Implementation and Integration of Artificial Intelligence for Financial Process Innovation of Commercial Banks in Nigeria

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Abstract

This study investigated the strategic implementation of artificial intelligence (AI) for financial process innovation within commercial banks in Nigeria. With the increasing adoption of AI technologies globally, particularly in the banking sector, understanding its impact on efficiency, innovation, and customer experience is crucial. Through a mixed-method approach, data was collected from 143 participants comprising staff from 10 major banks in Uyo, Akwa Ibom State, Nigeria. A structured questionnaire, "Artificial Intelligence Applications for Financial Process Innovation Questionnaire" (AIAFPIQ), was utilized to gather data on the implementation of AI for personalized banking experiences and credit risk management. Statistical analysis, including means, standard deviations, and t-tests, was conducted to examine the relationship between AI adoption and financial process innovation. The findings indicated a significant positive impact of AI implementation on financial process innovation within Nigerian commercial banks. Recommendations include investment in AI infrastructure, ethical AI practices, customer education, and regulatory support. By embracing AI technologies and implementing recommended strategies, Nigerian banks can drive innovation, enhance customer satisfaction, and achieve sustainable growth in the digital era.

Keywords: Artificial Intelligence (AI), Commercial Banks, Financial Process Innovation.

INTRODUCTION

The implementation and integration of artificial intelligence (AI) in the financial processes of commercial banks in Nigeria represent a significant opportunity for innovation and efficiency enhancement within the banking sector. Nigeria's banking industry has witnessed rapid growth and technological advancement in recent years, driven by factors such as increasing competition, evolving customer expectations, and regulatory reforms. As a result, commercial banks are increasingly turning to AI technologies to streamline operations, improve decision- making processes, and enhance customer experiences.

Artificial intelligence (AI) is commonly defined as the intelligence exhibited by machines rather than humans. Academic literature often describes AI as the study of "intelligent agents" that are capable of perceiving their environment and taking actions to maximize their chances of success (Muzanenhamo et al., 2023; Poole et al., 1998). Although AI has been a subject of study for many years, some prominent scholars in the field, such as Russell & Norvig (2003), argue against the notion that AI can fully replicate cognitive functions like learning and problem-solving. Since its inception in 1955, AI has aimed to develop "intelligent machines" with cognitive abilities resembling those of humans. Similar to the internet, AI is anticipated to have far-reaching impacts across various industries (Dumasia, 2021). The Covid-19 pandemic has accelerated the adoption of AI by businesses, with a focus on improving operational efficiency (Rizqulloh, 2021). Post-pandemic, AI continues to rise in importance as organizations automate routine processes and leverage AI for data analysis, potentially enhancing shareholder satisfaction (Zhu et al., 2021).

In sectors like banking and finance, AI holds significant promise. Citi's (2018) highlighted the financial services industry as the largest non-technical spender on AI services, with continuous growth anticipated. Even in developing countries like Nigeria, where interest in AI among bankers is growing, the potential rewards are substantial. Financial institutions stand to benefit from strategic AI adoption, incorporating machine learning, natural language processing (NLP), and computer vision to enhance workforce and customer satisfaction, as well as

Indonesian Annual Conference Series, Vol. 3, 2024

International Hybrid Conference on Revitalizing Global Economy for Sustainable National Development (IHCRGESND), Nigeria

streamline back-office operations (Tucci, 2020). At the enterprise level, AI solutions are transforming business operations (Rozan, 2022; Upe, 2023). Companies are leveraging AI to reduce costs, boost productivity, gain actionable insights, and expand their market reach. AI applications in corporate software span various domains, including customer service enhancement, sales optimization, cybersecurity, supply chain management, process automation, product innovation, and refinement (Volcker, 2009).

In the financial services sector, AI is utilized for algorithmic trading, portfolio optimization, model validation and testing, robo-advisory services, market impact analysis, regulatory compliance, stress testing, fraud detection, personalized banking experiences (through chatbots and robo-advisors), and credit risk management. These applications underscore the diverse potential of AI in driving efficiency, innovation, and customer-centricity within the financial industry. This study investigates the strategic implementation and seamless integration of artificial intelligence technologies within the financial processes of commercial banks in Nigeria, aiming to analyze its impact on innovation, efficiency, and customer experience within the sector, ultimately contributing to a deeper understanding of the transformative potential of AI in the Nigerian banking industry.

