Determinant of E-Money Usage in the Nigeria Financial System

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Abstract
This study investigates factors influencing electronic money usage in Nigeria, aiming to identify determinants of its adoption. Using time series data from the Central Bank of Nigeria (CBN) statistical bulletin (2012–2021), electronic money transaction values were set as the dependent variable, while financial sector development, banking sector development, financial access, financial literacy, and perceived risk served as independent variables. Multiple regression analysis with econometrics software was employed for data analysis, utilizing R^2, Durbin-Watson statistics, T-statistics, F-statistics, and β coefficients to measure the effect of independent variables on the dependent variable. The findings reveal that 48% of the variation in electronic money usage is attributable to the chosen independent variables, while 52% is due to factors outside the model. Specifically, financial literacy, banking sector development, and financial access positively impact electronic money usage, whereas financial sector development negatively impacts it. Perceived risk also showed a positive effect. Consequently, the study concludes that financial sector development negatively and significantly relates to electronic money usage, while banking sector development, financial literacy, financial access, and perceived risk are positively and significantly related to electronic money usage. Based on these findings, the study recommends that commercial banks and electronic money providers prioritize system updates to enhance user accessibility, emphasizing ease of use for all users. These measures could improve electronic money adoption and increase user confidence across Nigeria.

Keywords: *Electronic Money, Financial System, Financial Literacy, Banking Sector Development, Perceived Risk.*

Introduction

The advancement of Electronic Money (e-money) as a contemporary exchange medium is a vital subject in today ‘s digital economy. Technological innovation has reshaped transactional behaviors, driving the increasing adoption of e-money. During the Covid-19 pandemic, digital payment popularity surged as mobility restrictions motivated people to adopt cashless payment methods for convenience and safety. The efficiency and ease of e-money transactions, surpassing traditional cash payments, align with the shift toward digital economies and the concept of a cashless society (Addai & Pu, 2015). E-money offers both speed and convenience, allowing payments without the need for physical cash, differentiating it from credit and debit cards that remain connected to bank accounts. This shift toward digital transactions is well-documented by central banks, with the Central Bank of Indonesia noting a significant rise in e-money usage. In

2020, e-money accounted for 41.71% of e-commerce transactions, outpacing bank transfers (20.23%) and cash (19.01%) and showing a marked increase from previous years (CBN, 2021; CBN, 2022). Similarly, Nigeria saw a 52.5% year-on-year increase in electronic money transactions. The Covid-19 pandemic played a substantial role in this surge, especially in e-commerce, as restricted physical mobility encouraged reliance on digital transactions (CBN, 2022). This data indicates a transformative trend toward e-money, particularly in regions adjusting to the digital shift within their economies.

The evolution of digital technology has led to innovations across sectors, particularly in finance. The emergence of digital currencies signifies a broader transformation within payment systems, prompting central banks to adapt by exploring public digital currency options as secure alternatives to private payment methods. In Nigeria, the pursuit of a cashless economy has been consistent, bolstered by strategic economic policies promoting digital transactions. This initiative accelerated with the rise of the internet and globalization, which introduced new transaction channels, such as mobile and internet-based businesses (e-commerce and e-business). E-money has thus emerged as a key tool for micro-transactions, essential for both local usage and for enhancing Nigeria ‘s global competitiveness (Atakli & Agbenyo, 2020; Amoah, Korle & Asiama, 2020).

Despite Nigeria ‘s progress in promoting digital payment solutions, adoption rates are still influenced by consumer confidence and self-efficacy. Alalwan et al. (2015) observed that, while financial technology continues to advance, Nigerian consumers remain cautious, often due to individual levels of self-efficacy. Wood and Bandura (1989) define self-efficacy as one ‘s belief in their ability to mobilize motivation and resources to achieve specific goals. Individuals with higher self-efficacy perceive e-money as user-friendly and are more likely to adopt it (Alhujran, 2009). Alalwan et al. (2015) further demonstrated that self-efficacy enhances novice users ‘perceptions of financial performance, service value, and future use intentions (Van Beuningen et al., 2009). While studies have explored e-money ‘s effects on banks ‘performance (Ma & Chao, 2011; Dary & Issahaku, 2013) and economic growth (Borg & Smith, 2018; Djamaluddin et al., 2016), few focuses on adoption factors within emerging markets like Nigeria. This study, therefore, aims to address this gap by investigating the determinants of e-money usage in Nigeria ‘s financial market, contributing valuable insights to the existing literature.

Literature Review

Conceptual Review Electronic Money (e-money)

E-money has emerged as an efficient transactional method in the evolving cashless society. Defined as a monetary value stored electronically on devices such as chip cards or servers, e-money represents a claim on the issuer and is issued upon receiving funds for payment transactions accepted by third parties (Fung, Molico, & Stuber, 2014). E-money is categorized into two main types: card-based products (chip-based) and server-based products. Card-based e-money, also known as an electronic purse or e-money prepaid card, is widely used in Indonesia through brands like E-Money, while server-based e-money stores the value electronically on devices like personal computers. Server-based products, which include prepaid software (EPS), mobile-based e-money, and digital cash, provide benefits in terms of convenience, speed, and efficiency, without minimum transaction amounts or complex security checks. Popular brands in Indonesia for server-based e-money include Go-pay, OVO, T-Cash, and Shoppe Pay.

