Cashless Payment System on Financial Inclusion in Nigeria

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ABSTRACT: The study investigates the effect of cashless payment system on financial inclusion in Nigeria. Secondary data from year 2010 till 2023 on variables of interest were collected and were analysed using quantitative analysis. Volume of point-of-sale systems in the banks, Volume of Web-Based Transactions in the banking industry, Number of ATM Machines available, number of account holders, rate of usage of bank account all these were used as the independent variables while financial inclusion which was proxied by the number of commercial banks branches in rural area and the total number of commercial bank branches in the country. Quantitative analysis was used to analyse the data. The Auto-regressive Distributed Lag was precisely employed and the result showed that only point of sale volume and web-based transaction have the most significant impact on financial inclusion in Nigeria. Findings indicate that Automated Teller Machines was unable to exert significant impact on financial inclusion. It s recommend that government should reinforce pint of sae transaction as ell as web based transaction among the populace in order to continue to achieve massive financial inclusion in Nigeria.

KEYWORDS: Financial Inclusion; Cashless Payment; Point of Sale Transaction; Web Based Transaction

INTRODUCTION

In Nigeria, similar to many developing countries, cash is the predominant method of payment, and a considerable portion of the population remains unbanked (Ajayi and Ojo, 2006). As a result, the country relies heavily on a cash-based economy. However, the advent of electronic payment systems revolutionized the banking landscape, offering customers more flexibility, efficiency, and cost-effectiveness. Before the introduction of electronic payment methods, customers had to physically visit the bank, endure long queues, and spend hours waiting to conduct transactions with a teller, leading to frustration and inconvenience. The emergence and widespread adoption of technology have paved the way for cashless payments, including mobile money, debit and credit cards, and electronic transfers. A cashless economy does not imply the complete absence of cash transactions but rather emphasizes minimizing the reliance on physical currency in exchange for goods and services (Daniel, Swartz, and Fermar, 2004).

Over the years, Nigeria has undergone a gradual transformation from a cash-based economy to a cashless society. This transition has been instrumental in linking people to banks, facilitating financial inclusion, and allowing them to benefit from the process. However, a significant challenge remains in rural areas, where the majority of the unbanked population resides, as limited access to financial services hinders their ability to participate in electronic payment transactions. Moreover, the lack of financial literacy further complicates the adoption of cashless payment systems and inclusion into the formal financial system. A study by Adeoti and Osotimehin (2012) revealed that despite the implementation of the cashless policy, customer satisfaction remains a concern. Customers expressed dissatisfaction with various aspects of the system, including the speed of transactions, the level of service provided by merchants, awareness, and security. Considering these factors, there are reservations regarding whether the government's introduction of the cashless policy has truly achieved its intended objective of enhancing financial inclusion in Nigeria. This study aims to investigate the impact of cashless payment systems on financial inclusion in the country, shedding light on the effectiveness of the policy in achieving its goals.

This study's importance rests in its capacity to enhance our insights and comprehension of the connection between digital payment methods and promoting financial inclusion in Nigeria. While earlier research has concentrated on the factors influencing the acceptance and utilization of digital payment methods in Nigeria (Abiola & Adeniji, 2021; Oyewole et al., 2020), there exists a requirement for more in-depth exploration into how these systems affect financial inclusion. The objective of this study is to shed light on the degree to which digital payment methods have widened the availability of financial services and raised the utilization of official financial services in Nigeria.

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Consequently, the main aim of this study is to investigate the effect of cashless policy on financial inclusion in Nigeria. The rest of the paper is divided into the literature review, methodology, results and discussion, conclusion and recommendations.

