

Artificial Intelligence, Customer Profiling and Satisfaction in the Nigerian Banking Industry in Lagos State

Abiodun, O. and Oniku, A.

¹Scholars School System in partnership with Leeds Trinity University ORCID ID: 0009-0000-6912-3920

²University of Lagos ORCID ID: 0000-0001-8456-6738

Received: 29, 03, 2025

Accepted: 04, 04, 2025

Published: 23, 04, 2025

Abstract

The contemporary marketing environment is developing intensely in technological advancements, with the rising integrations of artificial intelligence (AI) constantly reshaping organizational marketing efforts and tactics to remain competitive. This study investigated the influence of AI on customer profiling and satisfaction variables of customer relationship marketing in the Nigerian banking sector based on a study of customers of selected commercial banking organisations in Lagos state. The study used a survey method involving data collection through primary data sources. A sample of 400 respondents selected using simple random sampling technique and convenience sampling technique. The data was collected using a questionnaire and analysed using means and standard deviations as well as Pearson correlation analysis. The outcomes from the study showcased a significant relationship between personalized chatbots, and customer service satisfaction based on R-square 91.8% and probability value of 0.03. In addition, automated messaging systems have a significant relationship with customer patronage based on R-square value of 95.5% and probability value of 0.012. Finally, there is a significant relationship between predictive financial offerings and customer retention based on R-square value of 97.0% and probability value of 0.02. The study established and concluded that AI systems have a profound influence on marketing effectiveness in terms of enhancing customer profiling, engagement, repeat patronage and satisfaction. The study recommended that executives and management of commercial banks in Nigeria should ensure that application of AI systems should fit the customer profile and unique target market characteristics.

Keywords: Artificial Intelligence, Banking, Customer, Customer Relationship Marketing Performance, Technology

Background to the Study

There has been increasing integration of artificial intelligence (AI) in the attainment of customer relationship marketing performance based on the expansive technological disruptions (Stieglitz, Mirbabaie, Möllmann & Rzyski, 2021; Pattnaik, Ray & Raman, 2024). Nigeria as an emerging economy has been observed to have various industries, sectors and organisations, following along with global counterparts on the trend of using AI in collaborations with marketing (Elegunde & Shotunde, 2020; Onobrakpeya & Bayagbon, 2024). This study is carried out to investigate AI is impacting customer relationship marketing performance in the context of the Nigerian banking sector. Customer relationship marketing performance has become very dynamic in the global business environment due to the changes in consumer behaviour, economic pressures as well as socio-political dynamics. It has become pertinent for organisations to look into means of navigating marketing effectiveness as a tool for driving customer relationships. Since, the global pandemic there has been dramatic paradigm shift in application of AI as technology integration and advancement in the banking sector, such that banks across the global and as well as in Nigeria are observed to progressively setting up AI to drive operation and marketing strategies (Marcu, 2021; Darwish & Bayyoud, 2023).

The justification for this study is based on the fact that business organisations are becoming more acquainted and reliant on AI to attain desired customer relationship marketing performance in terms of market coverage, reach, accessibility, engagement, and satisfaction (Zhang, Meng, Chen, Yang & Zhao, 2021; Okoliko, Ayetigbo, Ifegwu & Chidiebere, 2023; Smit, 2024). AI can be described as the design, development, deployment and application of computer technology structures and systems, protocols as well as procedures that can accomplish tasks requiring human intelligence through machine intelligence. These can involve virtual awareness, visual and audio recognition, information processing and exchanging, decision-making, predictions, and transmitting language translations. According to Statista (2023) the top five banks in Nigeria are known to pull high level investments for technology in their banking activities, however the challenge being faced is to what extent AI contributes to return on investment of marketing. As such this study is pertinent to investigate AI in the form of personalized chatbots, automated messaging systems and predictive financial offerings, all impact on customer satisfaction, complaints handling and repeat patronage.

Mogaji and Nguyen (2022) examined AI in the context of business and marketing of financial services in countries such as Canada, United Kingdom, Nigeria and Vietnam. The study showed that there are diverse challenges faced in deploying AI in marketing and business such as adequacy in infrastructure, ease of

use, security and alignment with tasks, this has brought about the need for more research. This study is centred on how AI is used in the banking and financial services for customer profiling and satisfaction in a bid to enhance customer relationship marketing performance in an emerging economy such as Nigeria. It was found that AI transformed and assisted bank interactions with key stakeholders (Mogaji & Nguyen, 2022; Pattnaik, Ray & Raman, 2024), but there are yet to be investigations into the dimensions of the influence on customer profiling and satisfaction aspect of customer relationship marketing.

Previous studies in recent times have been carried out on various forms and applications of AI in contemporary business organizations, industries and economies (Alzaidi, 2018; Syaful, 2019; Elegunde & Shotunde, 2020; Manjaly, Varghese & Varughese, 2021; Omoge, Gala & Horky, 2022; Okoliko et al., 2023). Salemcity, Aiyesan & Japinye, 2023; Shaik, Mohanasundaram, Palande & Drave, 2023; Veerla, 2021; Zhang et al., 2021; Mogaji & Nguyen, 2022, Svoboda, 2023; Pattnaik et al., 2024; Onobrakpeya & Bayagbon, 2024), but there appears to be limited evidence as regarding direct application in the AI and customer profiling and satisfaction in the Nigerian banking industry. As such this study seeks to bridge the gap in literature by investigating the influence of artificial intelligence (AI) on CRM from the perspective of customers of selected banks in Nigeria. This is done through answering the following key research questions:

- i. What is the relationship between personalized chatbots and customer satisfaction?
- ii. To what extent is the relationship between automated messaging systems and customer patronage?
- iii. What is the extent of the relationship between predictive financial offerings and customer retention?

