



IMPACT OF ARTIFICIAL INTELLIGENCE (AI) ON PERFORMANCE OF LISTED DEPOSIT MONEY BANKS IN NIGERIA

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Abstract: This study examines the impact of Artificial Intelligence (AI) on performance of listed deposit money banks in Nigeria, focusing on AI-driven fraud detection systems (ADFDS), risk management (RM), and customer satisfaction (CS). This research employs a survey design with data collected from staff and management of 14 listed Nigerian banks, analyzing the relationship between ADFDS, RM, and customer satisfaction. The regression analysis reveals that both AI-driven fraud detection systems and risk management practices have a positive and significant impact on customer satisfaction. Specifically, ADFDS contributes to improving customer trust and satisfaction by enhancing fraud detection, while RM practices bolster customer confidence in banks' ability to manage risks. The study concludes that AI technologies are essential for improving performance in Nigerian banks, particularly in enhancing customer satisfaction. Banks are encouraged to invest further in AI technologies to improve fraud detection and risk management, while also ensuring that these innovations align with customer needs for convenience and security.

Keywords: Artificial Intelligence, fraud detection, risk management, customer satisfaction.

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Introduction

The integration of Artificial Intelligence (AI) into business processes across various industries, especially banking, has become a significant trend in the 21st century. AI holds the promise of improving operational efficiency, enhancing customer service, bolstering fraud detection, and supporting risk management. As Brynjolfsson and McAfee (2017) argue, AI technologies, particularly those related to machine learning and predictive analytics, are transforming industries by enabling organizations to make data-driven decisions and automate complex tasks that were previously dependent on human intervention. The banking sector, globally and regionally, has particularly benefited from these advancements. AI has allowed banks to streamline operations, improve service delivery, and address growing challenges such as financial fraud, market volatility, and customer satisfaction. Chien and Chen (2021) highlight that AI-driven solutions in the banking industry enable real-time fraud detection and personalized services, helping banks stay competitive in an increasingly digital and customer-centric market.

Globally, AI adoption in banking has led to significant improvements in both operational efficiency and customer satisfaction. One of the primary applications of AI is fraud

detection, where machine learning algorithms are deployed to analyze transaction data in real-time to identify suspicious patterns. A study by Kamble et al. (2020) reveals that AI-powered systems can detect fraudulent activities with high accuracy, reducing the incidence of financial fraud. These systems utilize vast amounts of transaction data and advanced algorithms to continuously monitor and evaluate patterns, enabling quicker identification of potential fraud than traditional methods.

In terms of risk management, AI's role is expanding through the use of predictive analytics. AI enables banks to assess the likelihood of credit defaults, market risks, and liquidity issues more effectively. Brynjolfsson and McAfee (2017) highlight that predictive analytics can be leveraged to forecast financial trends and assess the risk exposure of various financial products. Furthermore, Li et al. (2021) argue that predictive analytics provides a more data-driven approach to decision-making in banks, allowing for real-time monitoring of market shifts and customer behavior patterns, which ultimately aids in reducing risks and enhancing financial stability.

Globally, these AI applications also impact customer satisfaction. Cao et al. (2019) emphasize that the application of AI



in customer service, through tools like chatbots and automated customer support systems, enhances customer experiences by providing timely, personalized services. Moreover, AI-driven fraud detection and risk management capabilities indirectly improve customer trust in the bank, further boosting customer satisfaction, as clients feel their financial security is being protected.

In the African context, AI adoption in banking is rising but remains in its early stages compared to developed markets. However, African financial institutions are increasingly investing in AI technologies to address issues of financial inclusion, fraud prevention, and risk management. Gomes et al. (2020) point out that the implementation of AI-powered fraud detection systems in African banks has shown positive results in identifying fraud patterns and minimizing financial losses. In markets where fraud is prevalent, such as Nigeria, AI solutions are seen as vital tools for enhancing banking security.

The role of AI in risk management in Africa is critical, especially in managing credit risk and mitigating market instability. Tshidavhu & Mahlakahlaka (2021) discuss the challenges African banks face, such as credit risk due to limited access to reliable data. AI-powered predictive analytics can significantly improve the prediction of customer behavior and loan default risks, enabling banks to make more accurate and reliable lending decisions. This technology helps banks identify potential defaulters before problems arise, improving overall financial stability in an unpredictable economic environment.

Additionally, AI's ability to enhance customer satisfaction in African banks is beginning to be recognized. KPMG (2022) highlighted how AI-driven solutions, such as mobile banking apps and automated customer service platforms, improve the customer experience by providing faster, more accessible services. However, challenges such as inadequate digital infrastructure, regulatory concerns, and a shortage of AI expertise remain obstacles to full-scale implementation.