1. Statement of the Problem

Pioneers face challenges in garnering acceptance for novel concepts. The apprehension surrounding the adoption of innovation hinges upon understanding the original invention's potential and its societal impact. Artificial intelligence (AI) holds promise for enhancing the stock market, with fintech companies embracing AI more fervently than traditional banks. Its applications span marketing, operational efficiency, and financial management. However, when stakeholders lack awareness of these systems, biases, oversight, and missed opportunities jeopardize the banking sector. Despite this, industry experts remain largely uninformed about AI's implications for banking. This study endeavors to elicit insights from industry professionals regarding how AI can facilitate innovation within Nigeria's commercial banks' financial services.

2. Objective of the Study

a. To examine the effect of implementation of artificial intelligence for personalized banking experiences in promotion of financial process innovation by commercial banks in Nigeria.

b. To examine the implementation of artificial intelligence for credit risk management for promotion of financial process innovation by commercial banks in Nigeria.

3. Research Questions

The following research questions were stated for the study:

a. How does implementation of artificial intelligence for personalized banking experiences affects promotion of financial process innovation by commercial banks in Nigeria.

b. How does implementation of artificial intelligence for credit risk management affects promotion of financial process innovation by commercial banks in Nigeria.

LITERATURE REVIEW

1. Artificial Intelligence: Scope, Challenges and Prospects

Artificial intelligence (AI) encompasses the ability of computers or robots to perform tasks resembling human activities. This term denotes the development of machines capable of reasoning, extrapolating, and learning from experience, mirroring essential human cognitive functions. The maturation of artificial intelligence and advanced algorithmic technologies has reached a pivotal juncture poised to disrupt conventional banking practices, paving the way for a new era of digital banking tailored to meet customer demands. AI holds the potential to empower banks with heightened intelligence, efficiency, and customer-centricity (Franck, 2021), streamlining operations from cost-saving measures to resource allocation.

Research by Shannak (2013) investigated the advantages and drawbacks of online banking, noting the rapidity of fund transfers alongside the inherent risks associated with sharing sensitive information across devices. The emergence of internet banking signifies a pioneering shift towards a cashless society (Fung et al., 2015), while Saravani et al. (2015) argue that diverse banking channels such as internet, mobile, telephone, and ATM banking directly influence a bank's market share. Worldwide, innovative channels are revolutionizing financial services, rendering them more accessible and cost-effective (Nisar, 2017, August 28). Ahamed and Mallick (2019) propose that

Indonesian Annual Conference Series, Vol. 3, 2024

International Hybrid Conference on Revitalizing Global Economy for Sustainable National Development (*IHCRGESND*), Nigeria

pioneering financial services can augment a bank's market share, whereas Nazaritehrani and Mashali (2020) observe that banks failing to adapt to contemporary needs risk losing market share to competitors. In the context of Pakistan, a developing nation, struggles persist in leveraging modern methods and technology to enhance banking infrastructure and compete globally (SAMA, 2020, September 11). Khalifaturofi'ah, Yang, and Zouari-Hadiji (2021) highlight that innovative financing mechanisms can bolster bank market share and operational efficiency. In the fiercely competitive landscape of financial institutions, innovation is imperative for sustained relevance, this necessitates the incorporation of novel financial services and artificial intelligence within the banking sector (Işk et al., 2021; Karim et al., 2021; Rabbani et al., 2022a, 2022b).

According to Anjum (2020), cognitive technologies with AI might help banks exploit digitalization and compete with FinTech startups. 32% of financial organizations use AI techniques like predictive analytics and voice recognition. Future banking will use more AI. AI's powerful data analytics help fight fraud and enhance compliance. AI technology speeds up money laundering processes. Financial companies may get important insights from AI's fast data processing. AI bots, digital payment advisors, and biometric fraud detection technologies help provide high-quality services to more people. Anjum (2020) found that sales, costs, and earnings increased.