LITERATURE REVIEW

The Central Bank of Nigeria's implementation of the Cash-less economy policy aimed to decrease expenses linked to cash handling, enhance payment system efficiency, and promote financial inclusion. Various scholars (Humphrey & Berger, 1990; Humphrey et al., 1996; Onley, 1999; Klee, 2004; Garcia-Swart et al., 2006) have suggested that the increased adoption of digital payment methods has generated expectations of a cashless society. In such a scenario, people can engage in virtual transactions, use automated vending machines, and employ devices like mobile phones, PDAs, smart cards, and other electronic payment systems for point-of-sale (POS) interactions. Both government and commercial entities strongly support and encourage cashless transactions (Khan & Craig-Lees, 2009). As EFInA's records (2013) Unveil, a distinct correlation arises between the prevalence of electronic transactions within a community and the portion of individuals affiliated with financial institutions. The term 'banked' denotes people linked to recognized financial establishments like banks, cooperatives, and credit unions (Solo, 2008). In economies with limited cash usage, such as Canada, nearly the entire populace maintains connections with financial institutions, with 96% of adults holding formal accounts. Even among disadvantaged groups, this figure only minimally decreases to 93% (EFInA, 2013).

While there isn't a universally agreed-upon definition of financial inclusion, certain shared characteristics can be easily identified. Irrespective of the chosen standpoint, it becomes evident that financial inclusion pertains to providing individuals in need with access to formal financial services that are affordable, timely, and available in appropriate quantities and formats. Kodan & Chhikara (2013) proposed that despite the lack of universal consensus, comprehending financial inclusion can be based on financial accessibility, indicating convenient access for those requiring well-structured banking services. EFInA (2013) observed that although achieving a cashless status certainly demands increased financial inclusion, the connection between extensive financial inclusion and policies promoting a cashless society is not straightforward. Nonetheless, emerging evidence from scholarly literature suggests that achieving significant financial inclusion requires proactive policies that foster cashless societies (Jonker, 2005; Gangopadhayay, 2009; Mas, 2012; Ebiringa, 2010; Kodan & Chhikara, 2013). As highlighted by Mas (2012), catering financial services to individuals with economic challenges involves connecting three distinct dimensions. Firstly, a concrete cloud encompasses physical cash, the traditional payment system relied upon by many impoverished individuals for storing and exchanging value. Secondly, a digital cloud represents money existing solely as an accounting entry, forming an alternative payment system and an ideal space for financial services. Digitizing money simplifies transaction oversight, facilitates the creation of innovative financial products, and allows smooth money movement through simple credits and debits. On the other hand, a neural cloud within individuals' minds shapes their perceptions and behaviors related to money based on their circumstances, needs, and aspirations. People assess both informal and formal financial services based on their cognitive constructs. Mas emphasized the responsibility of financial institutions to connect these dimensions. Leveraging the growing prevalence of mobile phones with their digital communication capabilities offers potential for innovative, cost-effective ways to link these dimensions. Mobile phones not only reduce costs but also empower customers to directly interact with their banks, providing convenience and control.

The unparalleled immediacy, convenience, and control offered by mobile phones are unmatched. Their genuine potential goes beyond cost reduction, as they can redefine banking experiences by aligning with individuals' perceptions and allocations of funds for various purposes, like children's education, emergencies, or savings groups. This approach helps individuals effectively track their funds' intended purposes and ensures that all savings are earmarked for specific uses. As observed by Mas (2012), particularly among socioeconomically disadvantaged groups, this financial management approach clarifies why traditional bank accounts might not be advantageous, even if accessible. Ultimately, for banks to effectively engage with individuals and their finances, they must thoroughly comprehend how people's financial mindsets are electronically represented.

The all-encompassing policy for a cashless economy incorporates a variety of strategies aimed at achieving policy goals. Among these tactics, the emphasis on creating awareness through market education and sensitization takes a central role. This is carried out directly by the CBN and in partnership with banks through prominent media messaging. Nigeria's initiatives to raise cashless awareness play a crucial part in the policy framework, overcoming potential market obstacles by spreading public messages. These efforts effectively aid in promoting electronic services to both individuals without bank accounts and those who have inactive accounts and underutilized e-channels (Enhancing Financial Innovation & Access, 2013).

In Nigeria, experts in information and communication have identified a lack of awareness among potential users of point of sale (POS) systems. Increased awareness corresponds with higher adoption and penetration rates for POS systems (Ilesanmi, 2012). Scholars and ICT specialists attribute the gradual acceptance of POS systems in Nigeria to insufficient awareness. For instance,

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Yaqub et al. (2013) suggest that the slow embrace of e-payment methods arises from limited awareness about the benefits of the system, necessitating awareness campaigns to facilitate the spread of POS systems (Ilesanmi, 2012). Additionally, some researchers propose that the introduction of e-commerce services faces obstacles due to public unfamiliarity with the technologies (Chiemeke and Evwiekpaefe, 2011:1723).