From the standpoint of management and employees in the Nigerian banking industry, it is hoped that the result of this study would be of benefit in providing insights of AI elements in their organizations for engaging customers for increased patronage. The findings from this study would be significant to other kinds of organizations in the Nigerian business environment on how to use virtual assistants to innovate product offerings with the use of AI to enhance customer patronage.

From the standpoint of customers, the findings from this study would better educate them on AI and how it can affect their customer satisfaction, complaints handling and overall repeat patronage intention. The study would be useful in creating knowledge areas for government and policymakers to set guidelines with respect to the integration of AI in banking business and marketing. Finally, the outcomes and findings from this study are significant to academia, researchers, scholars and students by providing additional literature on AI in the Nigerian banking industry as a tool for customer relationship marketing performance in enhancing customer profiling and satisfaction.

Literature Review

Banking Industry in Nigeria

Kolapo, Mokuolu, Dada and Adejayan (2021) described the banking industry in Nigeria as vibrant and dynamic as a major source of demand and supply of financial resources in Nigeria. According to the Statista (2023) the Nigerian banking and financial industry is a key crucial aspect of the economy which is regulated and structured by the Central Bank of Nigeria (CBN). The banking industry in Nigeria is indispensable for its growing provision and

delivery of financial services, products, and access. Most of the banks in Nigeria have their headquarters in Lagos state targeting several forms of commercial activities from individuals, business and society at large (Central Bank of Nigeria, 2023). Currently there are 26 commercial banks, 6 merchant banks, and 4 non-interest banks in Nigeria with various level of competitiveness. The largest and most active banks in Nigeria according to market capitalization and asset base include First Bank Nigeria Holdings Plc, Guaranty Trust Bank Plc, Stanbic IBTC Bank Plc, Zenith Bank Plc and United Bank for Africa Plc (Mogaji et al., 2021; Statista, 2023). The advent of various technological integrations has expanded the operations and performances of banks in Nigeria, this can be observed in the form of increasing physical and virtual number of bank branches, growing automated teller machines networks, use of point of sale terminals, mobile and internet banking, finger print banking as well as auxiliary financial technology platforms increasing and developing banking services for more accessibility, convenience, security and inclusion (Wardoyo & Rusdianti, 2017; Kolapo et al., 2021; Statista, 2023).

Some critical indicators that describe the banking and financial industry in Nigeria include over 95000 employees directly or indirectly facilitate banking operations, diversity of financial products to potential clients, including account opening, whether savings or current, and credit and debit card services. As of 2021, the number of active current bank accounts in Nigeria are reported to be estimated at 133.5 million, while savings accounts added up to approximately 120 million (Statista, 2023). At the recognized level, customer relationship marketing performance of banking and financial organisations can be evaluated in indices such as customer and asset base, tier-one capitalization, profit level, customer satisfaction, patronage, market share as well as brand value (Mogaji et al 2021). This study focuses on how banking and financial organisations in Nigeria are adopting AI to drive customer relationship marketing performance, because according to Statista (2023) the share of the population utilising technology-enabled banking in Nigeria stood at only one percent as at 2015 but has expanded to over ten percent by 2022. Hence, it is critical to observe customer reactions towards AI and CRM.

Concept Review of Artificial Intelligence (AI)

According to Sun (2021) the infiltration of AI in the domain of business and society has given the birth to various conceptualisations of technological innovations, which are notable in diverse contributions to the acceleration and transformation industries and fields. It is considered as intelligence that is functioned by machines or software that thinks, behaves, acts and responds intelligently as the form of a real life human. The domain of AI is based on the interaction between virtual technology and consumers facilitated by virtual environment development, virtual objects development, personalization, sensorial enrichment and spatial interaction (Alzaidi, 2018; Milana & Ashta, 2021).

AI is a software agent that is spoken to or interreacted with through interpreting human speech and responds via auditory arranged voice or chat (Ledro, Nosella & Vinelli, 2022). For example, virtual assistant is AI that can be inferred from the concept of virtual marketing, which is the application of web-based technology, data interchange and virtual reality to engage target market effectively (Ledro, Nosella & Vinelli, 2022). It has been observed that marketers are becoming more and more excited as regarding the possibility of virtual reality in expanding marketing mixes application, this can be seen in major brands such as Google, Facebook and Apple (Jain, Sheth, Mogaji, & Ambika, 2023).

Payne, Szymkowiak, Robertson and Johnson (2011) explained AI as virtual agent as human-like characters that are designed to assist users in interactions with technology. The use of technology plays a critical role in service delivery, providing several channels by which wide range consumers can be reached (Payne, Szymkowiak, Robertson & Johnson, 2011; Alzaiddi, 2018;). Though, self-service technology such as virtual assistants have had negative perception based on users valuing social interactions of face-to-face transactions more, there has been increasing use of AI as virtual customer service agents, product recommendation agent, embodied conversational agent (Veerla, 2021; Al-Araj et al., 2022).

Application of AI in Banking and Financial Services

Personalized Chatbots

Bekmurodova (2019) opined that AI technologies in commercial banks are applied in the form of contact centers that use personalised chatbots to facilitate internet banking, remote banking, mobile banking, electronic banking which all contribute to adaptation and improvement in international banking services in Uzbekistan. The usage diverse of these forms of virtual marketing in commercial banking allows customers to communicate and conduct specific types of operations and transactions in a personalised manner from location in the world (Deb et al 2018; Bekmurodova, 2019; Elegunde & Shotunde, 2020).

Automated Messaging Systems

Ocharo and Muturi (2016) stated that alternative banking channels such as AMS have significant effect on profitability of commercial banks in Kisii county of Kenya based on use of technology applications that use machine learning and data to serve customer transactions through automatic messaging machines for internet banking, mobile banking. The use of these virtual enabled technologies was found to provide customers with better banking services. According to Nawafleh and Allozi (2014) as well as Elegunde and Shotunde (2020) the quality of banking services has been impacted significantly because of the rapid development of information and communication technologies, this can be observed in terms how virtual assistants are used in terms of reach, scope and interactivity in contemporary banks.