In Nigeria, e-money has been available since 2007, with chip-based and mobile-based options. However, chip-based transactions are less accessible to the general population, as they are primarily used in major urban areas for services like tolls, trains, and supermarkets and require

specialized card readers. In a country with diverse socioeconomic backgrounds and significant geographical spread, mobile-based e-money has proven more suitable for widespread adoption, accessible via mobile devices (Khatimah, 2016). Electronic Payment (E-payment) encompasses transactions for goods and services using digital systems, including internet-based transfers and electronic funds transfers (Wyllie et al., 2010). The goal of Nigeria's E-payment project was to align the national payment system with global standards, ensuring both domestic utility and international recognition (CBN, 2010).

Mobile Payment

Mobile payment is receiving growing attention globally from consumers to merchants as an alternative to using cash, check, or credit cards. The potential of this technology is enormous (Oliveira et al., 2016). Mobile Payment or abbreviated as M-Payment is a method of payment that uses a mobile phone or cellphone as a means. Mobile Payment, which is widely known by mobile users is certainly a banking product called Mobile Banking or abbreviated as M-Banking. Through M-Banking services, we can check the balance of savings accounts at the Bank, transfer money, pay bills, including the purchase of top up pulses. In using Mobile Payment or M-Banking, each bank has a different menu and method, some use a menu derived from our cellphone Sim Card (provided by a cellular operator called the SIM Toolkit menu), some use a Java application that can be clicked on from mobile menu, and some use SMS codes and send to certain numbers (SMS Banking).

This method is very practical as an alternative to transactions through ATM machines or tellers at the Bank's branch offices. In addition to M-Banking, which is generally managed by a banking system, Bank Indonesia has allowed cellular operators to operate a card payment system, specifically for micro payments. This system is referred to as Electronic Wallet (EWallet) or for mobile phones also called Mobile Wallet (abbreviated as M-Wallet). By this technology, all transactions become easier because we just need to attach our cellphones to make transactions and pulsakita (credit wallet) will be debited automatically at the transaction value that we do. The payment system is an important component in the economy specially to ensure the implementation of payment transactions made by the public and the business world. The payment system also plays an important role in supporting financial system stability and implementation of monetary policy (Lintangsari et al., 2018).

Electronic Wallet

According to the Regulation of the Central Bank of Nigeria (Number 18/40/MPC/2016 Article 1, no. 7), an Electronic Wallet, or E-wallet, is defined as a digital service for storing payment instruments, including payment cards and electronic money, that can also hold funds for payment purposes. E-wallets, developed as apps or features to facilitate transactions, have become increasingly popular with the rise of start-up companies focused on online business transactions, particularly in Indonesia. The system works by allowing users to deposit a specific amount into their e-wallet accounts, enabling direct payments to merchants partnering with the e-wallet provider. E-wallets provide users with convenience, as they eliminate the need to carry cash or physical cards, and transactions can be made swiftly via smartphone.

One major appeal of e-wallets is the promotional benefits offered by many e-wallet providers, including discounts, cashback, and points redeemable for free products or services. These promotions encourage frequent usage and offer value to consumers. E-wallets are not only

flexible but also enhance financial management through their transaction history features, which provide detailed and neatly organized records of all transactions, making it easier for users to track their spending. The enhanced safety and ease of use make e-wallets especially beneficial for travel, as users can manage transactions securely without needing to carry large amounts of cash or visit ATMs. Overall, the combination of convenience, security, and promotional incentives makes e-wallets an attractive payment method for many users.

Financial Sector Development

Financial development encompasses the policies, factors, and institutions that drive efficient financial intermediation and the effectiveness of financial markets. A robust financial system enables risk diversification and optimal capital allocation, with higher levels of financial development leading to more effective mobilization of savings towards high-return projects. Levine (1993) highlighted the crucial role of the financial sector in promoting economic growth, suggesting that financial development directly impacts economic progress. Financial development is typically measured through various indicators, including the depth, size, access, and soundness of the financial system, and by assessing the activities and performance of financial markets, banks, bond markets, and other financial institutions. A well-developed financial system extends financial services more broadly, enabling higher returns with minimized risk.

As financial systems mature, they also help mitigate information asymmetry. Antzoulatos (2008) argued that advanced financial systems reduce asymmetric information in the market by offering specialized services and efficient operations. This reduction in information gaps facilitates more informed and stable transactions. Although the significance of a structured financial system for economic growth is widely acknowledged, challenges remain in measuring financial development accurately. The literature discusses several prominent issues in measurement, as achieving a reliable assessment requires comprehensive indicators that reflect the multifaceted nature of financial systems.