However, not all claims have consistently received empirical confirmation. Awareness has been defined as individuals' understanding of the existence and advantages of utilizing e-government (Mofleh, Wanous, & Strachan, 2008). The concept of 'technology awareness', explored by Nambisan, Agarwal, & Tanmiru (1999), corresponds to awareness and relates to users' grasp of a technology's capabilities, characteristics, potential uses, and associated costs and benefits. Based on these definitions, this study introduces the concept of 'cashless policy awareness', encompassing users' comprehension of the presence, characteristics, costs, advantages, and user-friendliness of cashless economy channels in their business activities. Moreover, the importance of infrastructure emerges as a pivotal element influencing the effective execution of policies aimed at establishing a cashless economy. This factor serves as the foundation for various endeavors directed towards achieving financial inclusion, as supported by research by Gangopadhayay (2009), Bayero & Daneji (2014), and Gheysari et al. (2012). The Central Bank of Nigeria (2007) underscores that within the range of e-banking strategies adopted by Nigerian banks, ATMs gain prominence as a favored preference among customers. The acceptance of ATMs is significantly swayed by attitudinal inclinations, with Nigerian bank clients assigning elevated significance to this particular channel, as pointed out by Klynveld, Peat, Marwick & Goerdeler (2009). This trend demonstrates that Nigerian bank customers are increasingly correlating exceptional banking service with real-time online facilities, fostering a more discerning approach in their choice of financial institutions, as highlighted by Idowu, Aliu, & Adagunodo (2002).

The mobile phone, another pivotal electronic channel, continues to reshape the landscape of financial accessibility according to research by Jack & Suri (2012). Gangopadhayay (2009) emphasizes the critical role played by either reducing costs or enhancing benefits in driving the adoption of mobile phones for financial transactions. When mobile phones effectively decrease transaction costs, thereby bolstering access to financial services, their advantages are substantially amplified, leading to heightened adoption rates. Gangopadhayay underscores that a lack of mobile phone users should not be misconstrued as a lack of interest from financial institutions in promoting greater financial inclusion through this platform.

The effectiveness of the payment system will depend less on tangible money, offering the possibility of revitalizing the national economy. As Cobb's research from 2005 indicates, adopting secure and user-friendly electronic payment methods has the potential to produce various macroeconomic benefits. Moreover, by achieving enhanced oversight of consumer and business credit, the economic momentum can receive additional amplification. The notion of a society without physical currency can be traced back to historical eras when barter and alternative non-cash exchange approaches were widespread, resulting in everyday occurrences of cashless transactions. In modern times, the idea of a cashless society has gained substantial momentum due to the digitization trend and widespread availability of mobile devices. In such a society, financial transactions occur through the digital exchange of information between parties, bypassing the use of physical banknotes or coins, as effectively pointed out by Fletcher in 2016. The global inclination towards digital payment methods in trade, investments, and everyday transactions has prompted widespread discussions about the concept of a cashless society.

Nigeria faces challenges in transitioning to a cashless system due to the continued dominance of cash in transactions and a significant portion of the population lacking access to banking services (Ajayi and Ojo, 2006). The prevailing reliance on cash entails elevated expenses for the nation's financial ecosystem, exemplified by the nearly fifty billion naira cost in 2008 (CBN, 2012). Shifting from a society centered around cash, where a substantial portion of money remains outside formal banking channels, to a cashless model represents a significant transformation that necessitates collaborative efforts from the government, financial institutions, individuals, and other stakeholders to unlock the systemic economic advantages.

Mamudu & Gayuvwi's 2019 study emphasized the profound influence of implementing cashless policies on Nigeria's economic landscape. Through an analysis of time series data, the study established a long-term relationship between variables and the Nigerian economy. However, the research also revealed that the absence of robust infrastructure for facilitating cashless transactions could contribute to the observed insignificant results. To harness the full potential of a cashless society, it is crucial for both the government and deposit money banks to collaborate and enhance infrastructure provisions, thereby improving accessibility to digital transactions.

