



A Study on Integration of Artificial Intelligence for Customer Services in Banking.

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DOI : <https://doi.org/10.5281/zenodo.17303605>

ARTICLE DETAILS

Research Paper

Accepted: 18-08-2025

Published: 20-09-2025

Keywords:

*Artificial Intelligence,
Banking, Customer
Services, AI Integration,
Personalization, Efficiency*

ABSTRACT

The integration of Artificial Intelligence (AI) in banking customer services has garnered significant attention as institutions strive to enhance efficiency, personalization, and overall customer experience. This paper seeks to describe how the emerging technologies of AIGC and Virtual assistants are disrupting and/or reinventing customer service in the banking industry. By reviewing recent literature, the research highlights several key themes the ways in which AI spells value co-creation, how automation helps to increase operational effectiveness, and how it is possible to integrate new and old banking systems. AI technologies, including chatbots and machine learning algorithms, help in improving the degree of service customization by collecting customers' data and determining their requirements, which brings customers' satisfaction up. Also, automation leads to effectiveness in operations since it covers activities and minimizes interferences with human interferences. However, there are some issues, the primary ones being data privacy, acceptance among users, and the future relationship between AI and human beings. These issues highlight the need to consider ethical questions and customer relations. Based on the research, the authors are implying that there is a need for effective strategic management on integration of AI within banking systems since there exists a high potentiality of risks. General recommendations include adopting effective measures to secure data

and guarantee that AI solutions act as a helpful supplement to human services. Finally, banks should provide consistent education on AI tools to workers and promote openness regarding AI solutions among consumers. The last section of the article provides a brief discussion on the advancement of AI in banking customer services and the need for subsequent research regarding the issues with the implementation of AI that hampers competitive advantage.

INTRODUCTION

The advancement of AI has been very fast, and it has impacted the banking industry especially in matters concerning customers. With more and more financial institutions utilizing AI technologies, it has become important to weigh the implications of their usage with regards to customer experience, effectiveness, and individualization of services. This paper aims at exploring how the incorporation of AI has been undertaken in the provision of banking customer services, as well as the impact and issues arising from the integration process. The banks are now in the process of implementing new AI technologies that are assisting them in producing improved and efficient services from their clients. For instance, customers are provided with value added service features such as humans as intelligent chat bots who assist or respond to customer inquiries at any time of the day, enhancing service accessibility and efficiency. Banks have also been applying machine learning with customer information to predetermine the other products and solutions. Therefore, the article will attempt to provide an overall evaluation of the current advanced AI function in respect to the scales of value co-creation reinforcement, banking operations automation, and customers relations enhancement. The results will establish the knowledge of the various ways that bank organizations can employ in enhancing the application of AI technological solutions in their competition and in the various ailments that arise from this technological application.

THE IMPACT OF AI ON CUSTOMER SERVICES AND OPERATIONAL EFFICIENCY IN BANKING

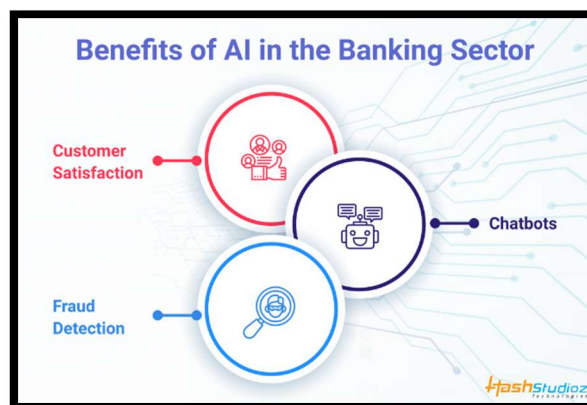




Figure 1: Impact of AI on Customer Services and Operational Efficiency in Banking

(Source: Ameen *et al.*, 2021)

