IMPACT OF ARTIFICIAL INTELLIGENCE IN DETECTING FINANCIAL FRAUDS IN NIGERIAN DEPOSIT MONEY BANKS

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ABSTRACT

The purpose of this study is to examine how artificial intelligence (AI) is used to identifying and detecting financial frauds in Nigerian deposit money banks. The study used primary data by eliciting response from 94 respondents who were chosen at random from the population of 125 employees in five Nigerian deposit money banks. A questionnaire that the researcher created served as the data collection tool. The data was analyzed using descriptive statistics such as mean and standard deviation and displayed in a bar chart. The findings of the study revealed that machine learning (ML), natural language processing (NLP) and Robotic Process Automation (RPA) served as artificial intelligence tools that can be used in detecting financial frauds in deposit money banks in Nigeria. The study concludes that AI and fraud detection are highly correlated in Nigerian banks and hence recommends that deposit money banks should integrate AI with new financial technologies, such as blockchain technology and the Internet of Things (IoT) to enhance safety and surveillance in Nigerian banks.

Keywords: *Artificial Intelligence, Fraud Detection, Deposit Money Banks, Machine Learning.*

1.0 INTRODUCTION

The Nigerian banking industry has been rapidly changing towards digitalization which is further accelerated by the cashless policy of the Central Bank of Nigeria (CBN). Although this has contributed towards improved operational efficiency, a breeding place of advanced financial fraud has also been created. Fraudsters keep evolving and use phishing, identity theft, and payment frauds to use the loopholes in the current security systems (Apsimet, Smanova, Utegenova, 2024). Almost all the conventional rule-based fraud detection systems known have failed in processing high volume and real time data and in many cases have led to a large false-positive ratio (Ikemefuna, Okusi, Iwuh & Yusuf,2024).

Yahaya (2025) maintained that the Nigerian banking sector has experienced a major digital transformation with an acute growth in digital transactions and as a result has advanced in financial fraud detection. The old rule-based fraud detection systems are becoming very weak in detecting complex and changing financial fraudulent activities. The emergence of Artificial Intelligence (AI) and especially machine learning, deep learning and predictive analytics provides a groundbreaking

method to screen fraudulent transactions in real-time Bello, Ogundipe, Mohammed, Adebola & Alonge, 2023).

The growing pressure on the Deposit Money Banks (DMBs) in Nigeria to guarantee their platforms, minimize their financial losses and preserve the customers trust is forcing the integration of AI-based fraud detection solutions to become an urgent and strategic necessity (Akinwunmi, 2025). Technologies such as AI-based forensic accounting and automated anomaly detection offer an opportunity to process extensive data and detect the unnoticeable patterns that commonly occur when human auditors work on them (Ikumapayi & Ayankoya, 2025).