METHODLOGY

The research design, as expounded by Blumberg, Cooper, and Schindler (2008), is elucidated as a time-based plan and roadmap for obtaining information to address research inquiries.

The research design employed in this study is a quantitative approach that utilizes secondary data obtained from reputable sources such as the Central Bank of Nigeria statistical bulletin and economic reports, as well as data from the National Bureau of Statistics

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and other esteemed repositories. The primary objective of this design is to analyze the correlation between cashless payment systems and financial inclusion in Nigeria.

To assess the relationship between cashless payment systems and financial inclusion, the selected statistical technique is the Augmented Dickey-Fuller test (ADFL). The ADFL test is well-suited for handling datasets comprising multiple variables and is effective in reducing dimensionality and revealing underlying components that elucidate variance in the data. By utilizing the ADFL test, the study aims to identify potential relationships and trends between cashless payment systems and financial inclusion indicators.

Control variables are incorporated in the research design to account for potential confounding factors. These control variables include POS transaction volume, ATM usage, access to banking services, technological infrastructure, and other pertinent variables proposed by prior research or theoretical frameworks. The inclusion of these control variables enhances the robustness of the analysis and ensures a comprehensive examination of the impact of cashless payment systems on financial inclusion. The study's findings are anticipated to provide empirical evidence that informs policymakers, financial institutions, and stakeholders about the benefits and challenges associated with cashless payment systems and their implications for financial inclusion in Nigeria. The research aims to contribute to the existing literature on financial inclusion by providing valuable insights and guidance for future policy endeavours aimed at fostering inclusive and sustainable financial systems in the country.

DATA SOURCE

The research work obtained a time series data covering the period (2009-2021) and the source of the data is outlined below:

Table 1: Variable description and data sources

Variable/indicator	Description	Sources
Financial inclusion	Financial inclusion indicators: These indicators represent various aspects of financial inclusion, such as the number of commercial bank branches in rural areas, and the aggregate number of commercial bank branches	CBN-statistical bulletin
Cashless-payment systems	Cashless payment systems: this variable signifies the acceptance and utilization of electronic payment systems in Nigeria. The quantity of automated teller machines (ATMs), point of sale terminals, and online methodologies serve as indicators of cashless payment systems, specifically denoting transactions conducted without physical currency.	CBN-statistical bulletin
Geographical Coverage	The extent of financial services availability in different regions or areas (urban and rural), including variables like number of bank branches, ATMs, or other financial service providers in specific locations.	National Bureau of statistics
Account Ownership rate	The percentage of individuals or households with access to a formal financial account.	CBN-Statistical bulletin
Account usage rate	The frequency and regularity of account usage, including variables like the number of transactions, deposits, withdrawals, or balance levels	CBN statistical bulletin

Estimation Technique

The study employs the financial inclusion index using the Augmented dickey-fuller test(ADFL) as estimation technique. The ADFL is a statistical technique that reduces the dimensionality of a dataset while retaining the most relevant information. It identifies underlying components that explain the majority of the variance in the data.. In thus research work, the ADFL is used to identify the key factors that drive financial inclusion and construct index based on these components.

Model Specification

FI = β0 + β1 * ATMVLt + β2 * POSVLt + β3 * WBTVLt + β4 *EOT+ β5* ACBS+ β6 * + ε

In this model, the Financial Inclusion variable is regressed on multiple independent variables, representing the cashless payment systems and financial inclusion indicators.

Financial Inclusion: This is the dependent variable representing the level of financial inclusion in the study area. It is the variable we are trying to explain or predict

Financial inclusion was proxy using the following variables:

ATMVLt: Volume of Automated Teller Machines in the banks during the time period under investigation. It measures the availability and accessibility of ATMs, which is a component of cashless payment systems.

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POSVLt: Volume of point-of-sale systems in the banks during the time period. It captures the usage and acceptance of card-based payment systems at merchant locations.

WBTVLt: Volume of Web-Based Transactions in the banking industry during the time period. It represents the extent of online and digital banking services offered to customers.

ACBS: access to banking services

EOT: Ease of transactions. This refers to the level of convenience, simplicity and efficiency experienced by individuals when conducting various types of financial transactions.