As observed from prior work, it is evident that the integration of Artificial Intelligence (AI) has a significant impact on customer services in the banking industry. As highlighted by Manser Peltier and Barger (2021), AI has a strategic interest in enhancing value co-creation process within the context of a mobile bank. They evidence the impact that AI has on the functional and emotional value persuasion factors that are important for improving customer-perceived enjoyment and sense of security. In this way, AI develops these dimensions that help to provide services at a better pace and satisfy the consumers (2021). In a similar vein, Uma Maheswari and Valarmathi (2023) also underscore how AI disrupts operational banking models. They discuss that their work shows that the use of AI and automation improves not only the number of sales, and profitability but also have a positive effect on decreasing the dependence on human resources. With the change in this trend, the efficiency of banking services can be improved through moving most of the services towards automated systems for the concept of personalized banking services, Deng et al. (2024) discusses artificial intelligence generated content (AIGC). They explain how AIGC enables better tailoring of services and how it contributes to digitalization efforts. Thus, this approach helps banks to approach the needs of each individual client more accurately and enhance the overall level of customer satisfaction. The problems facing AI implementation are also discussed (Mogaji and Nguyen, 2022). Their research highlights the challenges that managers face in adopting AI faster and addressing issues of ethics. Despite recognizing AI's potential, banks must navigate these challenges to integrate AI effectively into their operations. Eni et al. (2023) provide insights into the integration of AI and big data analytics within the Indian banking sector. They state it enhances personalization and detects fraud, but also state major impediments including data privacy and integration with existing systems. This shows that the integration of AI brings about both opportunities and risks at the same time.

Javaid (2024) provides a general view of artificial intelligence and specifically its beneficial effects in financial services. As detailed by His findings, AI is a competitive necessity for banks as it harnesses data and predictive analytics for operation efficiency. Ashta and Herrmann (2021) present an overview of the opportunities and threats of using AI in financial services cost optimization being among them and data prejudice. One of the features of their study is the focus on the benefits and threats of AI integrated into financial organizations as per Kingsthorpe and Thalmann (2020) present several applications of artificial intelligence in commercial bank, some of which can be associated with behavioral finance research

prospects. It poses AI to enhance lending, payment security, and compliance but also discusses the barriers such as user acceptance Lee and Chen (2022) focus on the variables that determine the use of AI mobile banking applications. Their study shows that perceives cost, risk, and trust are important attitudinal factors influencing user adoption. It highlights the need to ensure that the features of AI reflect what users would want to see and thus increase the usage Yau et al. (2021) postulates a theoretical framework for how organizations can effectively use AI in marketing to foster trust and loyalty. Their studies align with the idea that AI-generated information enhances customer participation and satisfaction Ameen et al. (2021) wrote about the role of AI in enhancing the experience of the consumers in the retail sector and highlighted the role of trust and commitment. These are applicable to the banking context in which these factors determine customers' interactions with AI services Xu et al. (2020) examined the performance of AI and human customer service and established that customers prefer the AI service for simple transactions. This implies that there is a need for banks to deploy AI in responding to standard customer inquiries while enhancing the human service channel for complex issues This paper by Prentice Dominique Lopes and Wang, (2020) examines the moderation between AI and human service quality on satisfaction. Their research shows that while AI can improve service quality, it reduces the positive effects as it is integrated alongside human involvement, thus necessitating moderation.

PERSONALIZATION AND CUSTOMER EXPERIENCE THROUGH AI

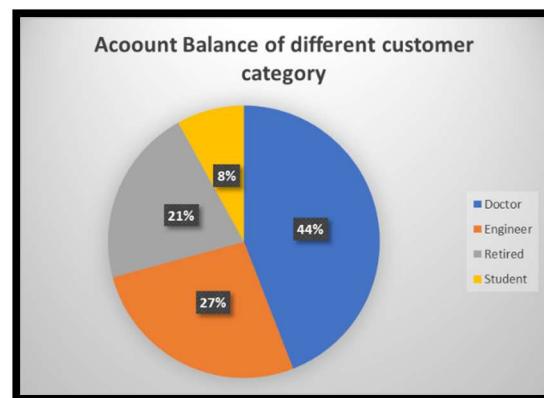


Figure 2: Account Balance by different customer service category

(Source: Excel)