Predictive financial offerings

Furthermore, El-Gohary, Thayaseelan, Babatunde and El-Gohary (2021) described AI as 5th generation technology that represents use of data insights to offer intelligence to customers in financial offerings that are interactive, content-centred and internet-based customer service driven by the customer as well as integrated with related organizational support processes and technologies. El-Gohary, Thayaseelan, Babatunde and El-Gohary (2021) also stated using AI through virtual assistants is based on predicting what customers need in financial services. The AI incorporate natural-language processing, semantic technologies, dialogue control, domain knowledge and visual appearance. All, these gives insights to the logical step of replacing humans with virtual assistants that trend towards system-oriented services (Manjaly, Varghese & Varughese, 2021). In culmination, technology in the form of AI systems in commercial banking has improved customer satisfaction and loyalty in online banking services that are tailor-made for customers (Ledro et al., 2022).

Concept of Customer Profiling and Satisfaction

According to Dixon-Ogbechi (2019) consumers/customer are the centre of all marketing activities with emphasis on meeting customer needs and wants through products that give value. Thus, the concept of customer relationship marketing performance is linked to customer-oriented indicators such as customer services, enhancing customer satisfaction, patronage and retention (Kotler & Armstrong, 2020). Customer profiling and satisfaction are measures of CRM performance in this study. According to Kasem, Hamada and Taj-Eddin (2024) the concept of customer profiling is effective for relationship marketing to understand and organizing customers into precise groups based on common features, characteristics and behaviours. This assists contemporary businesses align their relationship marketing tactics and strategies to meet the unique needs of diverse customer units. The usefulness of customer profiling can be in various forms of collating customer information on demographic variables and psychographic variables as well as behavioural patterns. Marketing becomes more effective when strategies are built around customer profiling variables such as age, gender, income, education, occupation, lifestyle, values, attitudes, and interests, purchase history, product usage, and feedback to predicting future attitudes and purchase choices. By understanding these aspects, businesses can create more personalized and effective marketing campaigns, ultimately enhancing customer engagements, patronage, satisfaction and retentions (Al-Gasawneh, Anuar, Dacko-Pikiewicz & Saputra, 2021; Kasem et al., 2024).

In the context of customer satisfaction, Saha, Hasan and Uddin (2014) stated that satisfying customers is the essence of success in the highly competitive banking industry. Thus, customers are majorly satisfied by consistency in the reliability of banking services to align with their needs, responsiveness of banks representatives in giving service as well as the extent of their willingness to assist and provide service quality assurance (Saha et al., 2014). Customer satisfaction is an important factor in the marketing and sales of goods or services, there is need for better product quality and customer expectations in increasing customer satisfaction (Sorayaei, Valiollahi, Zadeh, Ghoryshian & Dinari, 2013; Adzhigalieva, Hurriyati & Hendrayati, 2022). Effective customer profiling and satisfaction fosters trust, commitment and strengthens marketing relationships. It has been argued that the degree to which an organisation can profile customers effectively can enhance its target marketing strategies. Jeanpert, Jacquemier-Paquin and Claye-Puau (2021) opined that customer profiling aligns with CRM objectives, focusing on knowing the customer for enhanced customer satisfaction and loyalty. The concept of customer patronage is another variable that is tied to customer profiling and satisfaction that leads to consistent purchase of goods or services from a particular organization (Kotler & Armstrong, 2020; Kolapo, 2021).

Link between AI and CRM variables in Banking Sector

Several previous contemporary studies have been conducted in the general and specific view application of AI in the banking sector and how it is deployed to drive various facets, aspects, dimensions and contexts. For instance, Kasem et al (2024) showcased how AI promoted accuracy in customer profiling, segmentation, and sales forecasting in various contemporary sectors including banking. The authors used quantitative data of customer clusters and algorithm through AI patterns. The findings revealed that effective customer profiling is a cornerstone of strategic decision-making in

contemporary organisations especially digital start-ups seeking sustainable growth and customer satisfaction. AI allowed for strategic understanding and addressing of the diverse needs of customer clusters, yielding significant results in enduring connections, optimize customer engagement, and satisfaction.

Similarly, a study conducted by Salemcity, Aiyesan, and Japinye (2023) examined artificial intelligence in Jordanian deposit money banks, demonstrating the adaptable way that technology is enhancing customer pleasure and service quality. Svoboda (2023) investigated the impact of artificial intelligence (AI) on the banking industry from various country context. The study employed a multi-branched research strategy using primary data collected through interviewing banking professionals as well as secondary data collected from scholarly publications, journals, periodicals and financial reports and statements of major banking and financial institutions. The data was analysed using statistical and non-statistical techniques. The results showed that the emergence of (AI) has resulted in substantial shifts for financial organisations with possibilities as well as challenges influencing the mobilization of capital, the provision of credit facilities, risk management and facilitating efficient payments and transactions. It was concluded greater use of new technological breakthroughs has been credited to AI integration thereby improving the overall performance of institutions.