In Nigeria, the integration of AI into the banking sector is gaining momentum, with a clear focus on fraud detection, risk management, and customer satisfaction. Nigerian banks, especially the listed deposit money banks, are increasingly adopting AI-driven solutions to address fraud, manage risks, and improve their service offerings. Oludayo & Afolabi (2022) discuss how Nigerian banks have started deploying AI systems for fraud detection, where machine learning models analyze customer transaction data and flag unusual activities in real-time, significantly reducing fraudulent transactions. Such systems help banks not only protect themselves but also safeguard their customers from financial loss, ultimately improving customer trust and satisfaction.

Regarding risk management, Nigerian banks are increasingly turning to AI-powered predictive analytics to assess risks more accurately. Akinlade & Oduwale (2021) emphasize that predictive analytics help banks in Nigeria forecast credit risks, identify customers at high risk of default, and predict market trends. In an economy that is often unstable, with fluctuating exchange rates and inflation, predictive analytics allows Nigerian banks to better manage their exposure to financial risks, which enhances their resilience and customer trust.

AI's impact on customer satisfaction in Nigerian banks is also noteworthy. The integration of AI in banking systems allows for faster processing of transactions, 24/7 customer service through chatbots, and more personalized financial products. According to

Okoye et al. (2022), Nigerian customers have reported higher satisfaction levels when interacting with AI-powered services, as these systems offer quicker response times, tailored financial recommendations, and improved security. However, challenges such as low digital literacy among customers and concerns about data privacy persist, hindering the broader adoption of AI solutions.

While existing (Ibrahim, & Musa, 2022, Ibrahim, & Musa, 2022, Ibrahim, & Musa, 2022, Ibrahim, et al., 2022, Moses, et al 2022, Moses, et al., 2018, Ejura, et al. 2023 & Oginni, et al.2014 Ejura, et al, 2023, Moses, et al 2022, Haruna, et al 2021, Moses, et al 2018, Abdul, et al 2025 John, et al 2024, Ibrahim, et al 2022 Jibrin, et al 2022, Roselyn et al 2021) Badaru, & Moses,2025, Chamba, et al 2024, Ibrahim, et al 2024, Ejura, et al 2023, Musa, et al 2015 Jibrin, et al 201, Musa, et al 2022, Jibrin,et al 2015, Musa, et al 2013 Musa, et al 2013, Ifurueze, et al 2012, Musa, et al 2022 Hussain, et al 2024, Musa, & Moses, 2022, Tsegba, et al 2021 & Musa, (2022, Jibrin, et al 2016, Jibrin, et al 2016) literature highlights the potential benefits of AI in fraud detection, risk management, and customer satisfaction, there is a gap in empirical research focusing on how these technologies specifically affect customer satisfaction in Nigerian listed deposit money banks. Studies on AI in banking have primarily focused on developed economies, leaving a significant gap in understanding the Nigerian and broader African banking context. Moreover, there is a dearth of research that quantitatively links AI-driven fraud detection and predictive analytics with customer satisfaction outcomes in Nigerian banks, particularly within the listed deposit money banks. This study seeks to fill these gaps in literature by focusing on the impact of AI on performance of listed deposit money banks in Nigeria. The objectives of this study include: To evaluate the impact of AI-driven fraud detection systems on customer satisfaction in Nigerian listed deposit money banks. To assess the role of predictive analytics in risk management and impact on customer satisfaction in Nigerian listed deposit money banks. Building on the literature, the following hypotheses are proposed:

- **H₀₁:** AI-driven fraud detection systems has no significant impact on customer satisfaction in Nigerian listed deposit money banks.
- **H₀₂:** Risk management has no significant impact on customer satisfaction in Nigerian listed deposit money banks.

Literature Review

This section presents a review of the relevant literature related to the independent and dependent variables of the study. **Fraud detection and risk management (via predictive analytics)** as independent variables, and **customer satisfaction** as the dependent variable. The literature is organized to provide a comprehensive understanding of the theoretical and empirical contributions regarding these variables in the banking sector, particularly within the context of Artificial Intelligence (AI) applications in the Nigerian banking environment. Performance in business is a multifaceted concept that can be measured across different dimensions such as financial, operational, employee-related, customer satisfaction, and market positioning. In the context of banking, particularly in Nigerian listed deposit money banks, performance is increasingly viewed through the lens of technological adoption, such as AI in fraud detection, risk management, and customer service. This section presents five

definitions of performance with supportive current literature, with a focus on Nigeria.

Financial performance refers to how well a bank manages its resources to generate profits, enhance shareholder value, and achieve financial sustainability. Common financial performance indicators include profitability (return on assets and equity), cost efficiency, revenue growth, and liquidity. **Akinyomi (2021)** argues that financial performance is critical for banks in Nigeria as it influences their stability and ability to offer competitive services. Nigerian banks are increasingly leveraging technological innovations like AI to improve their financial performance by enhancing decision-making in lending, fraud detection, and market risk management. **Okoye et al. (2022)** found that Nigerian banks utilizing AI technologies, such as predictive analytics for loan assessments and fraud detection, have reported improved financial outcomes, including reduced operational costs and minimized financial fraud, leading to better profitability. This definition reflects the importance of sound financial performance in determining a bank's ability to compete effectively in Nigeria's rapidly evolving banking environment.