Financial access

According to Cihak et al. (2013), efficient financial systems are distinguished by their ability to allocate capital based primarily on the quality of the project and entrepreneur, rather than the entrepreneur's wealth or social connections. To develop meaningful proxies for financial development, it is therefore crucial to go beyond measures of financial depth and include indicators of financial access, reflecting how broadly the public can access financial services. This analysis includes both financial institutions and financial markets, as these areas capture a more comprehensive view of access. To represent financial institutions, the authors selected the number of bank accounts per 1,000 adults, drawing from the Financial Access Survey database (fas.imf.org), an initiative built on foundational work by Beck, Demirgüç-Kunt, and Martínez Pería (2007). This database provides annual data across multiple jurisdictions from 2004 to 2011, enabling insights into financial inclusion.

For measuring financial market access, the analysis faced data limitations. To approximate access to stock and bond markets, the model employs measures of market concentration, under the premise that higher market concentration suggests barriers for new or smaller entrants. Specifically, Cihak et al. (2013) utilized the percentage of market capitalization outside the largest companies as a proportion of total market capitalization. Given the limited availability of

data on financial market access, the authors used linear interpolation for missing data, estimating values based on economic development levels and historical trends to preserve relative weights between countries. This approach revealed that developed nations generally scored higher on financial access measures compared to other regions, reflecting broader access to financial resources.

Financial Literacy

Conceptually, financial literacy encompasses the knowledge and skill required by individual to function effectively in the money economy and make informed judgments in respect to their own and their family circumstances. The need for financial literacy among entrepreneurs and business owners has henceforth become an issue of interest in both developed and developing economies (Hilgert and Hogath, 2003). Financial literacy is hypothesized to be a major determinant of the firm ‘s success or failure. OECD (2005) argued that financial literacy must involve not only the investors but also the customers, both having the knowledge of financial products and their ability to consider financial risks in their decision making and to make other effective actions to improve their financial levels.

Financial literacy is essential in helping individuals to identify vital financial issues and behaviors that support effective management of financial resource. It enables one to have the knowledge of critical financial concepts such as types of interests, risks and returns of investments, diversification of investments, among others. It equips the ability to understand important financial products needed in life including various bank products, basic investments, ideas and saving plans. It improves how individuals can examine and appreciate money and financial issues. Common measures of financial literacy are money knowledge, financial management, debt, savings, insurance and investment literacy (Margaretha & Supartika, 2016).

Perceived risk

Consumer behavior studies define perceived risk in terms of the customer's perception of the uncertainty and potential adverse consequences of buying a product or services. The degrees of risk that customers perceive, and their own tolerance of risk tacking are factors that influence their purchase decision (Nasri, 2011). On the other hand, introducing a new technology may involve both benefits and risks to the user, and before deciding to adopt the technology, the individual may want to weigh risks and benefits. Electronic banking services will not be an exception to this general rule. A larger perception of risk will reduce the perceived benefit of the technology (Horst, Kuttschreuter, and Gutteling, 2007). Previous studies mentioned that perceived risk was a major factor that influences the adoption of electronic banking services (Polatoglu and Ekin, 2001; Tan and Teo, 2000).

Featherman MS and Pavlou PA (2003) defined perceived risk as the potentiality of loss in the pursuit of a desired outcome of using electronic services. It increases with the higher level of uncertainty or with an increased chance of negative consequences (Lu, Hsu, and Hsu, 2005). Most of the researchers noted that customers' perceived risk was a kind of multi-dimensional construct, and such dimensions may vary according to the product or service type. Five dimensions of perceived risk have been identified in the previous studies (Featherman MS and Pavlou PA, 2003; Kuisma et al., 2007; Lu et al., 2005; Natarajan et al., 2010). These dimensions are performance risk, social risk, financial risk, privacy risk and time risk. Performance risk refers to losses incurred with deficiencies of electronic services.

Theoretical Review

Technology Acceptance Model

The Technology Acceptance Model (TAM), sometimes called Technology Acceptance Theory (TAT), explores customer adoption behavior by examining the intent to use a system based on perceived usefulness and ease of use. Previous studies have examined TAM's foundational constructs, showing that while TAM effectively predicts technology acceptance, it does not fully account for the specific usability factors influencing user adoption (Moon & Kim, 2001). Davis (1989) described perceived usefulness as the individual ‘s belief that using a technology improves job performance, while perceived ease of use indicates how easily a person can learn and operate new technologies. TAM emphasizes that a system's perceived simplicity positively influences the perception of its usefulness (Gefen, Karahanna, & Straub, 2003). A study in Finland by Pikkarainen et al. (2004) found that perceived usefulness positively impacts the adoption of autonomous, user-friendly banking technologies. Similarly, Gerrard and Cunningham (2003) noted that usefulness perception depends on bank services, such as utility payments, account monitoring, loan applications, and international transfers, underscoring its role in shaping adoption intentions.

Tan and Teo (2000) argued that perceived usefulness significantly affects the likelihood of adopting innovations, including e-banking. As such, the core elements driving e-banking acceptance are TAM variables like perceived ease of use and usefulness, making TAM a widely recognized framework for understanding technology adoption. Davis (1989) developed TAM to predict the acceptance of new technologies effectively, with subsequent modifications incorporating trust and risk factors, such as the Trust and Risk in Technology Acceptance Model (TRITAM) by Lui and Jamieson (2003). Today, TAM remains a significant theoretical model in technology acceptance studies, offering valuable insights into how perceived utility and simplicity shape users' adoption behaviors across various technological contexts.