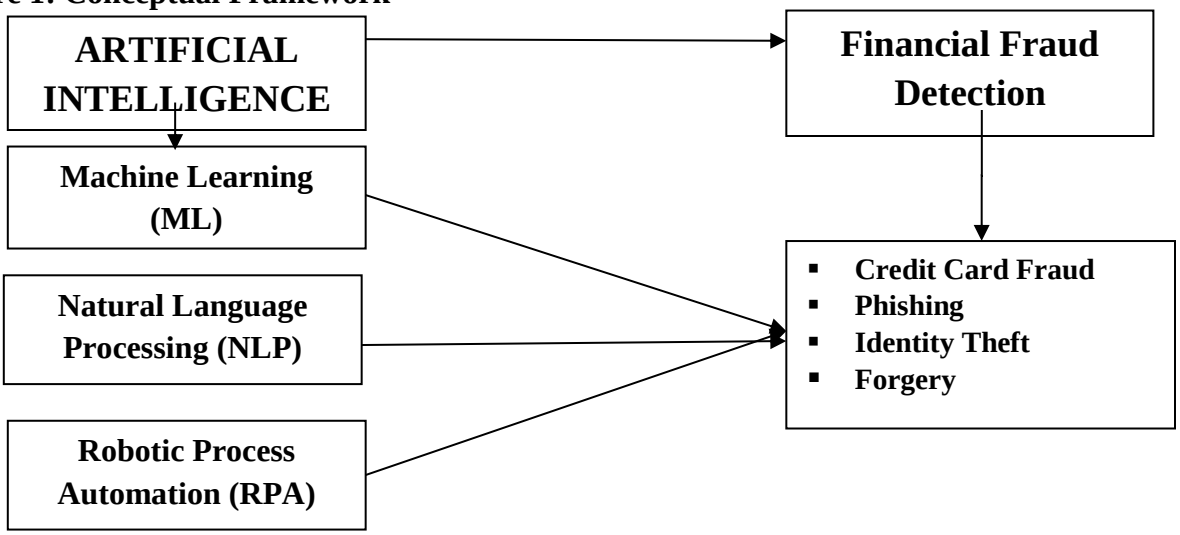
Even with the implementation of electronic security, the Nigerian DMBs are still registering colossal financial losses to cyber fraud that affect financial stability and confidence of the customers in the banking system (Manasseh & Ede,2024). Conventional fraud detection systems are largely proactive as they do not identify new fraud schemes actively. Also, human control is very slow and inaccurate in handling millions of transactions. It is necessary to learn how AI-based forensic systems, including predictive analytics can offer a more responsive, precise, and effective mitigation to financial threat in the Nigerian banking sector (Popoola, 2023). Machine learning (ML), natural language processing (NLP) and Robotic Process Automation (RPA) are promising as an answer to this problem because AI can be used to analyze large volumes of data and identify anomalies, patterns and make decisions with little human intervention. Humans are promoted to the "decision" stage by streamlining the "discovery" stage. They are given a succinct analysis and a suggested course of action rather than having to spend hours looking for a problem (Bali & Mehdi 2024). The fast pace of digitalization of the Nigerian banking industry has helped to raise the volumes of transactions and complex financial frauds which can no longer be detected by traditional rule-based methods. Artificial intelligence is proactive and real-time in nature to detects complex non-linear patterns of financial frauds (Uzoamaka & Ade, 2026). It is against this backdrop that this study was conducted to examine the impact of artificial intelligence (AI) in detecting financial frauds in Nigerian deposit money banks. The study also seeks to make contribution to the body of literature on financial technology by exploring the connection between AI adoption and financial fraud detection.

2.0 Literature Review

2.1. Conceptual Framework

Conceptual framework on the impact of AI on financial fraud detection in Nigerian banks aligns with AI adoption (machine learning, Natural Language Processing, Robotic Process Automation) as the independent variable which affects the dependent variables such as the credit card fraud, phishing, identity theft and forgery (Ogundele et al. 2025). In Nigeria's financial sector, credit card fraud is a significant national concern, impacting hundreds of transactions every second and having a detrimental impact on international e-commerce (Onyeama, 2024).

Figure 1: Conceptual Framework



Source: Authors' Compilation 2026

The conceptual framework on AI-based fraud detection in the Nigerian banking sector in figure 1 above describes AI Adoption as the independent variable and different types of fraud incidents as the dependent variables. The model discusses how certain AI technologies alleviate common financialoffences in the digital economy of Nigeria. Algorithms of ML have the ability to learn the historical transaction data in order to detect patterns and anomalies that would point out financial frauds. Machine learning is a potential remedy which possesses enhanced analytical power that may contribute immensely in detecting and preventing financial fraud (Njoku et al. 2024). The algorithms of ML are capable of processing thousands of transactions within a second, which allows instantaneously issuing warnings regarding suspicious activities before the transaction can be finalized. In comparison with human investigators, ML models are capable of processing massive amounts of data in real-time and thus it takes only seconds to identify fraudulent activity compared to days or hours (Olushola & Mart,2024). ML models can constantly learn on new transaction data and new fraud patterns and improve their detection capabilities of new risks. ML minimizes the false alarms on legitimate transactions and security. It makes personnel to work on the real threats thereby accelerating the process of solving actual cases of frauds (Ikemefuna et al. 2024). Machine learning has created a sweeping, radical change in how fast and accurate fraud detection in DMBs in Nigeria has been conducted, shifting the industry towards responsive and manual procedures instead of proactive and timely protection (Adeyemo & Obafemi,2024).