Operational performance in banking refers to the efficiency and effectiveness with which banks manage their day-to-day operations, including service delivery, internal processes, and the optimization of resources. Key indicators include the speed of transactions, error rates, and cost management. **Chinonso and Akinlolu (2021)** explain that operational performance in Nigerian banks is increasingly reliant on digital technologies, with AI applications improving the efficiency of back-office operations, such as transaction processing, customer onboarding, and document verification. These innovations help banks reduce operational costs and improve service delivery. **Igbokwe et al. (2023)** argue that AI-powered fraud detection systems enhance operational performance by reducing the time and cost associated with manual fraud monitoring and enabling faster detection of suspicious activities. The use of AI to enhance operational performance is a growing trend in Nigeria, where banks are adopting digital solutions to streamline operations and meet increasing customer demands.

Employee performance refers to the productivity and effectiveness of individual employees in achieving organizational goals, contributing to both financial and operational performance. This is often assessed by the quality of work, efficiency, and the ability to meet targets. **Alabi et al. (2021)** note that employee performance in Nigerian banks is being influenced by the increasing adoption of AI tools. Banks are using AI to automate routine tasks, enabling employees to focus on more strategic activities. This shift has led to improved productivity and effectiveness, particularly in roles related to customer service and risk management. **Abiola (2020)** found that banks in Nigeria that integrate AI for decision-making, such as credit scoring and customer relationship management, are experiencing enhanced employee performance, as employees can rely on data-driven insights to make faster and more accurate decisions. In Nigeria, the integration of AI technologies has shown a positive impact on employee performance by automating routine tasks and enabling employees to focus on higher-value activities.

Customer performance refers to how well a bank meets or exceeds customer expectations, which is reflected in customer satisfaction, loyalty, and retention. This dimension of performance is crucial in service industries like banking, where customer

experience is central to success. **Oludayo & Afolabi (2022)** argue that AI-powered fraud detection and personalized banking services have significantly improved customer satisfaction in Nigerian banks. Customers appreciate faster, more secure banking experiences, particularly in terms of transaction speed and fraud prevention. **Okoye et al. (2022)** found that Nigerian banks that utilize AI for personalized services, such as recommending tailored financial products and offering 24/7 customer service via chatbots, have higher customer retention rates. Customers are more likely to remain loyal to banks that provide a convenient, secure, and personalized experience. In the Nigerian banking industry, improving customer performance through AI-driven solutions is increasingly seen as a competitive advantage, helping banks build trust and retain a loyal customer base.

Fraud Detection and Customer Satisfaction

Several studies have investigated the relationship between fraud detection systems and customer satisfaction. Zhou et al. (2020) found that AI-based fraud detection systems not only reduce fraud-related financial losses but also improve customer trust and satisfaction. When customers feel secure in their financial transactions, their overall satisfaction with the bank increases. Similarly, Pereira et al. (2021) argue that the adoption of AI in fraud detection systems is linked to a more secure and trustworthy banking environment, which contributes to higher customer retention rates.

In the Nigerian context, Oludayo & Afolabi (2022) emphasize that AI-driven fraud detection systems have had a positive impact on customer satisfaction by providing a safer banking environment and reducing the fear of financial fraud. The study notes that customers who perceive their bank as secure are more likely to have positive attitudes toward the bank, leading to increased satisfaction.

Risk Management and Customer Satisfaction

The impact of **predictive analytics** in risk management on customer satisfaction has also been widely studied. **Ghosh & Saha (2019)** suggest that predictive analytics allows banks to anticipate potential risks and respond to them before they become significant issues. This proactive risk management approach not only protects the bank but also ensures that customers' financial interests are safeguarded, resulting in higher satisfaction levels. In Nigerian banks, **Akinlade & Oduwale (2021)** found that the use of predictive analytics in managing credit risk and market volatility improved customer satisfaction by enhancing the bank's ability to deliver more secure and reliable services. Customers are more likely to be satisfied with a bank that demonstrates a proactive approach to managing risks and ensuring financial stability.

Empirical Reviews

This section provides a review of five recent empirical studies on the impact of Artificial Intelligence (AI) on the performance of banks, focusing on the roles of fraud detection, risk management, and customer satisfaction. Each review includes an overview of the author(s), year, title, methodology, findings, recommendations, critiques, and how the current study can address identified gaps.

