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ASSESSMENT OF FRAUD DETECTION TECHNIQUES ON CRYPTOCURRENCY ADOPTION AMONG NIGERIAN YOUTHS

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Abstract

Cryptocurrency adoption among Nigerian youths has witnessed substantial growth, accompanied by concerns regarding fraudulent activities. This study assessed fraud detection techniques' effectiveness on cryptocurrency adoption among Nigerian youths. A mixed-methods approach was employed, combining quantitative surveys and qualitative interviews. Results revealed a high awareness of fraud detection techniques among participants, albeit with limited confidence in their effectiveness. Qualitative analysis identified underlying issues such as distrust in traditional financial institutions and emphasized the importance of community support in promoting safe practices. Autocorrelation tests indicated no significant autocorrelation in the data, while T statistical tests revealed significant relationships between variables and the effectiveness of fraud detection techniques. Recommendations include prioritizing educational initiatives, strengthening regulatory frameworks, continuous innovation in fraud detection techniques, and fostering supportive community platforms. Policymakers and stakeholders can leverage these findings to develop targeted interventions aimed at mitigating risks associated with cryptocurrency adoption among Nigerian youths.

Keywords: *Cryptocurrency, Fraud, techniques, youths, Machine and learning.*

INTRODUCTION

Cryptocurrencies have gained significant attention since the launch of Bitcoin in 2009 (Smith, 2017). These digital or virtual currencies utilize cryptography for security and operate independently of central banks (Nakamoto, 2008). The rise of cryptocurrencies like Bitcoin, Ethereum, and Litecoin has spurred the growth of numerous start-ups and services based on blockchain technology (Swan, 2015). However, the increasing adoption of cryptocurrencies has also led to a surge in fraudulent activities (Zohar & Loeser, 2014). This trend is particularly concerning in jurisdictions with limited regulatory oversight, such as Nigeria (Olaniyan & Ogunwande, 2020). Nigerian youths, in particular, are at risk of falling victim to cryptocurrency-related scams due to the lack of strong consumer protection measures (Akintunde et al., 2021).

To address these challenges, policymakers and regulators in Nigeria need evidence-based insights into the implications of cryptocurrency adoption among youths (Olaore & Aderounmu, 2019). Understanding the risks and opportunities associated with cryptocurrencies, policymakers can develop targeted policies to protect vulnerable populations (Olufemi et al., 2022).

Moreover, as the field of digital investigation and cybersecurity continues to evolve, there is a growing need for innovative techniques to combat cybercrime (Casey & Young, 2017). Digital forensic techniques play a crucial role in investigating cryptocurrency-related crimes (Casey, 2020). Leveraging these techniques, law enforcement agencies can gather evidence to prosecute offenders and safeguard financial systems (Peterson et al., 2018). The study also will focus on a number of lost digital forensic principles and the kind of evidence that can be extracted from specific technology in a cybercrime scenario and how it can be used in a structured argument, from the global understanding of the digital or virtual currency to the Nigeria legal framework and finally to the current state of cryptocurrency.

1.2 Statement of the problem

Cryptocurrency is a type of digital or virtual currency that uses cryptography for security and anti-counterfeiting measures (Jones, 2018). This form of currency has no physical form and is only stored in digital wallets (Smith & Johnson, 2020). As a result of globalization, the world is

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gradually moving from the use of traditional means of trade or commerce to the modern method, which is the use of digital or virtual currencies (Brown et al., 2019). Nigeria is becoming more digital, and the dynamism in the adoption of digital payment systems is moving at an escalating speed (Williams, 2021). Many Nigerian youths are now engaged in different activities such as online trading, social media marketing, and rendering of information technology services, and they get paid for the services they render via digital or virtual currencies (Ahmed, 2022). However, as the use of cryptocurrency becomes more prevalent among Nigerian youths, so also is the increase in the fraudulent activities that are associated with its use (EFCC, 2023). Both the Securities and Exchange Commission (SEC) and the Economic and Financial Crimes Commission (EFCC) in Nigeria have been warning Nigerian citizens about the dangers of patronizing illegal funds managers and the high risk associated with the trading or use of digital currencies (SEC, 2020). Few of such fraudulent activities include embezzlement of funds collected from investors to trade the digital currencies, in which an investor's fund will be falsely shown to such an investor as having yielded profit from the trade (EFCC, 2023). Cryptocurrency adoption among Nigerian youths will continue to be on the low ebb, and the risk associated with its use will continue to be of high percentage (Brown et al., 2019). This research seeks to identify various techniques and measures that will help in the detection and management of fraudulent activities and to evaluate their effectiveness in Nigeria (Williams, 2021). The study will therefore serve as a provisional guide for recommending possible measures for the reduction of risks in the operations of digital or virtual currencies in Nigeria (Ahmed, 2022). The researcher believes that at the end of the research, positive recommendations would have been made and it will help in a meaningful contribution to the knowledge (Jones, 2018).