Natural Language Processing (NLP) constitutes an intelligent and proactive interface that can process text and behavioral information (of unstructured information). It also detects, categorizes and suppresses financial frauds. NLP models like text classification, named entity recognition NLP detects the patterns of fraud, contextual transactions and communications used by the users in a faster manner than the conventional rule-based systems. It processes unstructured text of customer

communications, e-mails and chat messages to detect phishing attacks and fraudulent intent to minimize fraud losses. NLP systems are capable of detecting complex scams, such as identity theft, payment fraud, and forged signatures with the help of machine learning algorithms and minimizing false positives (Raju et al.,2025). Natural Language Processing (NLP) is a transformative and crucial resource to Deposit Money Banks (DMBs) in Nigeria, which helps them to identify advanced fraudsters through unstructured data such as SMS, email, and transaction descriptions (Sayibu, Asante, Abdul-Salam & Frimpong 2025).

Robotic Process Automation (RPA) is used in the fight against financial crime by the use of software robots to automate the process of rule-based detection, threat monitoring, and threat mitigation in real-time (Rawat et al. 2023). RPA coupled with AI and machine learning (ML), organizations are able to move away from manual, reactive processes to automated, proactive, defensive systems, which helps to reduce the number of human errors, decrease false positives, and lower operational costs. Although the advantages are considerable, the application of RPA in financial fraud detection and management is subject to overcome some challenges such as the high cost of starting with the implementation, difficulty in integrating with old systems and data security that is required to make sure that the bots themselves are not compromised. RPA can be combined with AI and machine learning to enable the process of complex patterns that reveal fraud to be more efficient, making it easier to process large volumes of data and detect frauds. RPA lowers the cost of operations by reducing the number of hands required to conduct investigation and simplifies the process of investigations (Jangam & Karri, 2024). RPA can help to improve the accuracy of fraud detection in Nigerian Deposit Money Banks (DMBs) by automating rule-based and repetitive human duties and reducing human error. RPA enhances the accuracy of detection, false positive rates decline, and it allows real-time tracking of transactions to address high volumes of fraud and enhance service efficiency. Although these have their advantages, challenges to be overcome to ensure full protection of financial services in Nigeria include legacy integration systems and data privacy which would have to be overcome before the implementation is a success (Kumar, 2024). The study is expected to enhance the resilience of financial institutions to evolving cybercrime and hence stated three objectives and hypotheses on machine learning, Natural Language Processing and Robotic Process Automation-based solutions specific to the Nigerian banking industry. The hypotheses formulated were also tested.

2.2 Theoretical Literature

The Theory of the Fraud Triangle

The theory of the fraud triangle was postulated by Cressy (1953). He noted that a combination of factors, i.e., Pressure (Motivation), Opportunity and Rationalization is likely to render the occurrence of fraud. Pressure in this case is defined as having needs or desires that must be fulfilled. It may be categorized as financial pressure, vices, work related pressure and other pressures. The second aspect of the triangle of fraud is an opportunity to commit an offense, conceal the offense, or avoid punishment. The third component is rationalization, which involves the provision of unnecessary explanation(s) to explain his/her involvement in fraud. It is accompanied by pressure, inspiration, or compulsion to the fraudster who finds an opportunity