Additionally, Omoge, Gala, and Horky (2022) took into account how disruptive AI is and how it might dynamically alter the banking sector in emerging markets like Nigeria. To determine how AI affects bank performance, the authors used quantitative research, focusing on operational efficiency and processing time. In addition, customer relationship marketing (CRM) powered by AI was examined by Kalaiyaran et al. in 2023. The study employed a qualitative research design to examine how the use of artificial intelligence (AI) in CRM systems has changed customer interactions and helped businesses better understand, communicate with, and serve their customers. This study examines AI-driven CRM execution strategies, delivering information on the challenges, benefits, and optimal techniques associated with this game-changing technology. The authors demonstrated how AI-driven chatbots, personalized marketing, predictive analytics,

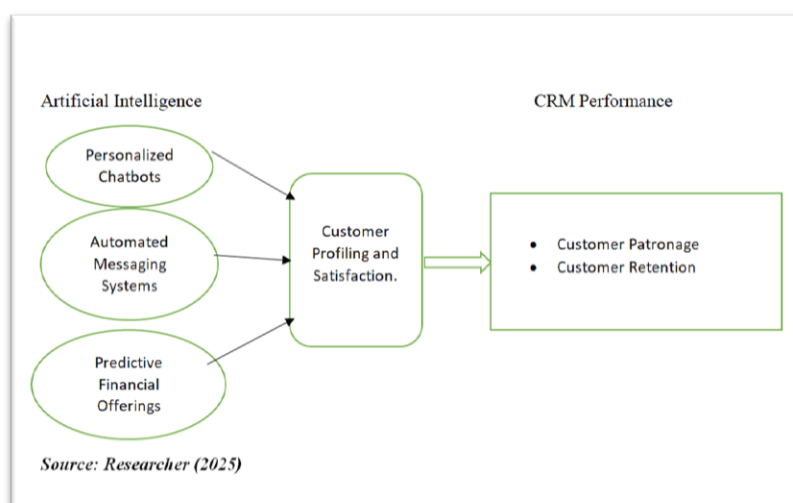
sentiment analysis, and customer segmentation have a major impact on customer satisfaction and business performance outcomes.

More so, Elegunde and Shotunde (2020) looked into how AI affected Access Bank Plc and United Bank for Africa's financial performance. Using a basic random sampling technique, 200 copies of the questionnaires were sent to Access Bank Plc and United Bank for Africa (UBA) personnel and customers as part of the survey research design employed in the study. The gathered data were subjected to regression analysis. The results demonstrated how artificial intelligence has been found to help with non-financial company metrics such as staff productivity, competitive advantage, customer satisfaction, and service quality.

Finally, Alzaidi (2018) carried out a study in Middle east on AI impact on performance of banking industry. The purpose of the study was evaluating AI as a cutting-edge technology being at forefront in technological advance in many walks of life. The study adopted mixed research approach through descriptive research with a sample 200 bank employees selected through simple random sampling technique. The study used primary data collected based on survey and analysed with frequency counts, percentages and bar charts. The outcomes indicated that AI is pushing the boundaries of financial operations in terms of detecting mismatching in financial transactions, providing personalised recommendations for the customers and developing financial services and solutions as well as eliminating human errors and insecurities. The study concluded that though the execution of AI in banking sector even though is less than a decade, there are growing opportunities for AI to transform Middle Eastern banks by enabling efficiency in risk and asset management.

Model of the Study

This study focuses on AI and marketing performance in the Nigerian banking sector. The model was developed based on adaptation from previous studies such as Elegunde and Shotunde (2020), Veerla (2021), Hornung and Smolnik (2021), Ledro, Nosella and Vinelli (2022), Kalaiyaran et al (2023) as well as Pattnaik et al (2024) as shown in the image below



Methodology

Research design is the action plan that indicates an overview of the activities that are necessary to execute the study (Asika, 2012;

Bryman & Bell, 2015). The survey research design method was used in this study which principally involves data collection through primary data sources in order to explain the influence and relationship between the study variables. The reason for using a

survey research design for this study is because it is considered suitable for studying a large sample in an objective and scientific manner (Bryman & Bell, 2015).

The population of this quantitative study included customers of deposit money banks in Lagos state that can be attributed from Lagos state population of 2020 at 35 million (Lagos state Government, 2020). However, due to the fact that the researcher may not be able to cover the total population a sample was used in this study. The aimed sample size was articulated by using the Yamane (1967) formula, which was arrived at 400 respondents which were selected based on multistage sampling technique consisting of simple random sampling technique to select customers of selected deposit money banking industry in Lagos state, also, convenience sampling technique was used to select individual respondents.

The theoretical model guiding this study is the technology acceptance model (TAM) based on the postulation of the degree to which technology is being embraced by stakeholders such as organisations and customers. This model as a theory was developed by Davis (1986) explaining the attitude behind consumer adoption of specific technology systems. AI was described as a technology platform that consumers consider based on two major determinants: perceived usefulness and perceived ease of use. In essence, Davis (1986) asserted, TAM advocates that the factors influencing the application and deployment of new technological systems such as AI are embedded on direct or indirect variables. These can be the user's attitude, intention and behaviour, as well as the user's perception of the technology usefulness and the ease (Kalaiyarasan, Gurumoorthy & Kamalakannan, 2023; Hussain & Sudha, 2024).

This connection of TAM to this research, is that it points out the degree to which AI can be recognised, embraced, deployed and utilised by consumers/customers based on the perceived usefulness which designates the extent to which an individual observes that a specific technology functions and activates suitably and advances user experience, as well as perceived ease use technology in convenient manner (Zhang et al., 2021). Comparatively, Milana and Ashta (2021) argued that the use of technologies in business and marketing can be analysed based on the extent of ease of use and perceived usefulness, as well as the degree of perceived advantages of the use of technological processes and systems. Hence, this study would focus on the problem surrounding customers use of AI as a technological platform of deposit money banks in Nigeria, to determine the ease of use and perceived usefulness.

This study used a structured questionnaire as the only instrument to gather primary data from respondents via an online survey distributed. The instrument was developed based on adapting variables from prior studies such as Elegunde and Shotunde (2020), Veerla (2021), Hornung and Smolnik (2021), Ledro, Nosella and Vinelli (2022) as well as Kalaiyarasan et al (2023). The validity of instrument was done through expert face and content validity. Also, the reliability was ensured by testing the instruments for the reliability using a pilot study to ascertain the Cronbach Alpha values for each of the variables.