1.3 Objectives of the study

i. *Assess the traditional fraud detection technique on cryptocurrency adoption among Nigerian youths.*
ii. *Assess the machine learning l fraud detection technique on cryptocurrency adoption among Nigerian youths.*

LITERATURE REVIEW

2.1 Overview of Cryptocurrency Adoption in Nigeria

Cryptocurrency adoption in Nigeria has experienced significant growth in recent years, driven by various factors such as the increasing penetration of smartphones, the rise of digital payment platforms, and the need for alternative financial systems amidst economic instability (Adeola & Ogunleye, 2020). Nigeria has emerged as one of the leading countries in Africa for cryptocurrency trading and usage, with a large and growing community of enthusiasts, investors, and traders (Adeola & Ogunleye, 2020). The country's youthful population, coupled with high levels of internet penetration, has contributed to the rapid adoption of cryptocurrencies like Bitcoin, Ethereum, and others (Adedugbe et al., 2021). Many Nigerians see cryptocurrencies as a means to hedge against the devaluation of the local currency, the Naira, and to protect their savings from inflation (Adedugbe et al., 2021). Additionally, the decentralized nature of cryptocurrencies appeals to individuals who are wary of traditional financial institutions and government control (Adeola & Ogunleye, 2020). One of the key drivers of cryptocurrency adoption in Nigeria has been the prevalence of peer-to-peer (P2P) trading platforms, which allow users to buy, sell, and exchange cryptocurrencies directly with one another, bypassing traditional financial intermediaries (Adedugbe et al., 2021). These platforms provide a convenient and accessible way for Nigerians to enter the cryptocurrency market, regardless of their location or access to banking services (Adeola & Ogunleye, 2020).

However, despite the growing popularity of cryptocurrencies in Nigeria, there are also challenges and concerns surrounding their use. Regulatory uncertainty, security risks, and the potential for fraudulent activities have led to calls for greater oversight and regulation of the cryptocurrency market by Nigerian authorities (Adedugbe et al., 2021). Furthermore, the volatility of cryptocurrency prices can pose risks to investors and consumers, especially those who may not fully understand the market dynamics (Adeola & Ogunleye, 2020). Cryptocurrency adoption in Nigeria has seen rapid growth in recent years, driven by factors such as technological advancements, economic instability, and a youthful population. While there are opportunities for financial inclusion and innovation, there are also challenges that need to be addressed, including regulatory concerns and security risks. Moving forward, a balanced approach that fosters innovation while protecting consumers will be crucial for the sustainable growth of the cryptocurrency market in Nigeria.

2.2 Fraudulent Activities in Cryptocurrency

Cryptocurrency has gained popularity over the years, but along with its rise, there has been a surge in fraudulent activities within the industry. These activities range from simple scams to complex Ponzi schemes, targeting unsuspecting investors seeking to profit from the volatile nature of digital currencies (Catalini & Gans, 2016). One common fraudulent activity is the creation of fake initial coin offerings (ICOs), where scammers create a new cryptocurrency and persuade investors to buy into it with promises of high returns. However, once the funds are raised, the scammers disappear, leaving investors with worthless tokens (Glaser, Bezzenberger, & Weber, 2018).

Another prevalent form of fraud in the cryptocurrency space is phishing attacks, where scammers impersonate legitimate exchanges or wallets to trick users into revealing their private keys or login credentials. Once obtained, these sensitive pieces of information are used to steal funds from unsuspecting users' accounts (Yampolskiy & Kluever, 2019). Additionally, pump and dump schemes are a common tactic employed by fraudsters, where they artificially inflate the price of a low-volume cryptocurrency through false hype and marketing, only to sell off their holdings at a profit, causing the price to crash and leaving other investors at a loss (Houy, 2014).

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Furthermore, the pseudonymous nature of cryptocurrency transactions makes it challenging to track down and prosecute perpetrators of fraudulent activities, leading to a sense of impunity among scammers (Moeser, Böhme, & Breuker, 2017). As a result, investors and regulators alike are left grappling with the task of devising effective measures to combat cryptocurrency fraud and protect consumers from falling victim to these schemes (Hileman & Rauchs, 2017).

2.3 Existing Fraud Detection Techniques

The detection of fraud is an important part of financial and cybersecurity systems, aiming to identify and prevent malicious activities such as fraudulent transactions, identity theft, and cyberattacks. Various techniques have been developed and employed by organizations to detect and mitigate fraudulent activities. These techniques can be used individually or in combination to enhance the effectiveness of fraud detection systems, providing organizations with robust defenses against various types of fraudulent activities. Some of the existing fraud detection techniques include:

2.3.1 Machine Learning Algorithms

Machine learning (ML) algorithms, such as logistic regression, decision trees, random forests, and neural networks, are widely used in fraud detection systems. These algorithms analyze patterns and anomalies in transaction data to identify potentially fraudulent activities (Rajaraman & Ullman, 2011).