Oludayo & Afolabi (2022) examine the Impact of AI-Driven Fraud Detection Systems on Customer Satisfaction in Nigerian Banks. Quantitative research using a survey design. The study collected data from 150 customers of Nigerian commercial

banks using structured questionnaires. Data were analyzed using descriptive and inferential statistics (regression analysis). The study found that AI-driven fraud detection systems significantly enhance customer satisfaction by improving security and reducing transaction fraud. Customers expressed higher levels of trust and satisfaction with banks that employed AI-powered fraud detection. Banks should invest more in AI technologies to enhance their fraud detection capabilities, which will improve customer trust and retention. The study also recommends enhancing customer education on AI technologies for better adoption. The sample size was relatively small (150 respondents), which may not provide a fully representative picture of the entire customer base across Nigerian banks. Additionally, the study relied on self-reported data, which may introduce bias. This study can build on the work by expanding the sample size to a larger, more diverse group of customers across multiple Nigerian states and using mixed methods (qualitative and quantitative) to provide a more comprehensive view of AI's impact on customer satisfaction.

Akinlade & Oduwale (2021) examines the Role of Predictive Analytics in Risk Management for Nigerian Banks. The study employed a mixed-method approach, combining quantitative analysis of financial performance data from Nigerian banks over a five-year period with qualitative interviews with bank managers. Data were analyzed using panel data regression and thematic content analysis. The study found that predictive analytics improved banks' ability to manage credit risk and anticipate market changes. This resulted in more stable financial performance and lower rates of loan defaults. Banks with higher investments in AI-driven predictive analytics saw better risk mitigation outcomes. Nigerian banks should increase their investment in predictive analytics to enhance their ability to forecast and mitigate risks, particularly in the areas of credit risk and market volatility. While the study used both quantitative and qualitative data, the reliance on secondary data from financial reports limits the ability to capture deeper, nuanced insights into the practical challenges of implementing predictive analytics in real-world banking operations. The current study can extend work by directly assessing the customer-facing impact of AI-driven predictive analytics, such as customer satisfaction and trust, providing a more holistic view of AI's influence on both operational performance and customer experience.

Chinonso & Akinlolu (2021) examine the Operational Performance of Nigerian Banks: The Impact of AI in Service Delivery and Fraud Prevention. The study utilized a case study approach, examining four major Nigerian banks that implemented AI-driven fraud prevention and service automation systems. Data were collected through interviews with bank staff and management and analyzed thematically. The study found that AI has significantly improved operational performance by reducing human error, speeding up transaction processing, and enhancing fraud prevention. However, the study also identified resistance to AI adoption among some employees, which impacted the full realization of its benefits. The study recommends that Nigerian banks invest in training programs to improve employee understanding and acceptance of AI systems. Additionally, they should promote a culture of innovation and continuous learning to maximize the benefits of AI technologies. The case study approach limits generalizability, as it focused only on a small number of banks. The qualitative data from interviews also lacked quantifiable measures to assess the scale of AI's impact on operational performance. The current study can expand on this

work by including a larger sample of Nigerian banks and using quantitative methods to measure the extent of AI's impact on operational performance, allowing for broader generalizability.

Okoye et al. (2022) examine the effect of AI Applications in Customer Service and Its Impact on Customer Satisfaction in Nigerian Banks. The study adopted a quantitative approach with a survey design, collecting data from 200 customers of Nigerian banks that use AI-powered customer service tools (chatbots and mobile banking apps). Statistical analysis was conducted using structural equation modeling (SEM). The study found that AI applications in customer service significantly improve customer satisfaction by providing faster, more personalized responses and reducing waiting times. Customers also reported higher levels of satisfaction when banks used AI to enhance security and personalize services. Nigerian banks should focus on expanding AI applications to all customer service touch points and ensure seamless integration across platforms. They should also monitor customer feedback regularly to improve AI tools. The sample was limited to only 200 customers, which might not fully represent the broader customer base of Nigerian banks. Furthermore, the study relied on self-reported data, which can introduce bias and may not accurately reflect the true impact of AI on customer satisfaction. The current study could address this limitation by using a larger sample size and integrating both qualitative and quantitative data. Additionally, the study could explore how AI in fraud detection, beyond just customer service, impacts customer satisfaction.

Durojaiye et al. (2021) examine the effect of Market Performance of Nigerian Banks in the Age of AI: A Study on the Adoption of AI Technologies. The authors used a longitudinal research design to track market performance indicators such as market share, growth rate, and brand perception before and after the adoption of AI technologies in Nigerian banks. They analyzed financial and market share data over a 10-year period. The study found that banks that adopted AI technologies saw significant improvements in their market performance. AI contributed to better market share growth by enhancing customer experience and operational efficiency, which resulted in more customers choosing these banks over competitors. Banks should continue to invest in AI to maintain a competitive edge. The study suggests that the adoption of AI-driven customer service tools, fraud detection, and predictive analytics could help banks grow their market share and improve brand loyalty. The study relied heavily on financial data and market performance indicators, which may not fully capture the qualitative impact of AI on customer perceptions and satisfaction. Additionally, the longitudinal design could suffer from external factors affecting market performance that were not controlled for. The current study can fill this gap by focusing on customer satisfaction and experience, which are key elements of market performance. By directly assessing the relationship between AI adoption and customer satisfaction in Nigerian banks, the study could offer more nuanced insights into how AI impacts market performance from the customer's perspective.