Credit risk management has increasingly turned to artificial intelligence (AI) as a pivotal tool. The utilization of AI in assessing customer creditworthiness has become paramount for alternative lenders, who rely on both conventional and non-traditional data sources (Şk et al., 2021). This innovative approach to financing offers hope to individuals and organizations with limited credit history, enabling more inclusive access to financial services. Machine learning applications in banking have notably enhanced credit scoring, a fundamental aspect of the lending process (Rabbani et al., 2022). Both traditional financial institutions and innovative financial technology startups engage in lending activities, underscoring the importance of robust financial discretion in decision-making processes. Historically, creditworthiness assessments relied on manual methods, such as interviews and data analysis. However, the advent of AI has revolutionized this process, making assessments faster and more accurate (Eryk, 2020). Sophisticated categorization algorithms, incorporating variables such as demographics, income, savings, credit history, and transaction records, determine the feasibility of loan approvals. Unlike traditional methods, AI-based grading algorithms eliminate subjective biases, ensuring a fair evaluation of individuals' financial stability and reliability. Moreover, AI enhances the overall customer experience within financial institutions. By analyzing historical platform interactions, AI systems gain insights into client behaviors and preferences (Karim et al., 2021). This enables financial institutions to tailor their services to meet the unique needs of their customers, fostering meaningful interactions and long-term partnerships.
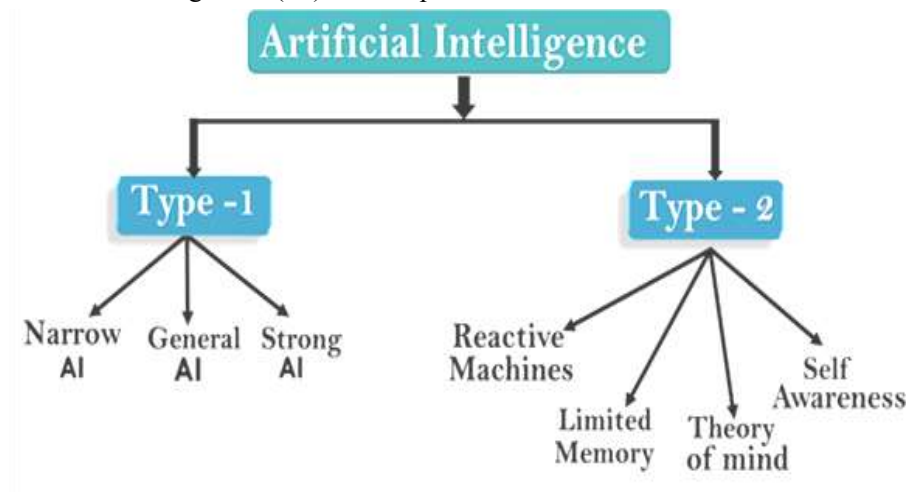

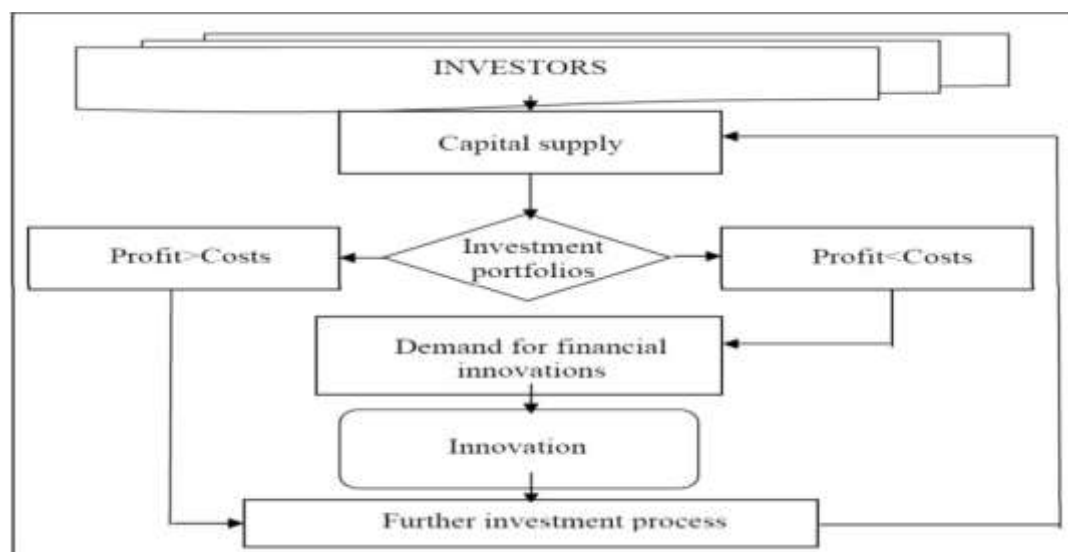Figure 1. A diagram that explains the types of Artificial Intelligence.