According to Kothari (2008) Cronbach Alpha values for each variable under study should not be lower than 0.6 for the statements in the instruments to be deemed reliable. The pilot study was carried out among a small number of respondents (20) displaying similar characteristics with the general population as well as sample. The results of the pilot study are shown below indicating Cronbach Alpha for the variables used in this study:

| Variables | Question statements items | Alpha Values |
|--------------------------------|---------------------------|--------------|
| Personalised chatbots | 3 | 0.711 |
| Automated Messaging systems | 3 | 0.734 |
| Predictive financial offerings | 3 | 0.738 |
| Customer satisfaction | 3 | 0.717 |
| Customer Patronage | 3 | 0.722 |
| Customer retention | 3 | 0.790 |

Pilot Study, 2025

Data were analysed through descriptive and inferential statistics, made up of frequency distributions, simple percentages, mean and standard deviations. In addition, Pearson correlation analysis was used to test the hypotheses. The reason for using Pearson correlation analysis as the statistical tool of this study is based on the fact that it effectively measures cause and effect interactions among variables (Bryman & Bell, 2015). The analysis of data was achieved with the aid of Statistical Packages for the Social Sciences (SPSS) (version 20). In this study, statistical tools such as means and standard deviations were used to adequately answer the research questions based on identifying patterns and trends in the data. The reason for using quantitative analysis for data evaluation and research design, is because it is widely used and acceptable in diverse fields of research in similar nature to this current study.

Data Analysis

This study investigated the connections between artificial intelligence and marketing performance in the banking industry in Lagos state through data collected from customers of selected major commercial banking organisation in Lagos state. A sample of four hundred (400) respondents were used in this study with the same number of questionnaires distributed, out of which three hundred and twenty-one (321) copies of the questionnaire were found usable which were sorted, arranged and codified for the necessary data analysis. This gives response rate of 80.3% which was found suitable for study of this nature.

The data analysis focuses on the main research variables as categorised in the questionnaire. The responses from the Likert scale statements were analysed using mean figures as shown and interpreted as follows; below 1.45 for strongly disagree, 1.45 to 2.44 for disagree, 2.45 to 3.44 for undecided, 3.45 to 4.44 for agree while 4.45 and above for strongly agree. Saunders et al (2019) expressed that mean values are suitable for quantitative analysis of respondents' opinions to ascertain convergence in their observations about research questions. In essence the analysis of each research variable was checked against average response to come to conclusive outcomes.

Test of Hypotheses

Hypothesis I: There is no significant relationship between personalized chatbots and customer service satisfaction.

The Pearson correlation analysis for hypothesis one was conducted based on questionnaire items, with decision rule based on comparison of probability value (p-value) level of significance that is less than 5% to reject the null hypotheses otherwise accept. The results are shown in table 1:

Table 1: Correlation Analysis for Hypothesis I

| Variables | | Personalized chatbots | Level of Satisfaction |
|-----------------------|---------------------|-----------------------|-----------------------|
| Personalized chatbots | Pearson Correlation | 1 | 0.918 |
| | Sig (2-tailed) | | 0.03 |
| | N | | 321 |
| Level of Satisfaction | Pearson Correlation | 0.918 | 1 |
| | Sig (2-tailed) | 0.03 | |
| | N | 321 | |

Source: SPSS Output

The variables employed in the correlation analysis are level of satisfaction as dependent variable and personalized chatbots as independent variable in testing the hypotheses. The R-square value 0.918 implies that variation in the dependent variable can be accounted for by the independent variable. The p-value calculated at 0.03 shows that the significant level is less than 5% which points to the rejection of the null hypothesis one and acceptance of the alternative hypothesis one. Thus, it can be concluded that there is a significant relationship between personalized chatbots and customer service satisfaction.

Hypothesis II: Automated messaging systems have no significant relationship with customer patronage

The Pearson correlation analysis for hypothesis two was conducted based on questionnaire items, with decision rule based on comparison of probability value (p-value) level of significance that is less than 5% to reject the null hypotheses otherwise accept. The results are shown in the table 2:

Table 2: Correlation Analysis for Hypothesis II

| Variables | | Automated messaging systems | Customer patronage |
|-----------------------------|---------------------|-----------------------------|--------------------|
| Automated messaging systems | Pearson Correlation | 1 | 0.955 |
| | Sig (2-tailed) | | 0.012 |
| | N | | 321 |
| customer patronage | Pearson Correlation | 0.955 | 1 |
| | Sig (2-tailed) | 0.012 | |
| | N | 321 | |

Source: SPSS Output

The variables employed in the correlation analysis are customer patronage as dependent variable and automated messaging systems as independent variable in testing the hypotheses. The R-square value 0.955 point toward that variation in the dependent variable can be accounted for by the independent variable. The p-value calculated at 0.012 shows that the significant level is less than 5% which points to the rejection of the null hypothesis two and acceptance of the alternative hypothesis two. Thus, it can be concluded that automated messaging systems have significant relationship with customer patronage.

Hypothesis III: There is no significant relationship between predictive financial offerings and customer repeat patronage.

The Pearson correlation analysis for hypothesis three was conducted based on questionnaire items, with decision rule based on comparison of probability value (p-value) level of significance that is less than 5% to reject the null hypotheses otherwise accept. The results are shown in the table 3:

Table 3: Correlation Analysis for Hypothesis III

| Variables | | predictive financial offerings | Customer retention |
|--------------------------------|---------------------|--------------------------------|--------------------|
| predictive financial offerings | Pearson Correlation | 1 | 0.970 |
| | Sig (2-tailed) | | 0.02 |
| | N | | 321 |
| customer retention | Pearson Correlation | 0.970 | 1 |
| | Sig (2-tailed) | 0.02 | |
| | N | 321 | |

Source: SPSS Output

The variables employed in the correlation analysis are customer repeat patronage as dependent variable and predictive financial offerings as independent variable in testing the hypotheses. The R-square value 0.970 point toward that variation in the dependent variable can be accounted for by the independent variable.