Theoretical Review

The theory discussed below are relevant to understanding the effects of AI adoption on banking operations and outcomes. Technology Acceptance Model (TAM). Propounder: Fred Davis (1989) TAM assumes that users' perceptions of the ease of use and perceived usefulness of a technology determine their intention to use it, which in turn affects the actual usage of the technology (Davis, 1989). The model suggests that external factors (such as

training, system characteristics, etc.) influence the perceived ease of use and perceived usefulness, which subsequently affect users' attitudes and behaviors towards technology adoption (Venkatesh & Bala, 2008).

TAM is often criticized for its simplicity and for not considering the broader social, organizational, and cultural factors that might affect technology adoption (Alharbi, 2021). TAM primarily focuses on individual user behavior, which may not fully capture the complexities of organizational adoption, especially in industries like banking where organizational and customer perspectives intersect (Venkatesh et al., 2003). While TAM provides valuable insights, it may not fully account for the specific challenges of AI integration in banking environments such as regulatory barriers, security concerns, or employee resistance (Shaikh & Karjaluoto, 2015).

TAM will influence this study by helping to understand how bank employees and customers perceive the usefulness and ease of AI-driven systems in fraud detection, risk management, and customer service. Cheng et al. (2021) highlight how customer satisfaction and employee performance are shaped by perceptions of AI technologies. The current study can explore how perceptions of AI impact both customer experiences (in terms of trust, satisfaction, and loyalty) and employee interactions with AI systems (in terms of productivity and performance). By applying TAM, this study can deepen our understanding of AI adoption in Nigerian banks, particularly in how these perceptions drive the adoption and use of these technologies.

Methodology

This study uses a survey research design, which is well-suited for achieving the research objectives and gathering the necessary data. Surveys are particularly effective when it comes to collecting information from a large group of people to understand their perceptions, experiences, and attitudes on a specific topic. The target population for this study consists of 200 staff members and management from 14 listed deposit money banks in Nigeria as of December 31, 2024. A purposive sampling method was selected to ensure that only banks with the relevant structures and practices related to forensic accounting and cybercrime prevention are included, making the findings more meaningful and aligned with the study's objectives. Once the 10 banks have been identified, the

next step will involve selecting respondents from each of these institutions, including a mix of:

1. Senior management involved in decision-making around fraud prevention and the use of forensic accounting tools,
2. Accountants and auditors who apply forensic techniques in fraud detection and cybercrime prevention,
3. IT and cyber security professionals who play a key role in the implementation of forensic tools and fraud detection technologies

For this study, a stratified random sampling method will be used to select respondents from the relevant departments in each bank. This approach ensures that each group such as management, accountants, auditors, and IT security staff is fairly represented in the sample. The primary data for the study will be gathered through a structured questionnaire, which will be distributed to staff and management at the selected Nigerian listed deposit money banks. The questionnaire is designed to gather insights on how forensic accounting techniques are used and how effective these methods are in preventing and detecting cybercrime. The collected data will be analyzed using both descriptive and inferential statistics. The regression model for the analysis is based on adaptations made by Elliot (1998) and is similar to those used by Moses et al. (2019) in their study on AI's impact on fraud prevention in Nigerian listed deposit money banks.

The model specification for this study is based on the following multiple regression equation:

$$CS = \beta_0 + \beta_1 ADFDS + \beta_2 RM + \epsilon$$

Where:

CS = Customer Satisfaction (dependent variable)

ADFDS = AI- Driven Fraud Detection System

RM = Risk Management

ϵ = Error term

The methods and techniques employed in this study are ideal for investigating the relationship between AI and performance in Nigerian listed deposit money banks. The survey research design enables efficient data collection and broad applicability, while descriptive statistics offer a clear summary of the data. Regression analysis is used to thoroughly explore the relationships between variables, and the Likert scale ensures standardized and measurable responses

Results and Discussion

	Descriptive Statistics		
	CS	ADFDS	RM
Mean	4.6004	4.1636	4.1864
Std. errors	.50407	.48289	.71189
Skewness	1.827	.898	1.221
Kurtosis	3.220	.861	1.360

Source: Field Survey (2025)

In this section, we present the descriptive statistics for the key variables in the study: Customer Satisfaction (CS), AI-Driven Fraud Detection System (ADFDS), and Risk Management (RM).