The coefficients β0 to β5 represent the parameters of estimation, indicating the impact of each independent variable on financial inclusion.

The ε term represents the error or residual term, accounting for unexplained variation in the model.

RESULTS AND DISCUSSIONS

Descriptive Analysis

Descriptive analysis involves statistical techniques employed to understand the fundamental characteristics of the variables under investigation across different time periods. This encompasses parameters such as the mean, median, maximum, minimum, standard deviation, skewness, kurtosis, Jarque-Bera test, probability, sum, sum of squared deviations, and the overall count of observations for each of the variables considered in this research.

Table 2: Descriptive Statistics

	FI	ATMVL	POSVL	WBTVL	EOT	ACBS
Mean	4.621070	9.171915	4.162527	3.773825	16.98182	17.24863
Median	0.845715	8.782496	0.845715	2.951289	18.10000	12.21800
Maximum	26.88773	17.95485	23.78752	9.037239	59.00000	72.83600
Minimum	0.112967	1.490407	0.112967	0.449170	3.400000	3.635461
Std. Dev.	7.593171	4.045371	6.874389	2.055649	11.82800	16.45949
Skewness	1.719068	0.308835	1.713319	0.771556	1.391385	2.176940
Kurtosis	4.568944	2.965885	4.465223	2.882927	5.983972	6.728843
Jarque-Bera	19.63826	0.526186	19.09700	3.292991	22.89086	45.18324
Probability	0.000054	0.768671	0.000071	0.192724	0.000011	0.000000
Sum	152.4953	302.6732	137.3634	124.5362	560.4000	569.2047
Sum Sq. Dev.	1845.000	523.6808	1512.231	135.2222	4476.849	8669.274
Observations	33	33	33	33	33	33

Source: Authors computation using EViews 10 2023

In the above table 2, it is evident that the mean values of financial inclusion (FI), volume of automated teller machine (ATMVL), point of sale volume (POSVL), volume of web-based transaction in the banking industry (WBTVL), ease to digital service volume (EOT), and access to banking service (ACBS) are 4.62, 9.17, 4.16, 3.77, 16.98, and 17.24, respectively.

Furthermore, the median values of financial inclusion (FI) as the dependent variable, volume of automated teller machine (ATMVL), point of sale volume (POSVL), volume of web-based transaction in the banking industry (WBTVL), ease to digital service volume (EOT), and access to banking service (ACBS) are 0.84, 8.78, 0.84, 2.95, 18.10, and 12.21.

The standard deviation indicates that access to banking service (ACBS) is the most volatile variable (16.45), signifying that the observations from ACBS deviate significantly from the sample mean. Conversely, the volume of automated teller machine (ATMVL) is the least volatile variable (2.05), suggesting that the observations from ATMVL are closer to the sample mean.

The skewness statistics demonstrate that all variables are positively skewed.

Moreover, the Jarque-Bera statistic accepts the null hypothesis of normal distribution for four (4) variables at a 5% level of significance, namely financial inclusion (FI), point of sale volume (POSVL), and ease of digital service volume (EOT).

Correlation Analysis

Correlation analysis is employed to gauge the extent of association between two or more variables. Therefore, the present study investigates the degree of association between the dependent variable (FI) and independent variables (ATMVL, POSVL, WBTVL, EOT, ACBS) using a correlation matrix, as illustrated in Table 3 below.

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Table 3: Correlation Matrix

	FI	ATMVL	POSVL	WBTVL	EOT	ACBS
FI	1					
ATMVL	-0.258567	1				
POSVL	0.698479	-0.266110	1			
WBTVL	0.599261	-0.140617	0.589822	1		
EOT	0.297326	0.019681	0.290031	0.092828	1	
ACBS	-0.238857	-0.215030	-0.236570	-0.191821	-0.429226	1

Source: Authors computation using EViews 10 2023

The correlation result in table 3 above indicates that the independent variable ATMVL have negative correlation with the dependent variable FI of about 25%, POSVL have positive correlation with FI of about 69%, WBTVL have a positive correlation of about 59% with FI, EOT have a positive correlation with FI of about 29% and ACBS have negative correlation with FI of about 23%. With the above result, multicollinearity problem may be present, however, they will be tested and adjusted to fit my analysis below.