Indonesian Annual Conference Series, Vol. 3, 2024

International Hybrid Conference on Revitalizing Global Economy for Sustainable National Development (IHCRGESND), Nigeria

Figure. 2 The demand-oriented theory of innovation's enabling conditions.

Category One

Artificial intelligence encompasses a spectrum of capabilities, starting with Artificial Narrow Intelligence (ANI), which refers to systems capable of autonomously performing specific tasks with human-like proficiency, albeit limited to their preset functions (Joshi, 2019). Moving beyond ANI, Artificial General Intelligence (AGI) represents the capacity for AI agents to learn, comprehend complex concepts, and perform tasks akin to human abilities, enabling them to learn multiple competencies and make connections across disciplines (Joshi, 2019). Finally, Artificial Superintelligence (ASI) signifies a scenario where computers surpass human intelligence, a concept often portrayed in popular media as a situation where machines outsmart humans (Lateef, 2022). This progression in AI capabilities highlights the trajectory towards achieving human-like cognition and the potential implications for society.

Category Two

Reactive machines had limited functionality, lacking the ability to process varied inputs like humans, as found by Joshi (2019), due to their lack of memory, rendering them incapable of learning from prior experiences. However, advancements in artificial intelligence, particularly in limited memory systems as noted by Johnson (2020), have shown promise in enhancing machine learning capabilities, albeit with increased complexity. The theory of mind, a concept fundamental to social connection and communication, remains a theoretical challenge in AI development, requiring a deep understanding of human emotions,

thoughts, and cognition (Biswal, 2022). Despite significant progress, artificial intelligence remains incomplete, with the prospect of self-aware AI, while hypothetical, raising concerns among technocrats about its potential implications (Sahu, 2021).

2. Implementation of Artificial Intelligence for Credit Risk Management of Financial Innovation

Loan extensions pose significant challenges for banks as they navigate the delicate balance between meeting customer needs and mitigating risks associated with lending to unqualified borrowers, who may default on their payments when faced with disruptions in income streams. Kumar (2021) in his work highlighted a concerning trend, indicating a 1.4% increase in US credit card delinquencies within a six-month period in 2020. To address this risk, financial institutions are increasingly turning to AI-powered credit record reviews, leveraging mobile banking apps to monitor spending habits and gather pertinent data. By employing AI algorithms, financial organizations can anticipate potential loan distribution concerns, such as customer bankruptcy or fraudulent activities (Kumar, 2021). Moreover, credit risk remains a pressing issue for financial firms, necessitating innovative approaches to assess the likelihood of default by counterparties. AI technologies offer a promising solution by enabling probabilistic analysis to inform loan approval decisions, thereby helping banks determine appropriate interest rates or collateral requirements. Through credit risk modeling, financial institutions can predict potential losses, providing

Indonesian Annual Conference Series, Vol. 3, 2024

International Hybrid Conference on Revitalizing Global Economy for Sustainable National Development (*IHCRGESND*), Nigeria

insights into a borrower's default probability and associated financial implications (Amplifi, 2021). Additionally, AI holds the potential to revolutionize credit decision-making processes, enhancing speed, accuracy, and cost- effectiveness. By incorporating additional factors and leveraging sophisticated metrics, AI-driven systems can offer more thorough and evidence-based assessments, enabling lenders to identify applicants with lower default rates and greater reliability, even in the absence of traditional credit history (Bachinskiy, 2019). Moreover, AI's objectivity minimizes the impact of biases, as computers seldom exhibit prejudices. Digital banks and loan-issuing apps are increasingly leveraging machine-learning algorithms to analyze credit status and other relevant data, including smartphone usage patterns, to determine loan eligibility and tailor customized lending options to individual customers (Kumar, 2021).

3. Implementation of Artificial Intelligence for a Personalized Banking Experience

AI implementation in customized banking has revolutionized customer service by leveraging customer interactions to inform system learning and tailor goods and services to individual needs, thereby fostering meaningful connections and long-term partnerships. In the post-crisis era, the utilization of robo-advisors and chatbots in financial services has surged, aiding clients in making informed investing, banking, and insurance decisions. Defined by The Future Today Institute's 2017 study as AI-based software programs automating specific operations, bots, including algorithm-based robo-advisors, now offer comprehensive investing and financial planning services, a term that has gained popularity in banking over the past decade. Contrary to its name, robo-advisors are far from robotic, as they customize portfolios based on investors' requirements and risk preferences. Through the integration of natural language processing (NLP) and machine learning (ML) algorithms, chatbots and robo-advisors deliver tailored, conversational, and seamless interactions across various sectors, catering particularly to millennials who prioritize cost-effectiveness and convenience in financial services (Huang et al., 2018; Eryk, 2020).