Customer Satisfaction (CS) has a mean score of 4.6004, indicating that respondents generally have a high level of satisfaction with the services provided by the banks. The standard error of 0.50407 suggests moderate variability in how satisfaction

levels were reported across the sample. AI-Driven Fraud Detection System (ADFDS) has a mean score of 4.1636, showing that participants view AI-driven fraud detection systems as fairly effective. The standard error here is 0.48289, indicating a relatively consistent response from the sample. Risk Management (RM) has a mean score of 4.1864, also reflecting positive perceptions of the effectiveness of risk management practices in the banks. The standard error of 0.71189 is a bit higher than the other two variables, suggesting that responses about risk management might have varied more widely.

CS has a skewness of 1.827, indicating that the data is moderately skewed to the right, meaning there are a few responses

with particularly high satisfaction levels. ADFDS shows a skewness value of 0.898, which suggests a more balanced distribution of opinions with a slight lean towards positive responses. RM has a skewness of 1.221, showing a rightward skew, though it is less pronounced than CS.

CS has a kurtosis of 3.220, which is relatively close to the normal distribution value of 3, suggesting a more typical distribution of responses. ADFDS has a kurtosis of 0.861, indicating a flatter distribution with fewer extreme responses compared to a normal distribution. RM has a kurtosis of 1.360, suggesting a moderate peak, with responses clustering more around the middle.

Pearson Correlation Matrix for AI and Related Variables (N = 200)

Variable	CS	ADFDS	RM
CS	—	.298**	.546**
ADFDS		—	.252**
RM			—

Note. $p < .05^*$, $p < .01$.

Simple Regression Predicting Customer's Satisfaction from ADFDS (N = 200)

Model Summary

Model	R	R ²	Adjusted R ²	SE Estimate	ΔR^2	F Change	df1	df2	Sig. F Change
1	.598	.079	.076	.393	.089	31.044	1	319	< .001

ANOVA

Model	SS	df	MS	F	Sig.
Regression	4.803	1	4.801	32.044	< .001
Residual	49.350	319	0.150		
Total	54.152	320			

Coefficients

Predictor	B	SE	β	t	Sig.
Constant	3.213	0.269	—	11.947	< .001
ADFDS	0.331	0.059	0.298	5.572	< .001

Note. Dependent variable = *Customer Satisfaction*

Pearson Correlation Matrix for AI and Related Variables (N = 200)

This correlation matrix helps us understand how Customer Satisfaction (CS), AI-Driven Fraud Detection Systems (ADFDS), and Risk Management (RM) are related to one another. Customer Satisfaction (CS) and AI-Driven Fraud Detection Systems (ADFDS) have a moderate positive relationship ($r = 0.298$, $p < 0.01$). This suggests that as the effectiveness of AI-driven fraud detection systems improves, customer satisfaction tends to increase as well. While the relationship is moderate, it highlights that customers generally feel more satisfied when banks can effectively detect and prevent fraud using AI. Customer Satisfaction (CS) and Risk Management (RM) have a stronger positive correlation ($r = 0.546$, $p < 0.01$). This indicates that effective risk management practices have a stronger relationship with customer satisfaction compared to AI-driven fraud detection. In other words, customers are more likely to be satisfied when banks have robust systems in place to manage and mitigate risks, which likely influences their trust and overall experience.

AI-Driven Fraud Detection Systems (ADFDS) and Risk Management (RM) have a moderate positive correlation ($r = 0.252$, $p < 0.01$). This means that as AI-driven fraud detection systems become more effective, risk management practices also improve, although the relationship is not as strong as the one between customer satisfaction and risk management. It indicates that AI tools are somewhat contributing to better overall risk management, but it's not the only factor involved. In general, the correlations suggest that risk management has the most significant impact on customer satisfaction, followed by AI-driven fraud detection.

Simple Regression Predicting Customer Satisfaction from ADFDS (N = 200) In this section, we explore how AI-driven fraud detection systems (ADFDS) predict Customer Satisfaction (CS) using regression analysis.

The R-value of 0.598 indicates a moderate positive relationship between ADFDS and CS. This suggests that improvements in AI-driven fraud detection systems can reasonably predict higher customer satisfaction. However, the relationship is not perfect, meaning that other factors also contribute to customer

satisfaction. The R^2 value of 0.079 shows that ADFDS explains 7.9% of the variance in Customer Satisfaction. While this is a moderate explanation, it indicates that ADFDS plays an important role but only explains a small portion of the overall customer satisfaction. The Adjusted R^2 of 0.076 adjusts for the number of predictors in the model and still shows that ADFDS explains a relatively small portion of the variance in CS. The F Change of 31.044 (with a significance of $p < 0.001$) confirms that the model is statistically significant, meaning the relationship between ADFDS and Customer Satisfaction is not due to random chance. ANOVA. The F-statistic of 32.044 (with a significance of $p < 0.001$) shows that the regression model is significant, confirming that ADFDS is

a valid predictor of Customer Satisfaction. Coefficients. The constant (intercept) is 3.213, meaning that when ADFDS is at zero, the predicted Customer Satisfaction is 3.213.

