major types of risks associated with the use of AI in any industry include ethical risks, security risks and workforce risks.

If choosing to build on existing technology, the technology team must put security checks and bias checks in place. To beat bias, for example, Best (2023b) informs us that Wells Fargo engineers continuously test the systems as well as have independent groups review the products at different points. This method of continuous development and testing is one good characteristic of agile software development which should be adopted for developing the best AI systems. Ghandour (2021) and Citigroup (2023) postulate some drawbacks to integrating AI into banking that should be prioritized. They include consumer concerns, privacy violations and infringement, lack of creativity, authenticity of information, absence of empathy due to machine responses and job loss. Before implementing AI-based solutions, the banks would be better off surveying their customers to determine their concerns and if possible, provide adequate explanations of what the customers stand to gain, what the banks will do to prevent the fears from actualisation, and the ability to opt-out of AI-based services to use alternate services (Best, 2023b).

To avoid privacy violations, it may serve the banks better if the AI systems are built in-house, from scratch. This would help to prevent sharing data with

a third party. Job loss is a major concern of employees, as Ahmed (2022) and Ashta & Hermann (2021) state. However, Ashta & Hermann urge the bank to retain the employees whose jobs AI can easily perform better and redirect the employees into high-level duties. Crosman (2018) says that while jobs being lost may be unavoidable, properly deploying AI software will create opportunities. Human emotions, empathy and analysis are still important and will be redirected to duties where these are necessary. Client-facing services need the human touch, and so they should not be abandoned to AI alone. Ahmed (2022) also informs us about the risk of misinformation and bias in credit scoring. In the last 2 years, the misinformation and hallucination challenges have become worse due to the use of AI image generators like Midjourney, DALL-E and WOMBO Dream increasing in popularity. These generators can create images with useful commands passed to them, so they seem real. Avoiding the risk of misinformation will need the implementation of quality assurance checks. This is a major concern Wells Fargo takes into consideration in its development (Best, 2023b).

IV. CURRENT STATE OF RESEARCH

Current Use Cases

Erica, an AI-powered virtual financial assistant created by Bank of America, achieved over 1.5 billion interactions within just a year of deployment (Aldridge, 2013). In Nigeria, several AI virtual assistants such as United Bank for Africa's Leo, Zenith Bank's ZiVA, Fidelity Bank's Ivy, First City Monument Bank's Temi, Ecobank's Rafiki and Access Bank's Tamada offer customers convenient self-service options (Phillips Consulting Limited, 2024). Wells Fargo's virtual assistant, Fargo™, which is built on Google's Dialogflow, helps customers get quick answers to their queries (Best, 2023a).

Russian banks such as Rosbank, Yandex and Sberbank offer robot advisors to provide advisory services to their customers. These advisors help clients open accounts, process transactions, and offer customised investment advice based on their risk appetite, amount of capital and preferred return rate (Ryzhkova et al., 2020). J.P. Morgan Chase has developed IndexGPT, to offer personalized investment advice to its clients (Rai, 2023). For big-data analytics, Citibank uses AI to perform real-time data analysis (Krigsman, 2022). In fraud detection, Tinkoff Bank uses EyeDES, an explainable AI for detecting anomalies. US Bank also uses machine learning (ML), an area of AI for detecting abnormal behaviours in customer patterns (Ryzhkova et al., 2020). Citibank has a solution called Citi® Smart Match, which uses AI and ML to read and discern remittance information from various sources for extracting crucial information in a faster way for their clients' businesses (Sinha & Davis, 2018).

In their study, Fernández et al. (2023) highlight the significant impact of AI on the banking industry, both in the present and the future. They cite several examples of how banks are leveraging AI to improve their services and operations. For instance, Standard Chartered uses an AI-powered engine called Trade AI engine, which identifies various documents from unstructured data while Banco Satander's Kairo helps its clients make informed decisions on investments by analysing how economic events could impact them. Japanese bank Mizuho uses AI to maintain its systems. Additionally, Barclays employs analytical and generative AI to enhance security through voice recognition and also detect fraud and money laundering in transactions (Barclays, 2024).