The advancement of natural language processing technology has blurred the distinction between human and artificial interfaces, exemplified by the adoption of AI and robots by the three largest Japanese banks to enhance customer service. For instance, the Mizuho Group employs a robotic system for asset management and document preparation (Huang et al., 2018). Beyond chatbots, banks utilize vast amounts of consumer transactional data to analyze spending habits and offer personalized advice, including strategies for reducing monthly expenses and visual representations of spending patterns. Additionally, modern financial institutions provide proactive alerts to customers facing potential financial shortfalls, demonstrating a commitment to comprehensive customer care and service innovation (Eryk, 2020).

4. Conceptualization of Financial Innovation in the 21st Century

Financial innovation refers to an introduction of a new financial products, services, or methodologies, which have evolved from fiscal instruments and remittance procedures into sophisticated entities (Apoorva, 2021). The advent of modern artificial intelligence and fourth industrial technologies has significantly accelerated financial innovation, as observed by Volcker (2009), who noted the widespread societal impact of innovations like automated teller machines (ATMs) compared to asset-backed securitization. Credit and debit cards, PayPal, and other payment innovations have revolutionized transaction processes, emphasizing the importance of innovations that reduce transaction costs. Such financial innovations have the potential to influence economies and currencies, thereby impacting monetary policy and the central bank's role in economic stabilization, particularly in managing interest-rate-capital relationships.

MacKenzie (2008) defines "financial innovation" as the emergence of new financial goods, services, platforms, and markets, exemplified by recent advancements such as hedge funds, private equity, weather derivatives, and exchange-traded funds. Financial innovation extends beyond product offerings to encompass the creation of new methods and processes within the banking and financial services sectors, including digital currencies and payment mechanisms, driven by digital technology's transformative impact on financial operations (Chen, 2021). Institutional, product, and process innovations have reshaped the financial landscape, with specialized credit card firms and online-only banks challenging traditional banking models. Process innovation, evident

Indonesian Annual Conference Series, Vol. 3, 2024

International Hybrid Conference on Revitalizing Global Economy for Sustainable National Development (*IHCRGESND*), Nigeria

in the adoption of ATMs, mobile banking, and online banking, has streamlined firm operations and enhanced customer service.

Technological advancements have facilitated the exploration of new customer care methods in the financial services industry, facilitating the delivery of financial services through various channels such as credit and debit cards, telephone and internet banking, and online trading platforms (Nkem & Akujinma, 2017). To capitalize on innovation, financial services organizations must embrace disruptive technologies such as artificial intelligence, advanced analytics, and blockchain. Manju's (2019) research underscores the transformative potential of automation and machine learning in banking, highlighting the need to analyze AI's impact on the banking sector comprehensively. Furthermore, AI's integration into financial innovation faces challenges related to data security, transparency, and regulatory compliance, as noted by Lerner and Tufano (2011). Addressing these issues is crucial for the successful implementation of AI solutions in financial services, as emphasized by Nekesa and Olweny's (2018) study on how financial innovation affects deposit-taking institutions' performance. Inclusively, while AI presents promising opportunities for enhancing fraud detection, credit scoring, and personalized financial services through robo-advisors and chatbots, navigating data security and regulatory concerns remains imperative for ensuring the responsible deployment of AI in financial innovation.

5. **Organizational Implications of Financial Innovation Implementation**

The implementation of financial innovation carries significant organizational implications within Nigeria's financial sector. As the country continues to embrace technological advancements and digital transformation, financial institutions are compelled to adapt to changing market dynamics and consumer preferences. The adoption of innovative financial products, services, and methodologies requires organizations to reevaluate their existing structures, processes, and capabilities to remain competitive in the evolving landscape. For instance, the emergence of digital banking platforms and mobile payment solutions necessitates investments in technology infrastructure and talent development to ensure seamless integration and effective service delivery

across various channels (Volcker, 2009; Apoorva, 2021).