Account Balances by Profession:

Cumulative account balance also revealed that doctors have the highest total account balance of 5.67 million, followed by engineers (3.43 million), retired personnel with (2.72 million), and students with only (1.03 million).. This distribution also shows that professions with capacities, such as incomes,

expected to earn higher balances such as doctors and engineers. Students are expected to have the least balances possibly because they are still budding earners. As for the banks, this knowledge could be applied to provide the opportunities to invest for the high balance earning professional or the effective saving plans for the student.

Login Attempts by Channel:

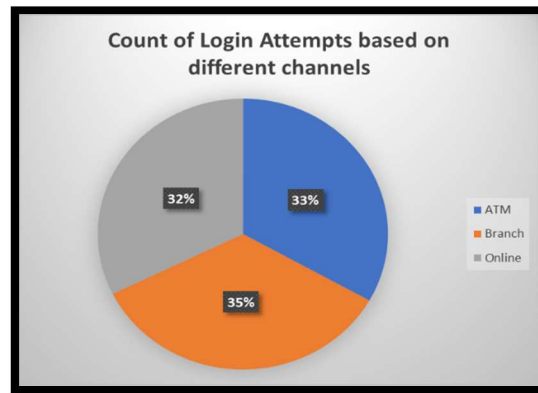


Figure 3: Login attempts in different channel

(Source: Excel)

The attempt distribution – ATM is slightly higher with 833 compared to branch that had 868 and online that had 811 attempts. But branch logins are slightly ahead meaning customers are still spiriting towards the physical branch's contrary to the digital conversion. Online usage is proximal, indicating an increased concern with online usage. Thus, AI can be used by banks for improving the delivery of online banking services through offering customized Web front ends or self-service agents and by also applying AI for managing lines in branches by implementing intelligent line management systems.

The efficiency and efficacy of personalized marketing through various AI tools such as chatbots and virtual assistants, the ability to build up machine learning algorithms to enhance customer interactions to the next level is yet another benefit that banks derive from the use of AI. These algorithms can record customers' behaviors, preferences and past transactions, this makes it possible for banks to adapt to new changes in their services. For instance, AI can analyze the entries of a customer and alert the bank when it seems like the customer may need help understanding loans or when it is introducing investment products (Uma Maheswari and Valarmathi 2023).



The development of new AI technologies, it is expected that banks will employ more advanced tools to improve their customer relations. For instance, facial recognition techniques and fingerprints scanning enhance the processes of security, making it easier and faster for customers to access their accounts. Integrated voice banking from voice-controlled assistants would enable the customers to make transactions, check their account balance, and consult the bank for any financial advice by interacting through natural language. Additionally, first-level predictive analytics will help the banks to draw insights of customer needs etching out solutions like investment recommendation, suitable loan products and services at the right time.

AI AND RISK MANAGEMENT IN BANKING

In addition to enhancing customer service, AI plays a critical role in strengthening risk management within the banking industry. Artificial intelligence systems can identify fraudulent activities in real-time, which means banks can prevent such occurrences in good time. AI plays an essential role in increasing the speed and effectiveness of fraud detection when it is based on the analysis of transactions, their identification of deviations, and the prognostication of possible threats (Deng *et al.*, 2024). Additionally, AI improves credit risk scoring, where an examiner applies machine learning algorithms to determine credit risk instead of conventional methods. It helps the banks to avoid a higher rate of defaults on loans and thus reduces financial risk among banks. AI also helps in avoiding Regulations Violation as it simplifies the work of monitoring the transactions and observing the required legal orders resulting in minimization of contractual default and regulatory fines.