The p-value calculated at 0.012 shows that the significant level is less than 5% which points to the rejection of the null hypothesis three and acceptance of the alternative hypothesis three, stated as there is a significant relationship between predictive financial offerings and customer retention

Discussion of Findings

This study investigated influence AI of customer profiling and satisfaction in CRM in the Nigerian banking sector based on a study of customers of selected of commercial banking organisations in Nigeria. The analysis of the data collected gave inference to the following insights

The findings indicated significant relationship between personalized chatbots and customer service satisfaction. The respondents showcased that personalized chatbots in the banking sector can significantly enhance customer service satisfaction. The findings pointed out to the fact that there is 24/7 availability of personalized support, improved customer engagement and enhanced user experience. Thus, the findings support the arguments of Omoje et al (2022) and Antal-Vaida (2022) based on effective nature of personalized chatbots leading to higher customer satisfaction based on user-friendly interfaces. The outcomes from this study agree with Okoliko et al (2023) describing how AI revolutionizing the Nigerian Banking Industry based on improving communications with customers through personalised chatbots.

Furthermore, the findings pointed to the fact the significant relationship between automated messaging systems and customer patronage. This is based on various ways such as faster response times, efficient issue escalation and improved customer engagement. It was noted that key factors such as response time and timing, integration with human support, transparency and feedback mechanisms. The major automated messaging systems used in customer complaints handling are email automation, SMS/MMS automation, IVR (Interactive Voice Response) systems, AI-powered messaging platforms (Ledro, Nosella & Vinelli, 2022). Artificial intelligence in customer relationship management best practices through automated messaging systems which help monitor and analyse customer feedback (El-Gohary et al 2021; Jain, Sheth, Mogaji, & Ambika, 2023).

Finally, the outcome of this study indicated the significant relationship between predictive financial offerings and customer retention. The respondents asserted that predictive financial offerings allowed for personalized financial recommendations, proactive problem-solving, improved financial planning, enhanced customer engagement. The findings align with the works of Shaik

et al (2023) as well as Pattnaik, Ray and Raman (2024) based on the need for accuracy of predictive analytics for relevant financial offerings and integration with existing banking services. In essence, predictive financial offerings can be in the form of predictive account balance management, automated savings and investment advice, credit score forecasting, implementing real-time data processing (Milana & Ashta, 2021; Manjaly, Varghese & Varughese, 2021).

Conclusions and Recommendations

The data analysis as regarding the test of hypotheses indicate the following:

Firstly, there is a significant relationship between personalized chatbots, and customer service satisfaction based on R-square 91.8% and probability value of 0.03. This gives the implication that AI systems through personalised chatbots drive marketing effectiveness in terms of customer services satisfaction.

In addition, automated messaging systems have significant relationship with customer patronage based on R-square value of 95.5% and probability value of 0.012. This points to the fact that automated messaging systems are implementations of AI systems that help in ensuring marketing effectiveness in banking sector by increasing patronage intentions.

Finally, there is a significant relationship between predictive financial offerings and customer retention based on R-square value of 97.0% and probability value of 0.02. This gives an assertion that AI systems are reflected in predictive financial offerings that guides customers towards repeat patronage

Based on the findings of the study it can be concluded the existence of significant and positive impact of AI on customer relationship marketing performance in the Nigerian banking sector based on a study of selected customers of commercial banking organizations. The study established that AI structures used in banks have a profound impact on customer relationship marketing performance in terms of enhancing customer profiling, engagement and relationships, repeat patronage and increasing overall customer satisfactions.

The study demonstrated the significant relationship between AI and customer relationship marketing performance in the Nigerian banking sector. AI was found to power marketing techniques and tools in a dynamic manner. Nigerian banks were found to invest AI-powered marketing solutions to remain competitive and engage customers. With respect to the research objectives and questions, this study established significant positive relationship between personalized chatbots and customer service satisfaction, as well as a large extent of the relationship between automated messaging systems and customer complaints handling and finally the significant positive relationship between predictive financial offerings and customer repeat patronage. Overall, the findings and conclusions from this study inform and highlight importance of AI adoption by contemporary Nigerian banks especially in the areas of marketing.

The following recommendations are made:

- i) Executives and management of commercial banks in Nigeria should ensure that their growing application of AI systems in the form of chatbots are personalised to critical fit the customer profile and target market characteristics.
- ii) AI systems through automated messaging systems should be regularly reviewed to match up with the current realities of the Nigerian business environment in order to meet up with stakeholder expectations.
- iii) In addition, predictive financial offerings as an execution of AI systems in banking should utilise up-to-date customer data analytics to ensure accuracy and authenticity to give informed financial decision making.
- iv) Finally, AI systems can be used to improve marketing performance as a whole through continuous improvement by regularly gathering customer feedback and insights on financial activities and services in order to find ways of enhancing customer relationship marketing performance.

This study focused on AI and CRM in the Nigerian banking sector based on a study of customers of selected banking organisations in Nigeria. the following areas can be considered and suggested for further studies. Firstly, further studies can focus on interaction between AI systems and other areas of marketing management.

Also, further studies can be done as regarding other organizational performance measures such as customer patronage, competitive advantage and productivity. Finally, the study used quantitative research approach, thus further studies can utilize qualitative research approach or a mixed research approach.

Data Availability

The data for this study is available in secured storage and can be accessed by contacting the authors if and when need. Hence, readers can access the data underlying the findings of the study via online repositories found under the ORCID of the authors.

Conflicts of Interest

The author(s) declare(s) that there is no conflict of interest regarding the publication of this paper."