Unit Root Test

Given the outcomes derived from the descriptive statistical analysis of the variables, the researcher considered it necessary to evaluate the time series characteristics of the employed variables. To scrutinize these attributes, the Augmented Dickey-Fuller (ADF) test was executed, and the outcomes are outlined in the following Table 4.

Table 4: Unit root test

	Augmented Dickey Fuller Test					
	AT LEVEL			AT FIRST DIFFERENCE		
Variable	t-statistics	Prob.Value	Status	t-statistics	Prob.Value	Status
FI			I (0)	-5.951197	0.0001	I (1)
ATMVL			I (0)	-5.473485	0.0004	I (1)
POSVL	-3.793869	0.0276				
WBTVL	-5.855176	0.0001				
EOT			I (0)	-9.227371	0.0000	I (1)
ACBS			I (0)	-3.764123	0.0302	I (1)

Source: Authors computation using EViews 10 2023.

The outcomes of the unit root test indicated that certain variables were stationary at the level, denoted as I (0), such as POSVL and WBTVL, while others, namely FI, ATMVL, EOT, and ACBS, were not stationary at the level. However, these non-stationary variables became stationary after undergoing first differencing. Consequently, there is a requirement to ascertain the long-run relationship among the variables employing the ARDL bound test.

Auto Regressive Distributed Lag (ARDL) Bounds Test

Using the ARDL bound test, the results presented in Table 6 indicate that, when considering strong exogeneity across all variables, the hypothesis of a long-term relationship's presence is validated at a significance level of 5%. This validation is attributed to the F-Statistics value of 14.44 for the bound test model, which exceeds both the upper bound (3.38) and the lower bound (2.39). Consequently, these outcomes underscore the confirmation of a sustained relationship between the dependent variable (FI) and the independent variables (ATMVL, POSVL, WBTVL, EOT, ACBS).

Table 5: ARDL Bound Test

Test Statistics	Value	K
F-Statistics	14.44690	5
Critical Value Bounds		
Significance	I (0) Bound	I (1) Bound

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10%	2.08	3
5%	2.39	3.38
2.5%	2.7	3.75

Source: Authors computation using EViews 10 2023

The Auto Regressive Distributed Lag (ARDL) bounds analysis is employed as the estimation technique to examine the interactions between short-term dynamics and enduring relationships among the variables being studied. The ARDL model, originally formulated by Pesaran & Shin (2001), is custom-designed to explore both the immediate and prolonged coefficients of the variables in question. The ensuing ARDL outcomes are presented below. As per the table, it's observed that in the short term, two (2) variables significantly influence the extent of financial inclusion (FI), namely, POSVL and WBTVL. From the table, it can be inferred that POSVL has a substantial and positive correlation with FI. A percentage change in POSVL yields a corresponding 1.17% alteration in FI. Experts posit that if the cost of POS services remains reasonable, more individuals will likely use banking services, thus fostering financial inclusion. The low cost of POS services and the increased number of POS service providers are attributed to the enhanced financial inclusion in Nigeria. Similarly, in the short run, WBTVL displays a positive correlation with FI. A percentage change in WBTVL results in a noteworthy 14% change in FI. This aligns with theoretical foundations, indicating that an escalation in web-based transactions in Nigeria contributes to an upsurge in financial inclusion. In the long term, three (3) variables significantly impact FI, namely, POSVL, WBTVL, and EOT. From the table, it's evident that POSVL has a significant and favorable impact on FI. A percentage change in POSVL results in a 1.08% shift in FI. Likewise, WBTVL exerts a positive and significant influence on FI, with a percentage change in WBTVL leading to a 5% change in FI. Additionally, EOT also contributes positively and significantly to FI. A percentage change in EOT gives rise to a 4% change in FI. Other variables not elaborated on in detail do not exert a significant impact on financial inclusion. The results indicate that the F-statistic stands at 2375.471, accompanied by a corresponding Prob(F-statistic) of 0.000000, implying that the collective effect of the independent variables on the dependent variable is statistically meaningful. Furthermore, the multiple coefficients of determination, R^2, total 0.969579. This suggests that a substantial 96% of the fluctuations in the dependent variable (FI) are explained by the independent variables (ATMVL, POSVL, WBTVL, EOT, ACBS), leaving the remaining 4% to be attributed to other unaccounted factors that are not part of the model. Additionally, the findings indicate a Durbin Watson (DW) statistic of 2.217456, which signifies the absence of serial correlation within the model. Moreover, the Error Correction Term (ECT) (-1) indicates that around 24% of the short-term imbalances will be rectified to achieve long-term equilibrium, implying that approximately 2.4 years are needed to attain long-term equilibrium.