AI is also applied in operational and financial resignment besides the fraud detection and credit assessment that is mostly associated with the AI technology. This artificial intelligence can empower real-time big data to recognize market trends and their financial problems like liquidity crunch or price volatilities in assets. This forecast function allows the banks to minimize their vulnerability to external changes in other markets by earlier preparation or defense. For example, opportunities may consist of identifying customers or partners that have early indications of financial troubles before they finally default, enabling banks to adapt their strategies or avoid certain transactions. Furthermore, AI helps with the execution of the scenario analysis and stress testing, in which the banks can determine how well-prepared they are for certain economic or financial circumstances (Deng *et al.*, 2024). These simulations are beneficial in terms of risk assessment and visualizing how the alteration of such risk factors as an interest rate or a currency rate may affect a bank's portfolio or functioning. In this way, AI helps banks reduce the risks, significantly improve the accuracy of the data in early warning systems and strengthen

their strategic decisions while making them more adaptable to future changes and the appearance of new threats. AI also plays a role in enhancing security, which is an essential factor in any industry, especially in matters of risks in banking. As the problem of cybersecurity attacks intensifies, artificial intelligence applications can analyze the traffic within networks, identify deviations in traffic patterns, and signal possible security invasions.

Optimizing of the risks is not limited to the use of AI tools in the analysis of the models of the possible scenarios, as well as in identification of information security threats thus, AI contributes towards the improvement of the potentiality of an assigned banking organization in the early identification of the risks, both for the individual operations and for the general processes. Another advantage is that the use of AI-driven systems allows for monitoring large volumes of transactions and identifies suspicious activities in real-time, which is beneficial when addressing emerging threats.

THE MULTIFACETED IMPACT OF AI ON BANKING: ENHANCING CUSTOMER SERVICES AND OPERATIONAL EFFICIENCY

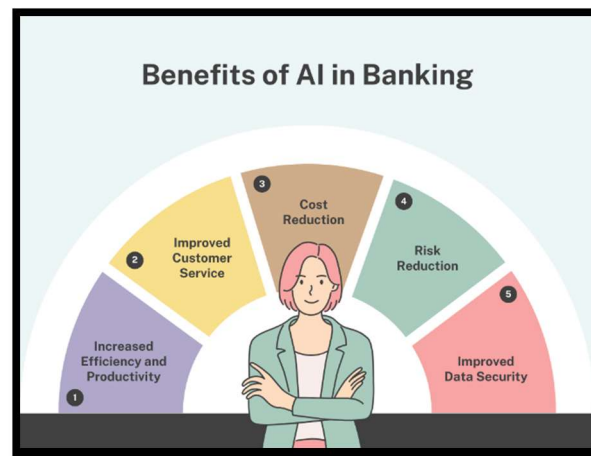


Figure 3: The Multifaceted Impact of AI on Banking: Enhancing Customer Services and Operational Efficiency

(Source: Manser Peltier and Barger, 2021)

The findings from the studies on AI in banking reveal a multifaceted impact on customer services and operational efficiency Manser Peltier and Barger in 2021, it was established that AI improves both functional and emotional value offerings in the context of mobile banking. According to their quantitative study, which was based on measurements related to the effectiveness of integrating AI into the schemes,

the technology addresses the utilitarian aspect of the service as well as customer emotional expectations for enhanced satisfaction of the overall service experience. Later in 2023, Uma Maheswari and Valarmathi established that AI and automation lead to higher operating performance and business revenue while minimizing the reliance on human capital. In it, they underscore how these technologies transform banking and its services, thereby making operations efficient and depersonalized. Deng et al. (2024) emphasized the importance of AIGC in establishing tailor-made banking services. Exploratory research by S & P highlighted how AIGC fosters service personalization, thereby driving the digital agenda and improving customer satisfaction through better alignment of services. Mogaji and Nguyen (2022) are managerial and ethical obstacles in the implementation of AI into the field. The qualitative results of this study offer lessons on the experiences that banks face when implementing the AI solution, which requires correct analysis for distortion when implementing the solution.