which he exploits and attempts to make sense of his conduct through unwarranted rationalization (Kagias et al. 2022). The model is premised on the assumption that a three-fold condition of motivation, opportunity, and rationalization is likely to lead to fraud. Fraud Triangle is the theory which explains why people at work commit fraud. It has three aspects that cause fraud pressure, rationalization, and opportunity. It is a premeditated fraud that involves the individual profit of an employee or a body. As per the concept, fraud is committed when fraud conditions are conducive to the fraud offender and it is not incidental.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), which was developed by Davis in 1989, tries to understand. Users can accept new technologies. TAM assumes that there exist two primary factors, perceived usefulness and perceived ease of use, has the power to determine whether a person adopts a given technology or not (Davis, 1989).

Perceived Usefulness indicates the extent to which an individual thinks that the application of a certain technology will improve their work efficiency or effectiveness while Perceived Ease of Use- this entails how one perceives that technology will be effort-free.

TAM can be used to explain the perceptions of bank employees and managers in terms of fraud detection. TAM provides valuable understandings of the technology adoption in the organizational context, it is more user acceptance-oriented behavior, which makes it less appropriate as the primary theoretical framework for the mechanisms of fraud. The study is predicated more on the Fraud Triangle Theory due to its holistic approach to learn more about the underlying causes of fraud and the ways AI technologies can help to reduce them. By focusing on the minimization of opportunity, which plays a significant role in the Fraud Triangle Theory is also being reduced with AI technologies such as computer vision and robotics, which can enhance internal controls of the banks and reduce the risk of fraud. In the case of computer vision, it is minimized.

2.3 Empirical Literature

Yang, Shukur, and Sahran (2026) provided a systematic review of AI-based detection of financial fraud with publications dated 2015-25. It provides an overview of common machine learning and deep learning techniques, which include tree-based, neural networks, and graph-based models, and examines how these techniques are applied in major fraud cases, such as loan fraud, credit card fraud, and anti-money laundering. Moreover, new findings about cryptocurrency- and blockchain-based fraud are discussed, with a focus on the unique threats of decentralized transaction settings. This review has found that numerous challenges in the literature were persistent, such as extreme class imbalance, drift, lack of access to labeled data, and trade-offs between detection performance and interpretability. The data presented in these findings are used to discuss practical considerations of an applied fraud detection system in the paper and the directions that future research should take, from both a data-centric and an application-oriented viewpoint.

Onoja et al. (2026) investigated the impact of AI disclosure on the profitability and the market value of the deposit money banks. The paper reviews the annual reports of 12 Nigerian DMBs in the period 2015-2024 and generates 120 firm-year observations. Return on assets, return on equity, and Tobin Q were used to measure the performance, whereas Feasible generalized least squares and system generalized method of moments considered heterogeneity, autocorrelation, and endogeneity. The findings show that strategic and operational disclosures are positively related to profitability and market value. Customer-focused and compliance-driven disclosures have negative impacts, whereas risk disclosures have negative impacts on short-term profitability but constructive effects on market values by indicating transparency.

Horobets et al. (2025) are interested in discussing the issues that banks experience within the AML framework during the implementation of AI systems and in the necessity to manage the balance between legal compliance and the technological possibilities of AI. The critical approach is the foundation of the discussion on the challenges of AI adoption in banking as an attempt at balancing regulatory efforts with the technological possibilities of AI. The AI Act offers both developers and users well-defined requirements and responsibilities to reduce the negative impact of AI development. The accelerated level of digital transformation highlights the necessity to have efficient global AML standards. Although the process of AI regulation and AML continues to improve, the issue of balancing legal obligations, especially in explainability, confidentiality, impartiality, and data protection of AI systems, with the technological capabilities of AI in the banking industry has not been addressed. It has been stressed that the EU needs to work out particular regulations regarding the application of AI in the financial sphere.