Table 6: ARDL Regression results

Short run Estimates			Long run Estimates		
Variables	Coefficient	Prob.	Variables	Coefficient	Prob.
D(ATMVL)	0.016905	0.7914	ATMVL	-0.027924	0.1437
D(POSVL)	1.178222	0.0001	POSVL	1.081869	0.0021
D(WBTVL)	0.146017	0.0176	WBTVL	0.051816	0.0104
D(EOT)	0.003160	0.9764	EOT	0.040741	0.0506
D(ACBS)	-0.160611	0.1931	ACBS	0.001066	0.5141
C	0.059616	0.8833	C	0.026868	0.8846
ECT (-1)	-0.249506	0.0000			
R-squared	0.969579				
Adjusted R-squared	0.959158				
F-statistics	2375.471				
Prob (F-statistics)	0.000000				
Mean dependent var	4.886010				
S.D. dependent var	7.765286				
Durbin-Watson stat	2.217456				

Source: Authors' Computation using E-views 10, 2023.

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Post Estimation Analysis

Table 7: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.286013	Prob. F (1,21)	0.5984
Obs*R-squared	0.429974	Prob. Chi-Square (1)	0.5120

Since the probability value exceeds the 5% threshold for significance, it becomes apparent that the null hypothesis related to serial correlation is refuted. Consequently, this outcome implies the lack of serial correlation, confirming the model's adherence to a standard distribution.

Table 8: Heteroskedasticity Test:

F-statistic	2.161647	Prob. F(15,15)	0.0734
Obs*R-squared	21.19498	Prob. Chi-Square(15)	0.1307
Scaled explained SS	5.163728	Prob. Chi-Square(15)	0.9906

Source: Authors computation using EViews 10 2023

Given that the probability value surpasses the 5% level of significance, it becomes clear that the null hypothesis regarding heteroskedasticity is dismissed. As a result, this discovery signifies the lack of heteroskedasticity, confirming the model's adherence to a normal distribution.
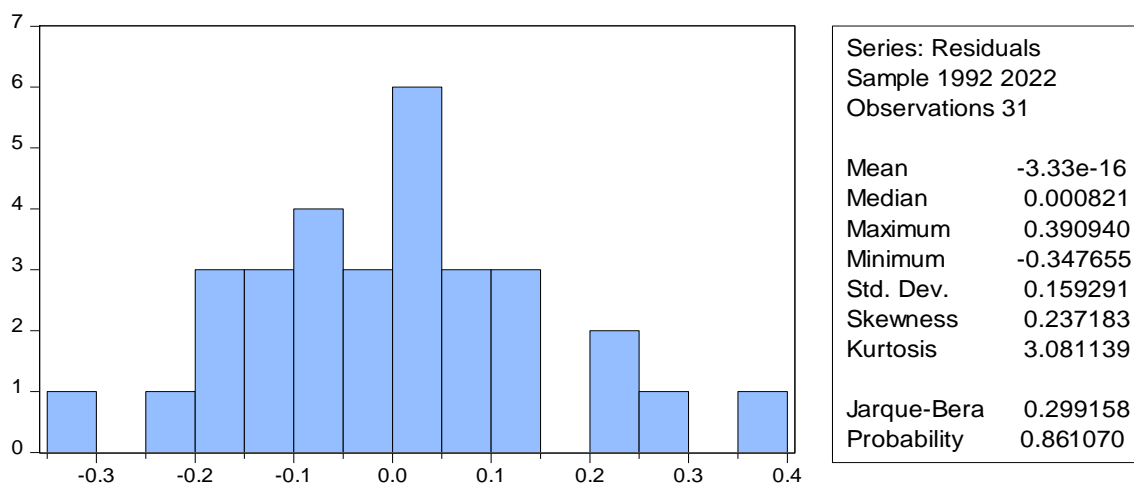