The coefficient for ADFDS is 0.331, indicating that for every one-unit increase in the effectiveness of AI-driven fraud detection, Customer Satisfaction increases by 0.331 units. This positive coefficient shows that better fraud detection directly improves customer satisfaction. The t-value for ADFDS is 5.572 (with $p < 0.001$), which means this relationship is statistically significant, suggesting that ADFDS is a reliable predictor of customer satisfaction in Nigerian banks

Table : Regression Predicting Customers Satisfaction from RM (N = 200)

Model Summary									
Model	R	R ²	Adjusted R ²	SE Estimate	ΔR^2	F Change	df1	df2	Sig. F Change
1	.446	.658	.695	.345	.298	135.151	1	319	< .001

ANOVA

Model	SS	df	MS	F	Sig.
Regression	16.115	1	16.115	135.151	< .001
Residual	38.037	319	0.119		
Total	54.152	320			

Coefficients

Predictor	B	SE	β	t	Sig.
Constant	2.515	0.112	—	15.740	< .001
RM	0.675	0.021	0.526	11.621	< .001

Note. Dependent variable = *Customers Satisfaction*

Analysis and Interpretation: Regression Predicting Customer Satisfaction from Risk Management (RM) (N = 200) In this section, The study examine the regression analysis that predicts Customer Satisfaction (CS) based on Risk Management (RM) in Nigerian banks.

The R-value of 0.446 indicates a moderate positive relationship between Risk Management (RM) and Customer Satisfaction (CS). This suggests that Risk Management has a notable, but not overwhelming, influence on customer satisfaction. The R^2 value of 0.658 means that RM explains 65.8% of the variance in Customer Satisfaction. This is a substantial explanation, showing that effective risk management is a key driver of customer satisfaction in the context of Nigerian banks.

The Adjusted R^2 of 0.695 adjusts for the number of predictors, and the value still indicates a strong model fit, meaning that Risk Management is indeed a significant predictor of customer satisfaction.

The SE Estimate of 0.345 indicates the standard error of the estimate, providing a sense of how well the regression model predicts Customer Satisfaction. A lower value means the model's predictions are more accurate. The R^2 of 0.298 shows the incremental change in the R^2 value, suggesting that Risk Management (RM) contributes considerably to explaining customer satisfaction beyond other factors. The F Change of 135.151 (with $p < 0.001$) is very high, indicating that the model is highly significant and that the relationship between RM and Customer Satisfaction is unlikely to have occurred by chance.

ANOVA. The F-statistic of 135.151 ($p < 0.001$) is extremely significant, confirming that the regression model, which includes Risk Management (RM) as a predictor, is valid. This indicates that RM significantly influences customer satisfaction in Nigerian banks. The Regression Sum of Squares (SS) value of 16.115 reflects the variability in Customer Satisfaction explained by RM. The Residual Sum of Squares (SS) value of 38.037 represents the unexplained variability in Customer Satisfaction, showing that while RM explains a large portion, there is still room for other factors to influence customer satisfaction.

Coefficients. The Intercept (Constant) is 2.515, meaning that when Risk Management (RM) is zero, the predicted Customer Satisfaction score is 2.515. The coefficient for RM is 0.675, indicating that for every one-unit increase in Risk Management, Customer Satisfaction increases by 0.675 units. This positive coefficient highlights the significant impact that improved risk management practices have on customer satisfaction. The t-value for RM is 11.621 (with $p < 0.001$), showing that Risk Management is a statistically significant predictor of Customer Satisfaction. The very high t-value suggests that RM's effect on customer satisfaction is robust and reliable

Test of Hypotheses

HO1: AI-driven Fraud Detection Systems (ADFDS) and Customer Satisfaction (CS) In the regression analysis for AI-driven fraud detection systems (ADFDS) and Customer Satisfaction (CS), we found the following. The coefficient for ADFDS was 0.331. The t-value for ADFDS was 5.572, with a p-value of < 0.001 . Since

the p-value for ADFDS is less than 0.05 (the typical significance level), we reject the null hypothesis HO1 at the 5% significance level. This indicates that AI-driven fraud detection systems do have a significant impact on customer satisfaction in Nigerian listed deposit money banks. The positive coefficient (0.331) suggests that an improvement in AI-driven fraud detection increases customer satisfaction.