V. MY VIEWPOINT

It is important to consider the impact AI brings and will bring into the banking industry globally. The benefits of integrating AI in banking outweigh the risks as long as the banks take measures to combat these challenges. To avoid becoming obsolete and gain a competitive advantage against tech giants and Fintechs, bank stakeholders should identify areas where accurate and faster operational efficiency is needed and consider AI integration in these areas. Improving legacy systems can be expensive; in this case, banks should consider partnering or merging with startups that already have or can implement these solutions. The possibility of reducing operational costs, improving customer experience, reducing employee turnover, reducing security risks, and detecting fraud and abnormal behaviour with AI-based solutions is incomparable to any other technology.

It is crucial to thoroughly research all risks associated with integrating AI before developing any solutions.

Setting up R&D departments to work with technology teams is essential. Due to ethical risks like privacy breaches, misinformation and bias caused by false algorithms, the systems must be continually evaluated with agile software development practices and, if possible, third-party policy audit teams before they are marketed. Banks should strictly adhere to policy guidelines put in place by the government to curb the issues with regulation while ensuring that clients are kept informed of any policy updates. Implementing Explainable AI models, which do not conceal how they work under the hood, can also help prevent these issues. It is equally important for banks not to neglect their employees when adopting AI. Training current employees to do duties that AI will take over in higher-level jobs will ensure employee retention and create other opportunities for software maintainers.

CONCLUSION

Artificial intelligence is becoming increasingly important in the banking industry. Integrating AI can significantly improve the efficiency and accuracy of day-to-day banking functions. It can also enhance customer experiences, reduce security and fraud risks, and ensure compliance with regulatory policies. However, banks must take into account the potential ethical, security, and workforce risks associated with AI. It is the responsibility of banks' stakeholders and technology teams to ensure that these risks are minimized.

REFERENCES

[1] Ahmed, F. (2022). Ethical aspects of artificial intelligence in banking. *Journal of Research in Economics and Finance Management*, *1*(2), 55-63.

[2] Aldridge, A. (2023, July 13). *Bofa's Erica surpasses 1.5 billion client interactions, totaling more than 10 million hours of conversations*. Bank of America. https://newsroom.bankofamerica.com/content/newsroom/press-releases/2023/07/bofa-s-erica-surpasses-1-5-billion-client-interactions--totaling.html

[3] Angko, W. (2013). Innovation in bank payment systems and related services among selected commercial bank branches in Wa municipality. *Innovation*, *3*(9).

[4] Ashta, A., & Herrmann, H. (2021). Artificial intelligence and fintech: An overview of opportunities and risks for banking, investments, and microfinance. *Strategic Change*, *30*(3), 211-222.

[5] Barclays. (2024, January 8). *From intelligence to ability: How Barclays is harnessing AI*. Barclays. https://home.barclays/news/2024/01/how-Barclays-is-harnessing-AI/

[6] Best, E. (2023a, June 13). *Wells Fargo, Artificial Intelligence, and you*. Wells Fargo Stories. https://stories.wf.com/wells-fargo-artificial-intelligence-and-you

[7] Best, E. (2023b, September 12). *How Wells Fargo Builds Responsible Artificial Intelligence*. Wells Fargo Stories. https://stories.wf.com/how-wells-fargo-builds-responsible-artificial-intelligence

[8] Best, E. (2023c, October 5). *Artificial Intelligence has the potential to reshape banking*. Wells Fargo Stories. https://stories.wf.com/artificial-intelligence-has-the-potential-to-reshape-banking

[9] Citigroup. (2023). *Unleashing AI*. Citigroup. https://www.citigroup.com/global/insights/citigps/unleashing-ai

[10] Crosman, P. (2018). How artificial intelligence is reshaping jobs in banking. *American Banker*, *183*(88), 1.

[11] Digalaki, E. (2022, February 2). *The impact of artificial intelligence in the Banking Sector & How Ai is being used in 2022*. Business Insider. https://www.businessinsider.com/ai-in-banking-report?r=US&IR=T

[12] Dobrescu, E. M., & Dobrescu, E. M. (2018). Artificial intelligence (AI)-the technology that shapes the world. *Global economic observer*, *6*(2), 71-81.