Moreover, the organizational implications of financial innovation extend beyond technological considerations to encompass regulatory compliance, risk management, and customer experience. With the introduction of new financial instruments and platforms, financial institutions in Nigeria must navigate complex regulatory frameworks to ensure adherence to local and international standards (MacKenzie, 2008; Chen, 2021). Additionally, the implementation of innovative solutions introduces new risk factors, including cybersecurity threats and operational vulnerabilities, requiring robust risk management strategies and investment in cybersecurity measures (Manju, 2019). Furthermore, enhancing the customer experience through personalized services and digital interactions becomes paramount in building trust and loyalty among Nigerian consumers, driving organizations to prioritize customer-centric approaches and invest in data analytics capabilities to gain actionable insights into customer preferences and behaviors (Nkem, & Akujinma, 2017).

THEORETICAL REVIEW
1. The demand Oriented Theory

The demand-oriented theory, initially proposed by Gurley and Shaw in 1956, posits that the impacts of income and substitution within the capital market are contingent upon factors such as financial instrument demand, income levels, interest rates, and alternative goods. Building upon this notion, Greenbaum and Haywood (1971) further hypothesized a relationship between the expansion of capital market-investable assets and diversification costs. Investors strategically manage portfolio diversity, drawing from H. M. Markowitz's methodology, to mitigate risk and optimize returns within predefined risk thresholds. Portfolio management costs, including diversification expenses, escalate in tandem with portfolio value, and when these costs surpass asset returns, the theoretical framework suggests a stimulus for financial innovation. Consequently, the banking industry actively seeks alternatives to either curtail costs or augment income as the benefits diminish, embodying the principle of the replacement effect, where interest serves as compensation for capital utilization.

Indonesian Annual Conference Series, Vol. 3, 2024

International Hybrid Conference on Revitalizing Global Economy for Sustainable National Development (IHCRGESND), Nigeria

In this theoretical framework, each financial service represents an n-dimensional vector characterized by dimensions of time, risk, and liquidity. The interplay of these dimensions allows for an infinite array of permutations, offering an expansive spectrum of financial services to cater to diverse market demands. Central to this conceptualization is the notion of invention, defined as a unique tool that amalgamates various components to address specific needs within the capital market. Schematically, the development of inventions follows a structured process, facilitating capital market players' ability to adapt and respond to evolving demand dynamics.

2. Empirical Reviews

Rajesh and Palpandi (2015) conducted a study examining the impact of technology on the banking industry in southern Tamilnadu. Their research highlighted the significant improvements brought about by information technology in enhancing financial services, facilitating product development, and implementing real-time information systems.

Specifically, the study investigated strategies aimed at enhancing customer service accessibility through technology-based initiatives. Utilizing an open-ended questionnaire, the descriptive study collected data to explore six key factors related to customer service accessibility: banking services, add-on services, front office services, technology-enabled services, safety, and dependability. Analysis using principal component factor analysis revealed that banking services emerged as the primary determinant of customer service access. Moreover, technology-enabled services were assessed through a single-sample t-test, indicating a need for optimization. Notably, methods such as weekly account statements, email notifications, and SMS capabilities for cash transactions were identified as areas requiring improvement. The study concluded by advocating for banks to prioritize customer-centric approaches, emphasizing the provision of cutting-edge and cost-effective services.

Sujud and Hashem (2017) conducted a study investigating the impact of banking innovations on the profitability and return on assets (ROA) of commercial banks in Lebanon. The research focused on various innovations, including mobile banking, debit and credit cards, ATMs, internet banking, point-of-sale terminals, and electronic money transmission. Through the collection of survey data, the study found that banking innovations exert a statistically significant and positive influence on the profitability and ROA of business enterprises in Lebanon. These findings underscore the beneficial effects of adopting new banking practices, which contribute to enhancing overall financial performance. It highlights that the pursuit of improved performance is an ongoing endeavor that mutually benefits financial institutions and their clients.

Sujud and Hashem (2017) in their study, explored the ramifications of banking innovations on the profitability and return on assets (ROA) of commercial banks in Lebanon. Their investigation encompassed various innovative practices such as mobile banking, debit and credit cards, ATMs, internet banking, point-of-sale terminals, and electronic money transmission. Employing survey data collection methods, the study revealed a statistically significant and positive correlation between banking innovations and the profitability and ROA of business enterprises in Lebanon. These findings underscore the advantageous impact of embracing novel banking technologies and strategies, which play a pivotal role in augmenting overall financial performance. Moreover, the study emphasizes that the pursuit of enhanced performance is an ongoing endeavor that mutually benefits both financial institutions and their clientele.