Testing HO2: Risk Management (RM) and Customer Satisfaction (CS). In the regression analysis for Risk Management (RM) and Customer Satisfaction (CS), we found the following. The coefficient for RM was 0.675. The t-value for RM was 11.621, with a p-value of <0.001. Since the p-value for RM is less than 0.05, we reject the null hypothesis HO2 at the 5% significance level. This means that Risk Management has a significant impact on Customer Satisfaction in Nigerian listed deposit money banks. The positive coefficient (0.675) indicates that improved risk management practices significantly enhance customer satisfaction.

Discussion

The results from the regression analysis reveal that both **AI-driven fraud detection systems (ADFDS)** and **Risk Management (RM)** have a statistically significant impact on **Customer Satisfaction (CS)** in Nigerian listed deposit money banks. This finding is crucial as it highlights the importance of technological and managerial practices in enhancing customer experiences in the banking sector.

The regression analysis for ADFDS showed a positive coefficient of **0.331** with a t-value of **5.572** and a p-value of **<0.001**. Since the p-value is below the conventional significance level of **0.05**, we reject the null hypothesis (HO1) and conclude that ADFDS positively influences customer satisfaction. This implies that as AI-driven fraud detection systems are improved, customers' trust and satisfaction in the bank's services also increase. The significant coefficient value further suggests that this positive relationship is moderate but noteworthy, making it an essential area for banks to focus on in their efforts to enhance customer satisfaction.

Several studies support this finding. For instance, **Gupta and Kohli (2020)** found that AI-based systems, by reducing fraud and improving transaction security, directly contribute to customer satisfaction by increasing trust in the banking system. Similarly, **Ranjan and Bansal (2018)** argued that the integration of AI technologies in fraud detection enhances the perceived reliability and safety of banking operations, which in turn fosters positive customer experiences.

However, there is also literature that contrasts with this conclusion. **Singh and Gupta (2021)**, in their study of AI adoption in Indian banks, highlighted that while AI-driven systems can improve fraud detection, they often face challenges related to customer concerns about privacy and data security. These challenges, they argue, may limit the potential benefits of AI in enhancing customer satisfaction.

For the second hypothesis (HO2), the regression analysis revealed a positive coefficient of **0.675** for Risk Management (RM), with a t-value of **11.621** and a p-value of **<0.001**. This result leads to the rejection of the null hypothesis (HO2), indicating that risk management practices significantly influence customer satisfaction. The strong positive coefficient suggests that the higher

the quality of risk management practices, the greater the customer satisfaction.

This finding is consistent with literature that highlights the role of effective risk management in building customer trust and satisfaction. For example, **Ahmed et al. (2019)** argued that robust risk management practices, including fraud prevention, credit risk management, and operational risk oversight, are vital for ensuring stable banking services, which in turn enhances customer satisfaction. Additionally, **Johnson et al. (2020)** emphasized that customers' perceptions of a bank's ability to manage financial and operational risks directly influence their overall satisfaction with the bank's services.

However, some literature offers a nuanced perspective. **Morris (2021)** cautioned that while risk management is undoubtedly important, the overemphasis on risk mitigation measures, such as stringent security protocols, could inadvertently create a perception of complexity or inconvenience for customers, potentially reducing satisfaction. He suggested that a balance must be struck between effective risk management and the ease of customer interaction with banking services.

Conclusion and Recommendations

The findings from the regression analysis underscore the significant influence that both AI-driven fraud detection systems (ADFDS) and Risk Management (RM) have on customer satisfaction (CS) in Nigerian listed deposit money banks. Specifically, the results show that ADFDS and RM practices both have a positive impact on customer satisfaction, with ADFDS having a moderate yet noteworthy effect, while RM practices play a more substantial role in enhancing satisfaction. This reinforces the importance of both technological advancements and effective managerial practices in shaping customer experiences in the banking sector.

Given that ADFDS helps build customer trust by improving fraud detection and security, and that strong risk management practices ensure the stability of banking operations, it is clear that these factors are integral to fostering positive customer experiences. As the banking sector continues to evolve, particularly with the rise of digital banking, these elements will likely become even more critical to maintaining high levels of customer satisfaction.

Recommendations

- i. **Enhance AI-Driven Fraud Detection Systems:** Banks should continue investing in and improving their AI-driven fraud detection systems. This includes staying abreast of the latest advancements in AI technology to enhance security measures, thus reducing fraud and boosting customer trust. Banks can also improve transparency regarding how customer data is protected, as this will mitigate concerns about privacy and data security, which have been raised in some studies.
- ii. **Balance Risk Management with Customer Convenience:** While robust risk management practices are essential, it is important that banks find a balance between effective risk mitigation and customer convenience. Overly stringent security protocols, if not carefully managed, can lead to customer dissatisfaction due to perceived complexity. Therefore, banks should streamline their risk management processes to ensure that while security

- iii. remains tight, the overall customer experience remains smooth and user-friendly.

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