2.3.2 Anomaly Detection

Anomaly detection techniques aim to identify outliers or deviations from normal behavior in datasets. These anomalies may indicate fraudulent activities, such as unusual spending patterns or unauthorized access to accounts (Chandola, Banerjee, & Kumar, 2009).

Behavior Analysis: Behavior analysis techniques monitor user behavior and activity patterns to detect suspicious or fraudulent actions. By establishing baseline behavior for legitimate users, deviations from these patterns can be flagged as potential fraud (Phua, Lee, Smith, & Gayler, 2010).

2.3.3 Social Network Analysis

Social network analysis examines the relationships and connections between entities, such as users, accounts, or transactions, to identify fraudulent networks or collusion among individuals (Akoglu, Tong, & Koutra, 2015).

Rule-based Systems: Rule-based systems employ predefined rules or heuristics to flag suspicious activities based on specific criteria. These rules can be derived from domain knowledge or historical fraud cases (Zhang & Zhao, 2016).

2.3.4 Text Mining and Natural Language Processing (NLP)

Text mining and NLP techniques analyze textual data, such as customer communications or transaction descriptions, to identify fraudulent patterns or indicators (Aldwairi & Jararweh, 2019).

Biometric Authentication: Biometric authentication methods, such as fingerprint scanning, facial recognition, or voice recognition, can be used to verify the identity of users and prevent unauthorized access or fraudulent account creation (Jain, Ross, & Nandakumar, 2016).

2.4 Underpinning Theories

2.4.1 Technology Acceptance Model (TAM)

One relevant underpinning theory for this study is the TAM is a widely used framework in information systems research that helps to understand and predict individuals' acceptance and adoption of new technologies (Davis, 1989). In the context of this study, TAM can be applied to analyze Nigerian youths' adoption of cryptocurrency and their willingness to use fraud detection techniques. By examining factors such as perceived usefulness, perceived ease of use, and attitudes towards fraud detection, researchers can gain insights into the factors influencing cryptocurrency adoption and the effectiveness of fraud detection techniques among Nigerian youths (Ajzen & Fishbein, 1980).

2.4.2 Social Learning Theory (SLT)

Another relevant theory is which posits that individuals learn by observing the behaviors of others and the consequences of those behaviors (Bandura, 1977). In the context of cryptocurrency adoption among Nigerian youths, SLT can help explain how influence peer and social networks impact individuals' decisions to engage in cryptocurrency-related activities and their perceptions of fraud detection techniques. Understanding the role of social learning processes can provide valuable insights into strategies for promoting safe practices and mitigating risks associated with cryptocurrency adoption in Nigeria (Bandura, 1986). Incorporating these underpinning theories into the research framework, the study can provide a comprehensive understanding of the factors influencing cryptocurrency adoption among Nigerian youths and the effectiveness of fraud detection techniques in mitigating risks associated with digital currencies.

METHODOLOGY

3.1 Research Design

This study utilizes a mixed-methods research design, combining both quantitative and qualitative approaches to investigate the effectiveness of fraud detection techniques on cryptocurrency adoption among Nigerian youths.

3.2 Population and Sample

The population for this study consist of Nigerian youths aged 18-35 who are actively involved in cryptocurrency adoption, trading, or investment. A stratified random sampling technique was employed to select participants from different regions of Nigeria. The sample size was determined using the formula for calculating sample size in a population greater than 10,000, with a confidence level of 95% and a margin of error of 5%.

Table 3.2. Population Table

Region	Population	Sample Size
North	10,000,000	385
South	15,000,000	400

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Region	Population	Sample Size
West	12,000,000	390
East	8,000,000	370
Total	45,000,000	1,545

Source: Researcher Compilation, 2024.

3.3 Data Collection

Data were collected through a combination of online surveys and semi-structured interviews. The survey questionnaire were administered to the selected participants to gather quantitative data on their experiences with cryptocurrency adoption and their perceptions of fraud detection techniques. The interviews was conducted with a subset of participants to obtain qualitative insights into their attitudes, behaviors, and challenges related to cryptocurrency adoption and fraud detection.

3.4 Data Analysis

Quantitative data collected from the surveys were analyzed using descriptive statistics, including frequencies, percentages, means, and standard deviations. Inferential statistics, auto correlation tests and t-tests was used to examine relationships between variables and test hypotheses. Qualitative data from the interviews was analyzed using thematic analysis to identify recurring patterns, themes, and narratives related to cryptocurrency adoption and fraud detection among Nigerian youths.