Empirical Review

Putra and Steven (2020) investigated customer loyalty factors in electronic money (e-money) products in Indonesia, focusing on E-Service Quality and Marketing Mix components. Their study of 400 server-based e-money users showed that reliability, responsiveness, and security significantly influenced perceived value and customer loyalty, with perceived price having the most substantial effect on loyalty, indicating a cost-sensitive market. Similarly, Dian and Neneng (2020) explored e-money adoption, surveying 107 South Tangerang residents. They found that while Perceived Usefulness was significant, Perceived Benefit and Compatibility were not individually impactful, though collectively, these factors contributed to e-money adoption.

Hesi et al. (2022) examined the impact of promotion and Perceived Ease of Use on e-money adoption among Indonesian millennials. Their survey-based analysis revealed that 51.6% of adoption decisions were influenced by these factors, indicating that ease of use and promotional incentives play critical roles in millennial adoption of digital payments. In a related study, Isaac and Fengying (2022) analyzed determinants of digital financial services (DFS) adoption, identifying transaction costs, security, privacy, and self-efficacy as influential, with socio-demographic variations affecting adoption levels, suggesting that improving digital infrastructure and reducing costs could boost DFS uptake.

Yavuz (2021) focused on mobile augmented reality (MAR) in Turkey, highlighting security and privacy as crucial adoption factors, while Efobi (2018) emphasized the role of internet access in fostering technology adoption by reducing communication costs and expanding market access. Shaikh and Karjaluoto (2015) noted that transaction costs, awareness, and self-efficacy limitations hinder adoption, underscoring the need for reduced barriers. Studies such as those by Borg and Smith (2018) and Zins and Weill (2016) highlighted the impact of demographics on DFS adoption, noting that robust telecommunications infrastructure can mitigate information asymmetry and lower transaction costs.

In Ghana, studies on DFS adoption have identified perceived transaction cost, infrastructure quality, and perceived risk as critical factors for small and medium enterprises (SMEs) in adopting ICT and e-commerce (Agboh, 2015; Awiagah et al., 2016). Amoah et al. (2020) pointed to service availability, education, and income as drivers of mobile money adoption. These studies utilize frameworks based on behavioral intentions, subjective norms, and attitudes, with socio-demographic characteristics significantly influencing DFS adoption patterns (Amoah et al., 2020; Gichuki & Mulu-Mutuku, 2018; Ghosh & Hom Chaudhury, 2020).

In Nigeria, digital banking ‘s profitability impact has been widely studied. Asidok and Michael (2018) reported a positive effect of ATM usage on bank performance, while Olaiya and Adeleke (2019) noted that ATMs and POS transactions enhanced Return on Assets, though mobile and internet banking unexpectedly impacted ROA negatively. Further, Oladejo (2016) found that e-payment adoption, including ATMs, POS, and internet banking, positively influenced Nigerian banks ‘financial metrics, such as gross margin and return on equity. Additionally, Puhazhendi (2020) highlighted in India that microcredit programs lower transaction costs, exemplifying how financial innovations support broader financial system efficiency.

Literature Gap

Putra and Steven (2020) presented an analysis of the orientation and factors that influence the loyalty in electronic money products., Dian and Neneng (2020) analyzed the factors that influence the use of e-money, Hesi et al., (2022) examined the importance of promotion and Perceived Ease of Use in the decision to use e-money prepaid software for the millennial generation in Indonesia. Isaac and Fengying (2022) explored digital financial services adoption determinants. It quantified the role played by each of the six incorporating factors and controlled four socio-demographic characteristics. Yavuz (2021) to determine the factors affecting mobile augmented reality (MAR) adoption in Turkey also noted that security and privacy are the two most significant factors influencing electronic money application, empirical literature presented above are foreign with limited studies of citable significant in Nigeria, this study wants to examine factors that determine electronic money usage in Nigeria.

Methodology

The study used quasi experimental research design approach for the data analysis. The approach combines theoretical consideration with the empirical observation and extract maximum information from the available data. Therefore, the research design in this study is the quasi-experimental which allows us to examine the causal relationship between the dependent and the independent variables. The data in this study will be sourced from the publications of Central bank of Nigeria Statistical Bulletin. This constitutes the time series data sourced from the secondary data

Model Specification

EM= f (FD, FL, BD, FA, PR) 1

EM = □0 □ □1FD □ □2 FL □ □3 BD □ □4 FA □ □4 PR □ □ 2

Where:

EM = Electronic money usage proxy by Value electronic money cash transactions as percentage of money supply

Financial sector development proxy by percentage of money supply to gross domestic product

FL = Financial Literacy proxy by number of account holders

BD = Banking density proxy by number of persons per bank branch FA = Financial Access proxy by number of accounts holding

PR = Perceive risk proxy by dummy variable of 1 and 0 β_0 = Intercept

$\beta_1 - \beta_6$ = Coefficient of the explanatory variable

μ = Error term

Data Analysis Method

The technique used in this study is the Ordinary Least Square (OLS) estimation technique. The test instruments in the OLS are the T-statistics and F-test which were used to test the significance of variables and the overall significance of the regression respectively. Other test instruments that will also be employed are the Durbin Watson test which will be used to test the presence or absence of auto correlation between and among the explanatory variables and the adjusted R-square to test the percentage variation of the dependent and the independent variables.