References

- [1] Al-Araj, R. E. E. M., Haddad, H. O. S. S. A. M., Shehadeh, M. A. H. A., Hasan, E., & Nawaiseh, M. Y. (2022). The effect of artificial intelligence on service quality and customer satisfaction in Jordanian banking sector. *WSEAS Transactions on Business and Economics*, 19(12), 1929-1947.
- [2] Al-Gasawneh, J. A., Anuar, M. M., Dacko-Pikiewicz, Z., & Saputra, J. (2021). The impact of customer relationship management dimensions on service quality. *Polish Journal of Management Studies*, 23(2), 24-41.
- [3] Alzaidi, A. A. (2018). Impact of artificial intelligence on performance of banking industry in Middle East. *International Journal of Computer Science and Network Security*, 18(10), 140-148.
- [4] Antal-Vaida, C. (2022). A review of Artificial Intelligence and Machine Learning adoption in banks, during the COVID-19 outbreak. In *Proceedings of the*

- International Conference on Business Excellence, 16(1), 1316-1328.
- [5] Adzhigaliev, Z., Hurriyati, R., & Hendrayati, H. (2022). The influence of complaint handling and service recovery on customer satisfaction customer loyalty and customer retention. In 6th Global Conference on Business, Management, and Entrepreneurship (GCBME 2021) Atlantis Press. 281-285.
 - [6] Bryman, A., & Bell, E. (2015) Business research methods (4th edition). Oxford: Oxford University Press.
 - [7] Carl, A. & Uelsen, A. V. 2015. Usefulness vs. uncanniness: Exploring the perceived usefulness of virtual assistants in the customer journey. University of Twente Enschede The Netherlands, 1-22.
 - [8] Central Bank of Nigeria (2023). The CBN Economic report. Retrieved from: <https://www.cbn.gov.ng/Out/2023/RSD/2nd%20Quarter%20ECR%202023,.pdf>. Accessed on 20 December 2024.
 - [9] Claessen, V., Schmidt, A. & Heck, T. (2017). Virtual Assistants: A study on the usability and user perception of customer service systems for e-commerce. Proceedings of the 15th International Symposium of Information Science, 116-130.
 - [10] Deb, S. K., Jain, R., & Deb, V. (2018). Artificial intelligence—creating automated insights for customer relationship management. In 2018 8th international conference on cloud computing, data science & engineering (Confluence). 758-764.
 - [11] Dixon-Ogbechi, B.N. (2019). The fundamentals of business policy and strategy with questions and answers. (2nd ed) Lagos: Philglad Nigeria.
 - [12] Elegunde, A. F. & Shotunde, O. I. (2020). Effects of artificial intelligence on business performance in the banking industry (A Study of Access Bank Plc and United Bank for Africa-Uba). Journal of Business and Management, 22, (5), 41-49.
 - [13] El-Gohary, H., Thayaseelan, A., Babatunde, S., & El-Gohary, S. (2021). An exploratory study on the effect of artificial intelligence-enabled technology on customer experiences in the banking sector. Journal of Technological Advancements (JTA), 1(1), pp.1-17.
 - [14] Hornung, O. & Smolnik, S. (2021). AI invading the workplace: negative emotions towards the organizational use of personal virtual assistants. Research Paper Electronic Markets, 1-16.
 - [15] Jain, V., Sheth, J. N., Mogaji, E., & Ambika, A. (2023). Artificial intelligence in customer service: An introduction to the next frontier to personalized engagement. In Artificial Intelligence in Customer Service: The Next Frontier for Personalized Engagement (pp. 1-11). Cham: Springer International Publishing.
 - [16] Jeanpert, S., Jacquemier-Paquin, L., & Claye-Puaux, S. (2021). The role of human interaction in complaint handling. Journal of Retailing and Consumer Services, 62, 102670.
 - [17] Hornung, O. & Smolnik, S. (2021). AI invading the workplace: negative emotions towards the organizational use of personal virtual assistants. Research Paper Electronic Markets, 1-16
 - [18] Hussain, M. A., & Sudha, V. (2024). A Study on the Impact of Artificial Intelligence (AI) Technology-Enabled Digital Banking Services on Consumer Loyalty"-A Conceptual Framework. Educational Administration: Theory and Practice, 30(4), 6845-6854.
 - [19] Kalaiyarasan, B., Gurumoorthy, K., & Kamalakannan, A. (2023). AI-Driven Customer Relationship Management (CRM): A review of implementation strategies. Computing Paradigms, 33.
 - [20] Kasem, M. S., Hamada, M., & Taj-Eddin, I. (2024). Customer profiling, segmentation, and sales prediction using AI in direct marketing. Neural Computing and Applications, 36(9), 4995-5005.
 - [21] Kolapo, F. T., Mokuolu, J. O., Dada, S. O. & Adejayan, A. O. (2021). Strategic marketing innovation and bank performance in Nigeria. Innovative Marketing, 17(1), 120-129.
 - [22] Kolapo, F. T. (2021). Determinants of Consumers' Patronage of Commercial Banks in Southwest, Nigeria. Journal of Economics, Finance and Management Studies, 4(10), 1-8.
 - [23] Kotler, P. & Armstrong, G. (2020). Principles of Marketing, (15th edn) New Jersey: Prentice Hall.
 - [24] Kothari, C.R. (2008) Research methodology, methods and techniques. New Delhi: New Age International limited.
 - [25] Lagos State Government (2020). Population estimates. Retrieved from: <https://lagosstate.gov.ng/>. Accessed 10 July 2024
 - [26] Ledro, C., Nosella, A. & Vinelli, A. (2022). Artificial intelligence in customer relationship management: literature review and future research directions. Journal of Business & Industrial Marketing, 37(13), 48-63.
 - [27] Manjaly, J., Varghese, R.M. & Varughese, P. (2021). Artificial intelligence in the banking sector – a Critical analysis." Shanlax International Journal of Management, 8 (S1), 210–16.
 - [28] Marcu, M. R. (2021). The impact of the COVID-19 pandemic on the banking sector. Management Dynamics in the Knowledge Economy, 9(2), 205-223.
 - [29] Mbuh, P. E., Mbouzu, T. S., Adenuga, K. I., Isoh, A. V. N., Nchise Delphine Nchang, N. D. & Abdallah, Z. (2020). The effects of the use of ICT as a marketing strategy on the performance of SME: A systematic literature review American Based Research Journal. 9(4).1-7
 - [30] McKinsey & Company (2021). Global Banking Practice Building the AI bank of the future. <https://www.mckinsey.com/~media/mckinsey/industries/financial%20services/our%20insights/building%20the%20ai%20bank%20of%20the%20future/building-the-ai-bank-of-the-future.pdf> Accessed 10 July 2024
 - [31] Milana, C. & Ashta, A., (2021). Artificial intelligence techniques in finance and financial markets: A survey of the literature. Strategic Change 30, 189–209.
 - [32] Mogaji, E. & Nguyen, N. P. (2022). Managers' understanding of artificial intelligence in relation to marketing financial services: insights from a cross-country study. International Journal of Bank Marketing, 40(6), 1272-1298.
 - [33] Mogaji, E., Adeola, O., Hinson, R., Nguyen, N. P., Nwoba, A. C. & Soetan, T. (2021). Marketing bank services to financially vulnerable customers: Evidence from an emerging economy. International Journal of Bank Marketing. 1-59.
 - [34] Ocharo, W., & Muturi, W., (2016). Effect of alternative banking channels on profitability of commercial banks a case study of commercial banks in kisii county, Kenya. International Journal of Economics, Commerce and Management United Kingdom, 4(4), 6 -17.
 - [35] Okoliko, E.O. 1, Ayetigbo, O.A. Ifegwu, I. J. & Chidiebere, N. U. (2023). Artificial Intelligence Impact in Revolutionizing the Nigerian Banking Industry: An Assessment of Selected Deposit Money Banks in Abuja. Achievers Journal of Scientific Research, 5(2), 120-131.