Oyetunji, (2024) studied how artificial intelligence and machine learning can contribute to better customer experience in digital banks in Nigeria. The banking industry has been shifting away considerably, particularly the development of digital banking as a result of the technological progress such as Smartphone and the Internet. ML and AI have transformed digital banking, and they come with many advantages, including fraud prevention, live transaction tracking, customized suggestions, customer behavior learning, risk mitigation, cost-saving, better decision-making, and customer experience. The use of AI-driven chatbots and virtual assistants can offer 24/7 support and keep waiting time short, as well as enhance client satisfaction. The technologies are also useful in addressing biases in credit scoring to encourage equity and equal access to financial services. In general, AI and ML have reshaped the banking sector and have resulted in the enhancement of operations, customer care, risk, and profitability as well as provided a more inclusive and personalized banking experience.

3.0 Methodology

3.1 Research Design

Typically, a descriptive research design or cross-sectional survey is used to collect data at a particular moment in time. The effect of AI (an independent variable) in detecting financial fraud (a dependent variable) is measured quantitatively.

3.2. Population and Sampling Methodology

The population frequently consists of workers from Nigerian Deposit Money Banks (DMBs) that are licensed, with an emphasis on the IT, fraudulent activity detection, and risk management divisions. The target population comprised 125 workers selected from five Nigerian banks: Union Bank Nigeria Plc (25

Employees), First Bank Nigeria Plc (25 Employees), Zenith Bank Nigeria Plc (25 Employees), Fidelity Bank Nigeria Plc (25 Employees), and Guaranty Trust Bank Nigeria Plc (25 Employees). These are the First Nigerian bank to adopt the use of AI in their operations hence their selection for the research work.

The top banks are shareholder value, transaction volume, or AI adoption. To evaluate its efficacy, the researcher concentrated on banks that already had AI infrastructure.

3.3. Instrument for Data Collection

Structured questionnaires or self-administered surveys are used to gather primary data, usually with a 5-point Likert scale (Strongly Agree to Strongly Disagree). The adoption rate of AI tools (such as machine learning, natural language processing, and Robotic Process Automation), the frequency of AI use in fraud detection, and the perceived effectiveness of fraud detection should be the main topics of questionnaires.

3.4. Data Analysis Method

For the research questions, mean and standard deviation were used to analyze the data, and linear regression analysis was used to test the hypotheses. This section describes the model that was used to investigate the relationship between the dependent variable (impact of AI on financial fraud detection) and the independent variables (due to perceived usefulness and ease of usage).

4.0 Results

The aim of the study is to analyze the impacts of AI in the detection of financial fraud in Nigeria.

Research Objective One: To determine the effect of Machine Learning (ML) in speed of fraud detection in Nigerian DMBs

Table 1: Mean Ratings and Standard Deviation on Machine Learning (ML) and speed of fraud detection in Nigerian DMBs

ITEMS	SA	A	D	SD	Mean	STD	Decision
Our bank analyzes consumer pattern of transactions using machine learning algorithms to find irregularities.							

	64	25	2	3	3.80	0.66	Accepted
Risk associated with transactions is scored in real time using machine learning models.	62	29	2	1	3.53	0.54	Accepted
Cluster Mean					3.67	0.60	Accepted

Table 1 shows the impact of Machine Learning (ML) on fraud detection speed in Nigerian DMBs. The respondents affirmed that their bank uses machine learning algorithms to determine irregularities in consumer patterns of transactions. The mean and standard deviation of 3.67 and 0.60 are obtained in the cluster means, respectively representing the general concurrence of the respondents in the prevalence of these types of fraud. The speed and effectiveness of fraud detection in Nigerian Deposit Money Banks (DMBs) are positively and statistically significantly impacted by ML, which represents a crucial shift from reactive, manual, rule-based systems to proactive, real-time detection. A strategic necessity that greatly improves cybersecurity, shortens detection times, and increases customer confidence in digital payment channels is the integration of ML into Nigeria's digital banking environment.