Analysis and Discussion of Findings

Descriptive Analysis

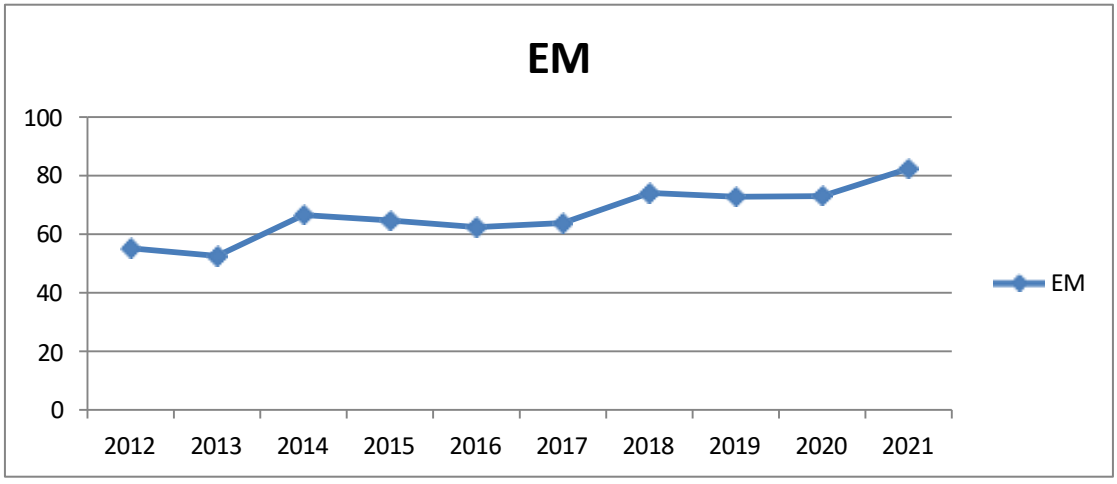

Figure 1: Trend showing the movement of electronic money usage in Nigeria from 2012-20

The graph indicates that there is steady increase in electronic money usage in Nigeria. The little fluctuation in the line graph could be traced to challenges facing full application e-money usage such as public awareness, poor network and poor power sully.

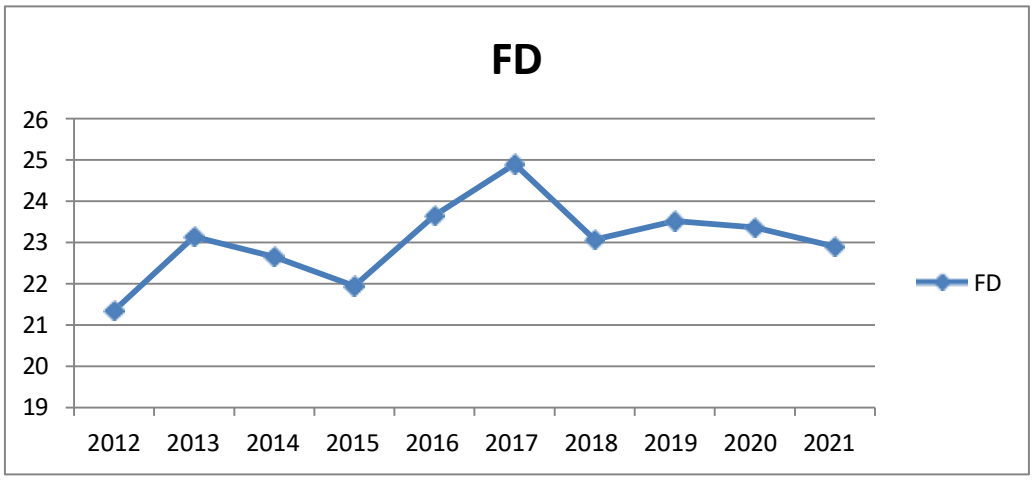

Figure 2: Trend showing the movement of financial sector in Nigeria from 2012-2021

The graph indicates that there is steady increase in financial sector development in Nigeria. The graph shows that their high fluctuation rate of fluctuation within the periods covered in the study.