[13] Fares, O.H., Butt, I. & Lee, S.H.M. (2023). Utilization of artificial intelligence in the banking sector: a systematic literature review. *J Financ Serv Mark* 28, 835–852. https://doi.org/10.1057/s41264-022-00176-7

[14] Fernández, M., Carrick-Varty, J., Whitfield, P., Mundhra, A., Bastit, B., Damak, M., Charnay, N., Duran, C., McKee, J., Edwards, G., Birry, A., & Kesh, S. (2023, October 31). *Ai in banking: Ai*

will be an incremental game changer. S&P Global. https://www.spglobal.com/en/research-insights/featured/special-editorial/ai-in-banking-ai-will-be-an-incremental-game-changer

[15] Ghandour, A. (2021). Opportunities and challenges of artificial intelligence in banking: Systematic Literature Review. *TEM Journal*, (1), 1581–1587. https://doi.org/10.18421/tem104-12

[16] Jakšič, M., & Marinč, M. (2018). Relationship banking and information technology: The role of Artificial Intelligence and Fintech. *Risk Management*, *21*, 1–18. https://doi.org/10.1057/s41283-018-0039-y

[17] J.P. Morgan Chase. (n.d.). *Research agenda*. Research Agenda. https://www.jpmorgan.com/technology/artificial-intelligence/research-agenda

[18] Kochhar, K., Purohit, H., & Chutani, R. (2019). The rise of artificial intelligence in banking sector. In *The 5th International Conference on Educational Research and Practice (ICERP) 2019* (p. 127).

[19] Krigsman, M. (2022, September 30). *Analytics and Data Science at Citibank*. CXOTalk. https://www.cxotalk.com/episode/analytics-data-science-citibank

[20] Mehrotra, D. (2019). *Basics of artificial intelligence & machine learning*. Notion Press.

[21] Milojević, N., & Redzepagic, S. (2021). Prospects of artificial intelligence and machine learning application in banking risk management. *Journal of Central Banking Theory and Practice*, *10*(3), 41-57.

[22] Napoleon Hill, W. Clement Stone (1960). *"Success Through a Positive Mental Attitude".* p.282, Simon and Schuster

[23] Ng, A. (2016). *What AI Can and Can't Do*. Harvard Business Review. https://hbr.org/2016/11/what-artificial-intelligence-can-and-cant-do-right-now

[24] Phillips Consulting Limited. (2024). *Unlocking the potential: Artificial Intelligence Revolutionising Nigeria's banking sector*. Businessday NG. https://businessday.ng/sponsored/article/unlocking-the-potential-artificial-intelligence-revolutionising-nigerias-banking-sector/

[25] Rai, S. (2023, November 9). *JPMorgan is discussing its generative AI projects with Regulators*. Bloomberg.com. https://www.bloomberg.com/news/articles/2023-11-09/jpmorgan-is-working-with-us-regulators-on-generative-ai-pilot-projects

[26] Rao, A., Verweij, G., & Cameroon, E. (n.d.). *PWC's Global Artificial Intelligence Study: Sizing the prize*. PwC. https://www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html

[27] Ryzhkova, M., Soboleva, E., Sazonova, A., & Chikov, M. (2020). Consumers' perception of artificial intelligence in banking sector. In *SHS web of conferences* (Vol. 80, p. 01019). EDP Sciences.

[28] Sinha, A., & Davis, L. (2018). *AI and Machine Learning Boost Efficiency and working ...* Citibank. https://www.citibank.com/tts/solutions/receivables/assets/docs/AI-Machine-Learning.pdf

[29] Umamaheswari, S., Valarmathi, A., & Iakshmi, R. (2023). Role of Artificial Intelligence in The Banking Sector. *Journal of Survey in Fisheries Sciences*, *10*(4S), 2841-2849. https://doi.org/10.17762/sfs.v10i4S.1722