Research Objective Two: To determine the impact of natural language processing (NLP) when searching fraudulent transactions in DMBs.

Table 2: Mean Ratings and Standard Deviation on Natural Language Processing (NLP) and Searching Fraudulent Transactions in DMBs

ITEMS	SA	A	D	SD	Mean	STD	Decision
In order to identify attempts at phishing, NLP analyzes unstructured data (such as emails and SMS).	54	25	9	6	3.62	0.77	Accepted
Voice conversations can be monitored for questionable activity with the help of NLP.	66	14	5	9	3.50	0.94	Accepted
Cluster Mean					3.56	0.85	Accepted

In Table 2 above, the respondents rated NLP as the most suitable AI method in detecting frauds during a search of fraudulent DMB transactions. The respondents accepted that, NLP is an extremely important part of contemporary cybersecurity, which uses AI to read, comprehend, and correlate the unstructured text contained in emails and SMS messages (smishing) to detect phishing. NLP is able to detect malicious content which traditional filters fail to detect, because of reading more than only static keywords, but also looking at semantic meaning, intent and linguistic patterns. This is in line with previous studies by Gaber, Vadera, and Shaalan (2022) who seek to conduct a systematic review and synthesis of the literature on the application of NLP to determine phishing emails. In addition, many of the respondents gave affirmation that voice communications can be scanned to doubtful movement through the aid of NLP. With the assistance of NLP, voice conversations can be tracked as being suspicious of activity by transcribing spoken audio into text

in real-time and examining it with specific triggers, sentiment, and context. These AI technologies find application in different industries to identify fraud, compliance, and inappropriate content.

Research Objective Three: To determine how effective the use of Robotic Process Automation (RPA) when searching for fraudulent transactions in DMBs.

Table 3: Mean Ratings and Standard Deviation on Robotic Process Automation (RPA) and Searching Fraudulent Transactions in DMBs

ITEMS	SA	A	D	SD	Mean	STD	Decision
High-volume, repetitive transactional checks are handled by software robots, or RPA	91	3	0	0	3.98	0.14	Accepted
Accounts are automatically blocked by RPA when questionable activity is found.	79	13	1	1	3.93	0.33	Accepted
Cluster Mean					3.96	0.24	Accepted

In Table 3, the respondents pointed out that high-volume repetitiveness of the transactional checks are performed by software robots, or RPA. This observation is aligned with the literature that indicates that in lockbox services where the incoming payments are handled and a huge amount of customer remittances are processed, RPA can provide a high level of efficiency improvement through automation to extract, validate, and post data into customer accounts. This eliminates errors in manual processing, reduces the processing time, and increases operational accuracy. Moreover, RPA can be combined with the current banking systems to enable the real-time management of exceptions and provide better adherence to the regulatory requirements.

4.1. Test of Hypotheses

Hypothesis One

$H0_1$: The Machine Learning (ML) does not produce any significant impact on the speed of fraud detection in DMBs in Nigeria.

Table 4 Model Summary[a]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.612[a]	.478	.599	3.08521

Predictors: (Constant), Machine Learning (ML).

Table 5 Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.917	1.656		4.780	.000
	Machine Learning (ML)	.218	.094	.312	2.355	.024

b. Dependent Variable: Financial Fraud Detection

The findings of the regression evaluation for the significant effect of ML on the rate of financial fraud detection in DMBs in Nigeria are shown in the tables above. The regression R (.612) in the aforementioned table demonstrates that the predictor (ML) and the dependent variable (Financial Fraud Detection) have a positive and statistically significant relationship. According to the fitted model's explanation of the R-squared statistics, machine learning has made a 60% contribution to Nigerian bank fraud detection. Thus, it was determined that ML has significantly improved the speed of financial fraud detection in Nigerian DMBs.

Hypothesis Two

$H0_2$: Natural Language Processing (NLP) has no significant impact on searching fraudulent transactions in DMBs in Nigeria.