METHODS

1. Research Design
In this study, survey methods were employed, enabling the researcher to delineate, document, scrutinize, and interpret the variables in question utilizing the designated approach.

2. Population of the Study
The population of this study was made of 225 participants selected from the staff of 10 banks including Access Bank, Union Bank, United Bank of Africa (UBA), First Bank, EcoBank, Zenith Bank, Polaris Bank, Unity Bank, First City Monument Bank (FCMB) and Fidelity Bank in Uyo metropolis, Akwa Ibom State, Nigeria.

3. Sample and Sampling Technique
A sample size of 143 respondents was selected for the study using Krecjie and Morgan, (1970)

4. Research Instrument
The study employed a structured instrument tagged "Artificial Intelligence Applications for Financial

Indonesian Annual Conference Series, Vol. 3, 2024

International Hybrid Conference on Revitalizing Global Economy for Sustainable National Development (*IHCRGESND*), Nigeria

Process Innovation Questionnaire" (AIAFPIQ). Section A of the questionnaire focused on gathering demographic data from participants, while Section B consisted of questions related to the study's objectives.

5. **Validity of the Instrument**

The research instrument underwent validation by a research expert specializing in test and measurement. This validation aimed to ensure that the questionnaire items were appropriately worded to align with the respondents' comprehension levels and comprehensively addressed the research objectives.

6. **Reliability of the Instrument**

The data was coded for the assessment of Cronbach's alpha, yielding a dependability score of 0.89. The selection of the research instrument was based on its commendably high dependability index, ensuring reliability in the measurement of variables.

7. **Method of Data Analysis**

The statistical analysis incorporated calculations of means, standard deviations, and t-tests. These metrics were utilized to address the research questions by examining the average values and variability of the data points.

RESULTS AND DISCUSSION

Research Question 1: How does the implementation of artificial intelligence for personalized banking experiences affects promotion of financial process innovation by commercial banks in Nigeria.

Table 1. mean analysis of implementation of artificial intelligence for personalized banking experiences affects promotion of financial process innovation by commercial banks in Nigeria

S/N	Implementation of artificial intelligence for personalized banking experiences	$\bar{X}$	SD	Remarks
1	Image recognition	3.65	0.84	Agreed
2	Voice recognition	3.28	0.92	Agreed
3	Sentiment analysis	3.55	1.03	Agreed
4	Virtual financial assistants	3.82	0.95	Agreed
5	Automated Transactions	3.97	1.19	Agreed
	Grand mean	3.65	0.99	Agreed

The integration of artificial intelligence to deliver personalized banking experiences significantly impacts the promotion of financial process innovation among commercial banks in Nigeria, as evidenced by the overall index score of 3.65, with a standard deviation of 0.99, as depicted in Table 1. Notably, question item (5), focusing on "automated transactions", garnered the highest mean score of 3.97, indicating strong support for this aspect of AI implementation. Conversely, question item (2), addressing "voice recognition", recorded the lowest mean score of 3.28, with a standard deviation of 0.92, suggesting comparatively less enthusiasm for this particular feature. These findings collectively affirm that the adoption of artificial intelligence technologies for personalized banking experiences positively influences the advancement of financial process innovation within the Nigerian commercial banking sector.

Table 2. Mean rating analysis of implementation of artificial intelligence for credit risk management affects promotion of financial process innovation by commercial banks in Nigeria

S/N	implementation of artificial intelligence for credit risk management	$\bar{X}$	SD	Remarks
1	Predictive analysis	3.78	1.02	Agreed
2	Market risk analysis	3.79	0.63	Agreed
3	Validating and back testing risk models	3.81	0.58	Agreed
4	Risk reporting	3.87	0.58	Agreed
5	Assess the creditworthiness of prospective borrowers	3.83	0.52	Agreed
	Grand Means	3.80	0.67	Agreed

Indonesian Annual Conference Series, Vol. 3, 2024

International Hybrid Conference on Revitalizing Global Economy for Sustainable National Development (IHCRGESND), Nigeria

The integration of artificial intelligence for credit risk management significantly influences the advancement of financial process innovation among commercial banks in Nigeria, as evidenced by the results presented in Table 2. The overall index score of 3.80, coupled with a standard deviation of 0.67, indicates a substantial impact. Notably, question item (4), concerning "risk reporting", emerged with the highest mean score of 3.87 and a standard deviation of 0.58, underscoring its role in driving innovation within the banking sector. Conversely, question item (1), pertaining to "predictive analysis", exhibited the lowest mean score of 3.78, accompanied by a standard deviation of 1.02, indicating a comparatively lesser impact. Nevertheless, the collective findings suggest that the adoption of artificial intelligence for credit risk management positively contributes to the promotion of financial process innovation among commercial banks in Nigeria.