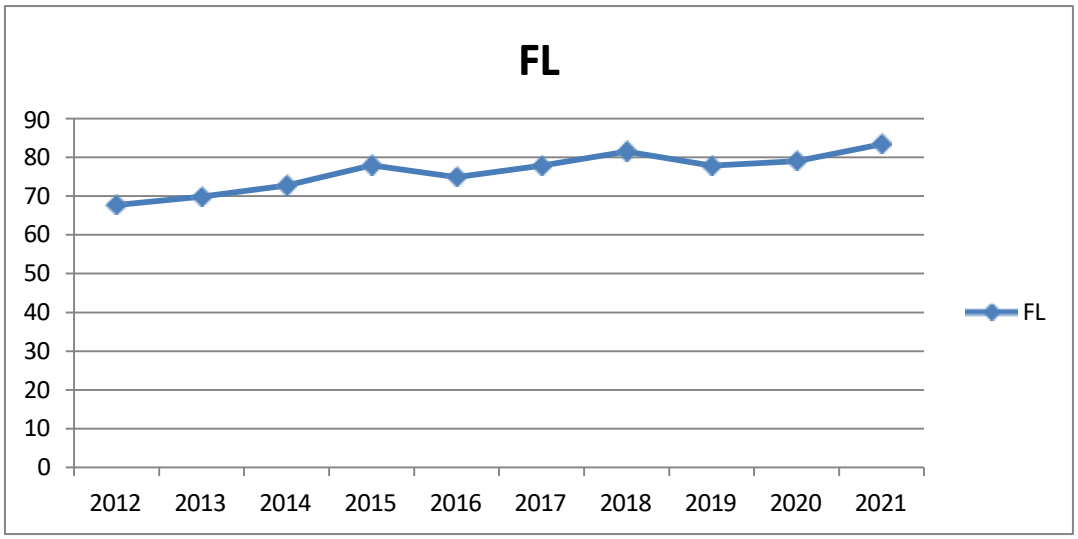

Figure 3: Trend showing the movement of financial literacy proxy number account holders in Nigeria from 2012-2021

The graph indicates that there is steady increase in financial literacy in Nigeria.

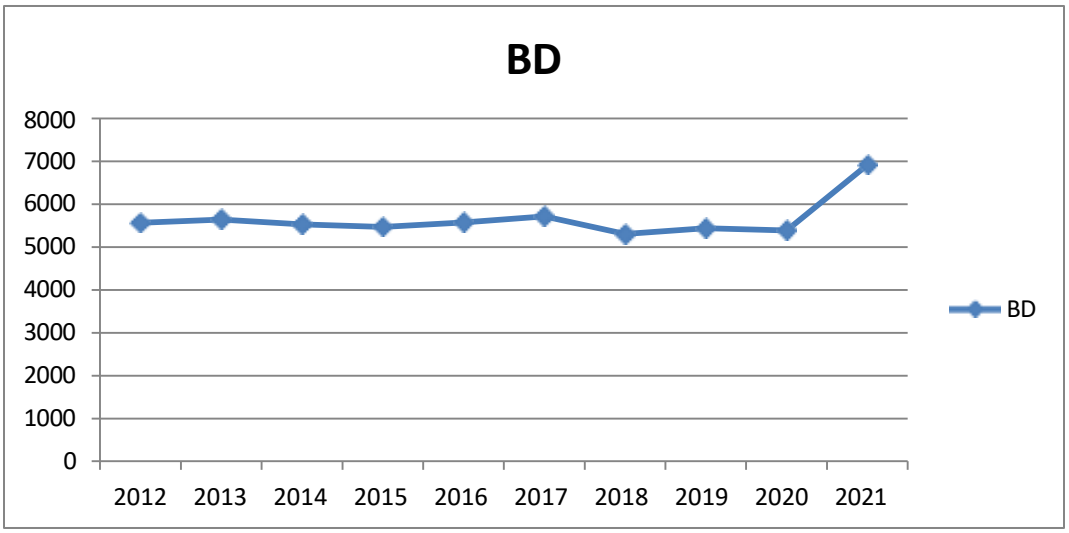

Figure 4: Trend showing the movement of banking sector development in Nigeria from 2012-2021

The graph indicates that there is steady increase in banking sector development in Nigeria.

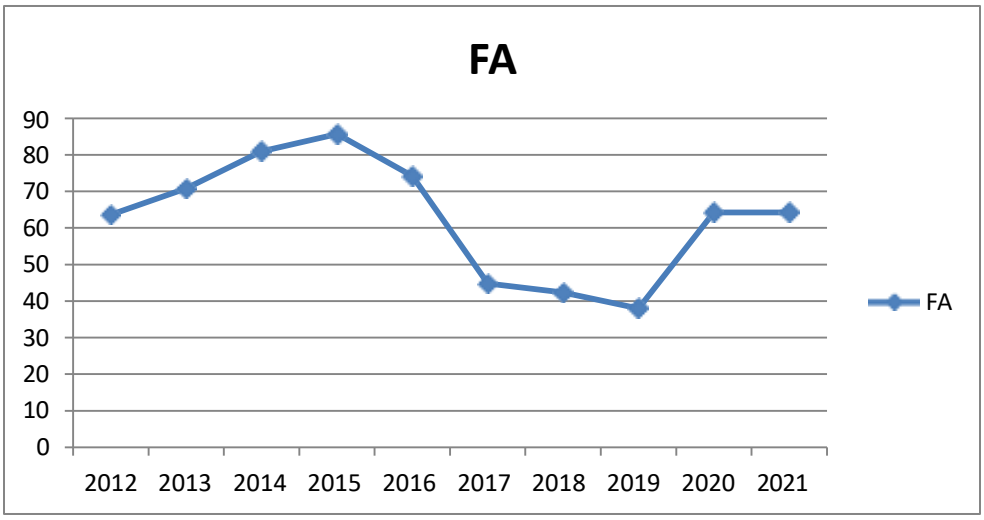

Figure 5: Trend showing the movement of financial access in Nigeria from 2012-2021

The graph indicates that there is steady increase in electronic money usage in Nigeria. The high fluctuation could be traced to monetary policy factors within the periods covered in this study.