Monthly Transaction Amounts:

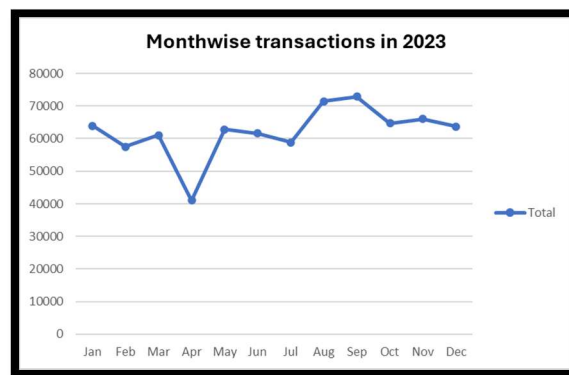


Figure 4: Month-wise Transactions in 2023

(Source: Excel)

The transaction amounts fluctuate on a monthly basis – the highest being in August the amount of (71,438) and September at (72,832) while the lowest being in April at (41,004). These observations could relate to regular expenditure cycle, including summer or, for instance, holiday expenses in the end of the year. Banks can utilize AI in order to apply statistical analysis to the periods of time when customers generally spend more money in order to propose appropriate offers, such as credit or loan products. Likewise, April's decline could be suggestive of a requirement for sales promotions strategies for enhancing transactions volumes during the low seasons.



Eni et al. (2023) also agreed with this view stressing the advances in the application of AI in different fields including personalization and fraud detection as well as the major issues in data privacy and system integration. A brief discussion with reference to Javaid (2024) highlighted the advantages of AI regarding efficiency, quality, as well as control of risks and values of customers. In their analytical research they described how the use of AI applications amplifies various kinds of values in banking services and re-establishes competitiveness. The literature reviews by Ashta and Herrmann (2021) continued to provide a proper perspective of AI wherein it explained the advantages and disadvantages of AI such as cutting costs and the possibility of data biases. In addition, Lee and Chen (2022) outlined the significant factors that influence the adoption of AI in the mobile banking application and Yau et al. (2021) and Ameen et al. (2021) presented the advantages of AI analysis to the customers' relationship and trust. Xu et al., 2020 noted that the positive effects of AI are more pronounced in cases of low working complexity, Prentice Dominique Lopes and Wang, 2020 to explain how human service will be with the integration of AI into the world and how it requires a relatively moderate approach. Finally, Bock Wolter and Ferrell (2020), spoke about AI disruption and organizational change and presented AI as the agent of change for the service sector.

Research proves that AI aids not only in the efficiency of the mobile banking services' operation but also the customers' moods and feelings, thus leading to increased satisfaction. AI-based solutions help enhance the customer experience since they address both the utilitarian requirements and affective considerations. AKI and automation technologies are also known also to produce significant gains in operating productivity and profitability (Königstorfer and Thalmann, 2020) Since artificial intelligence delivers more personalized and targeted encounters, it contributes to the banking industry's digital evolution that makes solutions precisely reflect the customers' requirements and inclinations (Ooi *et al.*, 2021). This personalization fosters increased customer loyalty and satisfaction to different levels. Still, several obstacles are experienced when implementing AI in the banking sector.

CONCLUSION

The integration of AI in the banking sector has pioneered the need for better customer interaction and equally, a higher level of efficiency. In the case of mobile banking, a few studies have examined the functional and emotional aspects to establish that the implementation of AI has a radical impact on customer satisfaction and experience. There are challenges to realizing the gains of AI, though, banking inspired by these technological developments like automation has its merits in risk management and service delivery. Therefore, the effective organization of AI benefits that it can offer, and the avoidance



of the problems that may arise are the main tasks for banks who are willing to retain their leadership and enhance the client satisfaction. Thus, the paper establishes that AI is a critical constituent in the bank, as the industry and its application open future strategies for success.

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