DISCUSSION OF FINDINGS

The study shows widespread agreement that AI can provide a personalised banking experience. The research found five specialised financial services AI applications. Table 2 shows that respondents agreed on all concerns. The research found that using AI in the form of the above features might help Nigeria commercial banks innovate financial processes and provide personalised banking experiences.

Research Question 1, which investigated the impact of AI for personalized banking experiences on financial process innovation, the results indicate a significant positive relationship. The high mean scores across various AI applications such as image recognition, sentiment analysis, and virtual financial assistants suggest that these technologies are well-received and contribute to

Innovation within the banking sector. This aligns with previous studies that have highlighted the importance of AI-driven personalized banking experiences in enhancing customer satisfaction, streamlining processes, and driving innovation (Smith et al., 2020; Liu et al., 2019). For instance, the high mean score for "automated transactions" reflects the growing trend towards automation in banking services, which has been shown to improve efficiency and reduce operational costs (Lee et al., 2018).

Research Question 2 investigated the impact of AI for credit risk management on financial process innovation. The findings reveal a positive association between AI adoption in credit risk management and innovation within commercial banks. Notably, the high mean score for "risk reporting" underscores the importance of AI-driven analytics in enhancing risk assessment and decision-making processes (Zhu et al., 2021). While "predictive analysis" received a slightly lower score, this may be attributed to the complexity and challenges associated with implementing predictive models in credit risk management (Gao et al., 2019). Nonetheless, the overall positive perception of AI applications in managing credit risk aligns with previous research emphasizing the role of AI in improving risk management practices and fostering innovation in the financial sector (Chen et al., 2020; Li et al., 2017).

CONCLUSION

This study focused on the strategic implementation and seamless integration of artificial intelligence (AI) technologies within the financial processes of commercial banks in Nigeria. Through a comprehensive examination of AI applications for personalized banking experiences and credit risk management, the study aimed to analyze their impact on financial process innovation within the sector.

The findings reveal that the adoption of AI for personalized banking experiences significantly influences the promotion of financial process innovation among commercial banks in Nigeria. Features such as automated transactions, image recognition, sentiment analysis, and virtual financial assistants received high mean scores, indicating strong support and recognition of the role of AI-driven technologies in enhancing customer satisfaction, streamlining processes, and driving innovation. Similarly, the integration of AI for credit risk management was found to positively contribute to financial process innovation within commercial banks in Nigeria. AI-driven analytics, particularly in risk reporting, were perceived as valuable tools for enhancing risk assessment and decision-making processes, despite the challenges associated with predictive analysis.

The study underscores the transformative potential of AI in the Nigerian banking industry, highlighting the

Indonesian Annual Conference Series, Vol. 3, 2024

International Hybrid Conference on Revitalizing Global Economy for Sustainable National Development (IHCRGESND), Nigeria

importance of embracing innovative technologies to remain competitive in the evolving landscape. By leveraging AI for personalized banking experiences and credit risk management, commercial banks can enhance efficiency, mitigate risks, and improve customer satisfaction, ultimately driving financial process innovation and fostering sustainable growth.

RECOMMENDATIONS

The following recommendations are made:

1. Commercial banks in Nigeria should prioritize investment in AI infrastructure and talent development to effectively implement and leverage AI technologies.
2. Banks should explore opportunities for collaboration and partnerships with fintech firms, technology companies, and AI specialists to access cutting-edge AI solutions and expertise. Banks should prioritize ethical AI practices to ensure fairness, transparency, and accountability in AI-driven decision-making processes.
3. Banks should establish mechanisms for continuous monitoring and evaluation of AI applications to assess their effectiveness, identify areas for improvement, and mitigate potential risks.
4. Banks should proactively educate and engage customers about the benefits of AI-driven banking services, such as personalized experiences and enhanced security measures.
5. Regulatory authorities in Nigeria should provide guidance and support to banks in navigating the regulatory landscape related to AI adoption.

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