Table 1: Presentation of Ordinary Least Square Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FD	-7.782296	1.334501	-5.831615	0.0000
FL	5.786147	1.185997	1.878717	0.2631
BD	4.319944	0.990309	1.362218	0.2843
FA	3.115671	0.761574	1.091093	0.2846
PR	1.642058	0.489106	1.357263	0.2793
C	198.4981	358.3773	0.553880	0.5861
R-squared	0.882200	Mean dependent var	111.9404	

Adjusted R-squared	0.844999	S.D. dependent var	4607.236
S.E. of regression	1813.874	Akaike info criterion	18.06912
Sum squared resid	62512642	Schwarz criterion	18.40784
Log likelihood	-227.8986	Hannan-Quinn criter.	18.16666
F-statistic	23.71495	Durbin-Watson stat	1.837980
Prob(F-statistic)	0.000000		

Source: Extract from E-view 9.0

From the result above, the R^2 and the adjusted R^2 which measures the extent to which the independent variables can predict changes on the dependent variables shows that 84.4percent variation in electronic money usage can be explained by the Nigerian factors as model in the chapter three of this study. The f-statistic and probability validate the regression model while the Durbin Watson statistic proved the presence of serial auto correlation within the time series. The regression coefficient found that financial sector development has negative effect on electronic money usage while other variables have positive but no significant effect on electronic money usage.

Table 2: Presentation of Error Correction Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FD	-23.38959	8.262497	-2.830814	0.0107
FL	7.311237	14.48543	0.504730	0.6196
BD	4.127815	17.30824	0.238488	0.8141
FA	22.73777	14.04443	1.618988	0.1219
PR	23.02717	6.101423	3.774066	0.2713
C	-465.8437	1358.088	-0.343014	0.7354
ECM (-1)	0.329467	0.432792	0.761260	0.4558
R-squared	0.788296	Mean dependent var		32206.65
Adjusted R-squared	0.480288	S.D. dependent var		39259.88
S.E. of regression	5512.005	Akaike info criterion		20.36366
Sum squared resid	5.77E+08	Schwarz criterion		20.99854
Log likelihood	-322.0004	Hannan-Quinn criter.		20.57728
F-statistic	5.483163	Durbin-Watson stat		1.073928
Prob(F-statistic)	0.000000			

Source: Extract from E-view 9.0

The R^2 and adjusted R^2 results indicate that 48% of the variation in electronic money usage is explained by the factors examined, with the remaining 52% attributable to other variables not included in the model. The error correction coefficient suggests a 32.9% annual adjustment rate. The Durbin-Watson statistic of 1.073928, below 2.0, shows no negative serial autocorrelation among variables. The F-statistic of 5.483163, significant at the 5% level, confirms the model's suitability in predicting variation in electronic money usage. Additionally, the beta coefficients reveal that financial literacy, banking sector development, and financial access positively influence electronic money usage, while financial sector development has a negative impact.

Table 3 Descriptive Statistic

	ED	FD	FL	BD	FA	PR
Mean	4.429600	4.232667	64.92867	4.538000	1.128000	4.232667
Median	4.120000	4.270000	66.50000	4.400000	1.080000	4.270000
Maximum	48.80000	6.340000	80.40000	5.270000	1.570000	6.340000
Minimum	1.250000	1.140000	42.90000	4.060000	0.640000	1.140000
Std. Dev.	5.306621	0.996729	10.37288	0.449071	0.309144	0.996729
Skewness	7.937089	-0.366427	-0.479081	0.550616	-0.175162	-0.366427
Kurtosis	66.95020	3.657236	2.314727	1.842836	2.154747	3.657236
Jarque-Bera	13567.56	3.028232	4.336479	7.974189	2.616189	3.028232
Probability	0.000000	0.220003	0.114379	0.018554	0.270335	0.220003
Sum	332.2200	317.4500	4869.650	340.3500	84.60000	317.4500
Sum Sq. Dev.	2083.856	73.51667	7962.153	14.92320	7.072200	73.51667
Observations	10	10	10	10	10	10

Source: Computed from E-view 9.0

Descriptive statistics were employed to outline the distribution and behavior of all variables, with Table 4 summarizing the observed variables and electronic money usage in Nigeria. The analysis was conducted on combined data from all commercial banks to identify general patterns. Results show that financial sector development exhibits the highest values among variables. The mean value indicates that, on average, the sampled firms reached approximately 4.232667. Both minimum and maximum coefficients indicate a positive response in electronic money usage at their respective extremes. The Jarque-Bera and probability values confirm that the variables are normally distributed.