Table 6. Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	.576[a]	.469	.567	3.75621

a. Predictors: (Constant), Natural Language Processing (NLP)

Table 7 Coefficient[b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
2	(Constant)	9.231	1.768		5.577	.000
	Natural Language Processing (NLP)	.095	.135	.115	.774	.464

b. Dependent Variable: Financial Fraud Detection

The findings of the regression evaluation for the significant effect of NLP on the rate of financial fraud detection in DMBs in Nigeria are shown in the Tables above. The regression R (.576) in the table 7.0 demonstrates that the predictor (NLP) and the dependent variable (Financial Fraud Detection) have a positive and statistically significant relationship. According to the fitted model's explanation of the R-squared statistics, NLP has made a 57% contribution to Nigerian bank financial fraud detection. Thus, it was determined that NLP has significantly impacted on searching fraudulent transactions in DMBs in Nigeria.

Hypothesis Three

$H0_3$: Robotic Process Automation (RPA) does not cause significant impact to the accuracy of fraud detection in DMBs in Nigeria.

Table 8 Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
3	.694[a]	.625	.686	1.98728

Predictors: (Constant), Robotic Process Automation (RPA).

Table 9 Coefficients[c]

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
3 (Constant)	7.938	1.656		4.990	.000
Robotic Process Automation (RPA)	.228	.075	.318	2.545	.024

Dependent Variable: Financial Fraud Detection

The findings of the regression evaluation for the significant effect of RPA on the rate of financial fraud detection in DMBs in Nigeria are shown in the Tables above. The regression R (.694) in the table 9 demonstrates that the predictor (RPA) and the dependent variable (Financial Fraud Detection) have a positive and statistically significant relationship. According to the fitted model's explanation of the R-squared statistics, RPA has made a 69% contribution to Nigerian bank financial fraud detection. Thus, it was determined that RPA has significantly impacted on the accuracy of fraud detection in DMBs in Nigeria.

5. 0 Discussion of Findings

The initial discovery is the nature of frauds that are common in the Nigerian banks, which comprises credit card fraud, phishing, identity theft, payment fraud and forged signatures. Parts of

these fraud cases are done through insider cooperation and the employees are often suspected to give information to other fraudsters. The same aligns with past research by Onyeama (2024) who found them to be the most prevalent fraud types in Nigerian financial institutions.

The study also uncovers the nature of AI that can be implemented in detecting fraud within banks in Nigeria. Machine Learning (ML), Natural Language Processing (NLP), and Robotic Process Automation (RPA) were the effective methods of AI identified by the respondents. This conforms to the study on the relevance of ML, NLP and RPA in identifying fraud transactions, and the increasing presence in preventing cyber enabled frauds like phishing and identity theft. Besides this, the study demonstrates that the key impact of the AI in identifying the financial fraud in Database Management Systems (DBMS) is that it can improve significantly the detection accuracy and the false positive as compared to conventional, rule-based systems. This is in line with previous results of Ogundele et al. (2025) that AI-based systems produce better results compared to rule-based systems, in terms of accuracy and efficiency in detection. The study also revealed the issues encountered by the banks in implementing AI-based fraud detection systems in Nigeria. The biggest issue being the shortage of skilled workforce among others is infrastructural and financial limitations. These issues are indicative of broader issues in the Nigerian banking sector about the lack of AI skills and insufficient institutional capacity (Sunday & Vera, 2018). Lastly, the study also confirms that there is a strong correlation between the adoption of AI and effective fraud detection in Nigerian banks, and hence the transformative impact of AI in enhancing financial security.

Conclusion and Recommendations

Based on the findings of this study ML, NLP and RPA are AI technological tools that can be used in financial fraud detection in Nigerian banks. The impact of AI on fraud detection is that it increases accuracy among others. The study thus recommends that DMBs in Nigeria should combine AI with other new technologies such as blockchain and the Internet of Things (IoT) to improve security and detection systems.

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