- [36] Omoge, A.P., Gala, P. and Horky, A. (2022). Disruptive technology and AI in the banking industry of an emerging market. *International Journal of Bank Marketing*, 40(6) pp. 1217-1247.
- [37] Onobrakpeya, S. A. & Bayagbon, T. J. P. (2024). Leveraging artificial intelligence to enhance marketing performance of electronic-commerce platforms in Nigeria *International Journal of Operational Research in Management, Social Sciences & Education*, 10(1),
- [38] Pattnaik, D., Ray, S. & Raman, R. (2024). Applications of artificial intelligence and machine learning in the financial services industry: A bibliometric review. *Heliyon*.
- [39] Persson, E. & Torssell, J. (2020). Virtual assistants and their performance in professional environments. *Kth Royal Institute of Technology School of Electrical Engineering and Computer Science*. 1-17.
- [40] Saha, A., Hasan, K. M. S & Uddin, S. (2014). A conceptual framework for understanding customer satisfaction in banking sector: The mediating influence of service quality and organisational oath. *American Journal of Trade and Policy*. 1(3), 39 – 50.
- [41] Salemcity, A., Aiyesan, O. O. & Japinye, A. O. (2023). Artificial intelligence adoption and corporate operating activities of deposit money banks. *European Journal of Accounting, Auditing and Finance Research*, 11(11),17-33.
- [42] Saunders, M.N.K., Lewis, P. & Thornhill, A. (2019). *Research methods for business students*. 8th Edition, Pearson, New York
- [43] Shaik, I. A. K., Mohanasundaram, T., KM, R., Palande, S. A., & Drave, V. A. (2023). An impact of artificial intelligence on customer relationship management (CRM) in retail banking sector. *European Chemical Bulletin*, 12(5), 470-478.
- [44] Smit, J. (2024). A Literature review on the impact of artificial intelligence on the future of banking and how to achieve a smooth transition. *Open Journal of Business and Management*, 12, 509-520.
- [45] Soderlund, M., Oikarinen, E. L. & Tan, T. M. (2021). The happy virtual agent and its impact on the human customer in the service encounter. *Journal of Retailing and Consumer Services*. 59, 102401 -1024011.
- [46] Statista (2023) Banking industry in Nigeria - statistics & facts. Published by Doris Dokua Sasu. Retrieved from: <https://www.statista.com/topics/9747/banking-industry-in-nigeria/#topicOverview>. Accessed on 20 December 2024.
- [47] Stieglitz, S., Mirbabaie, M., Möllmann, N. R. J. & Rzycki, J. (2021). Collaborating with virtual assistants in organizations: Analysing social loafing tendencies and responsibility attribution. *Information Systems Frontiers*. 1-27.
- [48] Svoboda, A. (2023). The impact of artificial intelligence on the banking industry. *Journal of Banking and Finance Management* 4(1), 7-13
- [49] Sun, C. C. (2021). Analysing determinants for adoption of intelligent personal assistant: An empirical study. *Applied. Sciences*.11(10618), 1-27.
- [50] Syaeful A. (2019). Artificial intelligent service quality to increase customer satisfaction and customer loyalty. (Survey of PT. Telkomsel Customers) *Advances in Economics, Business and Management Research, Proceedings of the First ASEAN Business, Environment, and Technology Symposium*. 141, 99-104.
- [51] Veerla, V. (2021) To study the impact of artificial intelligence as predictive model in banking sector: Novel approach. *International Journal of Innovative research in Technology*, 7(8), 94-105.
- [52] Zhang, S., Meng, Z., Chen, B., Yang, X. & Zhao, X. (2021). Motivation, social emotion, and the acceptance of artificial intelligence virtual assistants—trust-based mediating effects. *Frontiers in Psychology*. 12(1),1-10.