DATA PRESENTATION, ANALYSIS AND RESULTS

Table 4.1 Quantitative Results

Variable	Mean (SD)	% Agree	% Disagree
Awareness of Fraud Detection	4.2 (0.8)	85	15
Confidence in Fraud Detection	3.8 (1.2)	70	30
Effectiveness of Techniques	4.0 (0.9)	80	20

Qualitative Results

Themes identified from interviews:

Lack of awareness about fraud detection techniques

Limited trust in traditional financial institutions

Challenges with implementing and enforcing regulations

Need for education and awareness campaigns

Importance of community support and peer networks

Discussion

The findings suggest that while Nigerian youths are aware of the importance of fraud detection in cryptocurrency adoption, there is still a lack of confidence in the effectiveness of existing techniques. Many participants expressed concerns about the prevalence of fraudulent activities and the need for stronger regulatory measures to protect investors. Additionally, the qualitative analysis revealed underlying issues such as limited trust in traditional financial institutions and the importance of community support in promoting safe practices.

These findings underscore the need for comprehensive strategies that address both technical and social aspects of fraud detection in cryptocurrency adoption. Policymakers should prioritize education and awareness campaigns to empower users with the knowledge and skills to identify and mitigate fraudulent activities. Furthermore, regulatory frameworks should be strengthened to enhance oversight and enforcement mechanisms, thereby increasing investor confidence and promoting sustainable growth in the cryptocurrency market.

Table 4.2 Autocorrelation Test Results

Lag	Autocorrelation	95% Confidence Interval	Significance
1	0.15	(-0.05, 0.35)	Not significant
2	0.10	(-0.10, 0.30)	Not significant
3	0.05	(-0.15, 0.25)	Not significant
4	-0.02	(-0.22, 0.18)	Not significant
5	-0.08	(-0.28, 0.12)	Not significant

Based on the autocorrelation test results, there is no significant autocorrelation observed in the data at any lag, as all autocorrelation coefficients fall within the 95% confidence interval.

Table 4.3 T Statistical Test Results

Variable	T-value	Degrees of Freedom	p-value	Interpretation
Awareness of Fraud Detection	4.21	1543	<0.001	Significant
Confidence in Fraud Detection	2.98	1543	0.003	Significant
Effectiveness of Techniques	3.67	1543	<0.001	Significant

Interpretations

For the "Awareness of Fraud Detection" variable, the T-value of 4.21 with a p-value less than 0.001 indicates a significant relationship.

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For the "Confidence in Fraud Detection" variable, the T-value of 2.98 with a p-value of 0.003 indicates a significant relationship.
For the "Effectiveness of Techniques" variable, the T-value of 3.67 with a p-value less than 0.001 indicates a significant relationship.

These results suggest that there are significant relationships between each of the variables and the effectiveness of fraud detection techniques on cryptocurrency adoption among Nigerian youths.

Conclusion and Summary

The study delved into the assessment of fraud detection techniques on cryptocurrency adoption among Nigerian youths. It began by highlighting the rise of cryptocurrencies globally and specifically in Nigeria, along with the associated risks of fraudulent activities. The literature review emphasized the significant growth of cryptocurrency adoption in Nigeria, driven by various factors, alongside the challenges and concerns, including regulatory uncertainty and security risks. Moreover, fraudulent activities in the cryptocurrency space were discussed, ranging from fake ICOs to phishing attacks and pump-and-dump schemes. Various existing fraud detection techniques, such as machine learning algorithms, anomaly detection, behavior analysis, and social network analysis, were outlined. The methodology employed a mixed-methods approach, utilizing both quantitative surveys and qualitative interviews to gather data. Results indicated a high awareness of fraud detection among Nigerian youths involved in cryptocurrency adoption, albeit with limited confidence in the effectiveness of existing techniques. The qualitative analysis uncovered underlying issues such as distrust in traditional financial institutions and the importance of community support in promoting safe practices.

Recommendations

Policymakers should prioritize educational initiatives aimed at increasing awareness about fraud detection techniques and safe practices in cryptocurrency adoption among Nigerian youths. There is a need for stronger regulatory frameworks to enhance oversight and enforcement mechanisms in the cryptocurrency market. Continuous innovation in fraud detection techniques is crucial to stay ahead of evolving fraudulent schemes. Investment in research and development of advanced machine learning algorithms and blockchain analytics tools tailored to the Nigerian context can bolster the effectiveness of fraud detection efforts. Building a supportive community around cryptocurrency adoption can help in promoting safe practices and mitigating risks. Platforms for knowledge sharing, peer support, and collaborative problem-solving should be encouraged to foster a culture of trust and accountability within the cryptocurrency ecosystem.

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