Table 5: Correlational Matrix of the Variables

Covariance Correlation t-Statistic Probability	ED	FD	FL	BD	FA	PR
ED	27.78475					
	1.000000					
FD	1.152829	0.980222				
	0.220902	1.000000				
	1.935193	-----				
	0.0568	-----				
FL	1.118971	0.825622	106.1620			
	0.020603	0.080935	1.000000			
	0.176070	0.693782	-----			
	0.8607	0.4900	-----			
BD	0.481869	-0.049233	0.043917	0.198976		
	0.204939	-0.111480	0.009555	1.000000		
	1.788972	-0.958459	0.081645	-----		
	0.0778	0.3410	0.9352	-----		
FA	-0.030575	-0.003272	-0.411769	0.057276	0.094296	
	-0.018890	-0.010762	-0.130144	0.418144	1.000000	

	-0.161422	-0.091958	-1.121485	3.932957	-----	
	0.8722	0.9270	0.2658	0.0002	-----	
PR	1.152829	0.980222	0.825622	-0.049233	-0.003272	0.980222
	0.220902	1.000000	0.080935	-0.111480	-0.010762	1.000000
	1.935193	4.05E+08	0.693782	-0.958459	-0.091958	-----
	0.0568	0.0000	0.4900	0.3410	0.9270	-----

Source: Computed from E-view 9.0

The correlation results presented in table 5 indicate that the variables have positive correlation with the dependent variable except financial access; this implies that the variables have positive correlation in the same direction.

Discussions of Findings

The estimated error correction model demonstrated that 48% of the variation in electronic money usage in Nigeria could be explained by the independent variables, as confirmed by the model's F-statistic and probability values, with the Durbin-Watson statistic showing no serial autocorrelation among variables, thus indicating robustness. Notably, the study uncovered a negative and significant relationship between financial sector development and electronic money usage, a finding that contrasts with expectations and ongoing Nigerian financial reforms, such as financial sector liberalization. This result diverges from studies by Ivatury and Pickens (2009) and Ardic, Heimann, and Mylenko (2011), which highlighted the positive effects of financial development on unbanked populations. Additionally, it stands in contrast to Asidok and Michael (2018) and Olaiya and Adeleke (2019), who reported that ATMs and digital banking channels enhance Nigerian banks' performance, and to Ahannaya et al. (2021) and Eze and Egoro (2016), who noted the legitimacy and profitability of digital currencies like Bitcoin and electronic banking. Conversely, the study found positive but non-significant effects of financial literacy, banking sector development, financial access, and perceived risk on electronic money usage during the study period, indicating that while these factors support electronic money adoption, they do not significantly propel its usage in Nigeria 's specific context. These findings align with Nigeria 's cashless and e-Naira policies, supporting theories like the Technology Acceptance Model and Innovation Theory, which suggest that user adoption is driven by perceived ease and utility. This outcome resonates with Oladejo (2016), who reported that e-payment adoption positively affects Nigerian banks' profitability indicators, such as gross margin and return on assets, as well as Edwin and Adele-Louise (2014), who found phone banking to be more prevalent than internet banking and ATMs with wider reach.

Furthermore, the study 's results align with Ugwueze and Nwezeaku (2016), who observed that POS terminals are integrated with demand deposits rather than savings and time deposits, indicating that digital payment systems exert different influences on various deposit types in Nigeria 's banking system. Overall, these findings highlight the complex effects of financial development and related factors on electronic money usage, suggesting that while financial reforms are essential, the anticipated benefits of these innovations may not fully materialize in the short term within Nigeria 's evolving financial landscape.

Conclusion and Recommendations

This study examined the factors influencing electronic money usage in Nigeria from 2012 to 2021, using time series data and a multiple regression model with electronic transaction value as the

dependent variable and independent variables including banking sector development, financial sector development, financial literacy, financial access, and perceived risk. Results showed that 48% of the variation in electronic money usage was explained by these factors, while 52% was attributed to factors outside the model. The model's statistical significance was confirmed with an F-statistic of 5.483163 and a probability of 0.000000 at the 5% level, and the Durbin-Watson statistic of 1.073928 indicated no negative serial autocorrelation. Findings revealed a positive relationship between electronic money usage and variables such as banking sector development, financial literacy, financial access, and perceived risk, while financial sector development had a negative effect. This suggests that in Nigeria, growth in banking sector development, financial literacy, and accessibility promotes electronic money adoption, whereas the financial sector 's broader development may not directly support usage trends (Schumpeter, 1934).

Recommendations

i. This study recommends practical implications for some principals or e-money issuers to update the system so that they always highlight the "ease of use" principle for all users through the application which let users more easily find and use its features, adding to the features on the interesting list of merchants and various promotions.
ii. This finding has practical implications for policymakers, especially for some investors and principals or e-money issuers to develop related products and diversify similar products in the development of e-commerce and financial technology.
iii. In addition to carrying out attractive promotions through advertisements, it is important to update the system so that it is always easy to use and makes it easier for users through the features developed.
iv. Future development should be directed at improving the design of the e-money application to let users more easily find and use its features, adding to the features on the list of merchants and various promos
v. the study recommended to further elaborate these findings by diversifying some of the other predictors not discussed in this study, which of course will enrich relevant studies in the field of consumer behavior, especially to find the driving factor for millennial customers in adopting e-money prepaid software service
vi. There is need policy that increase operational efficiency of the financial market such that will enhance electronic money usage.

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