Series: Residuals	
Sample 1992 2022	
Observations 31	
Mean	-3.33e-16
Median	0.000821
Maximum	0.390940
Minimum	-0.347655
Std. Dev.	0.159291
Skewness	0.237183
Kurtosis	3.081139
Jarque-Bera	0.299158
Probability	0.861070

Figure 1: Histogram-Normality Test

The observation from the below figure 1 depicted below reveals that the probability value of Jarque-Bera exceeds the 5% threshold, thus indicating that the null hypothesis of normal distribution for residuals cannot be rejected. As a result, the model is considered to be normally distributed.

CONSLUSIONS AND RECOMMENDATIONS

Over a period of 33 years, a thorough investigation was undertaken to examine the impact of cashless payment systems on financial inclusion in Nigeria. The study made use of extensive and reliable data derived from esteemed sources, including the statistical bulletin of the Central Bank of Nigeria (CBN), the national bureau of statistics, and the world development indicator (WDI).

The analysis encompassed a diverse range of statistical tests. The augmented Dickey-Fuller test was employed with the aim of evaluating the behaviour of unit roots. Meanwhile, the bound test was skilfully utilized to establish the presence of a long-run relationship between the variables under scrutiny. Additionally, the ARDL (Autoregressive Distributed Lag) test was proficiently adopted to explore the intricate relationships among the variables under examination. To further enhance the robustness of the study, post-estimation tests were meticulously conducted, which included the serial-correlation test, the heteroskedastic test, and the histogram normality test. Upon perusing the descriptive statistics, it was revealed that access to banking services (ACBS) exhibited the highest volatility, characterized by a noteworthy standard deviation of 16.45, thus indicating considerable deviations from the sample mean. Conversely, the volume of automated teller machines (ATMVL) displayed the least volatility, boasting a standard deviation of 2.05, thereby suggesting observations in close proximity to the sample mean. Moreover, all variables demonstrated positive skewness, further elucidating their distribution characteristics. With the aid of the Jarque-Bera statistic, the null hypothesis

of normal distribution was convincingly supported for four variables, namely financial inclusion (FI), point of sale volume (POSVL), ease of digital service volume (EOT), and the unit root test. Remarkably, some variables attained statistical significance at the given level, whereas others achieved significance only after undergoing first differencing, thereby necessitating the adoption of the ARDL model. The bound test results unequivocally confirmed the existence of a long-run relationship among the variables, while the ARDL model astutely identified two variables (POSVL and WBTVL) that substantially influenced industrial growth (FI) in the short run, alongside three variables (POSVL, WBTVL, and EOT) that exerted a substantial impact in the long run. Notably, the results emanating from the study pointed towards an exceedingly significant F-statistic of 2375.471, which compellingly suggested that the combined influence of the exogenous variables on the dependent variable was statistically significant. The multiple coefficients of determination (R2) exhibited a substantial value of 0.969579, indicating that an impressive 96% of the variations in the dependent variable (FI) could be accounted for by the exogenous variables (ATMVL, POSVL, WBTVL, EOT, ACBS), leaving a mere 4% attributed to other unaccounted factors. Furthermore, the Durbin Watson (DW) statistic of 2.217456 lucidly signified the conspicuous absence of serial correlation in the model.

Lastly, the error correction term (ECT) of (-1) offered invaluable insights, intimating that approximately 24% of short-run disequilibrium would inevitably be adjusted to long-run equilibrium, necessitating a duration of approximately 2.4 years for this salient adjustment to fully unfold.

RECOMMENDATIONS

The study's results clearly indicate that the variables POSVL and WBTVL have a positive and substantial impact on financial inclusion (FI). Specialists assert that the decreased expenses associated with point of sale (POS) services encourage a greater number of individuals to avail banking services, thus fostering financial inclusion. The cost-effectiveness of POS services, combined with the proliferation of POS service providers, contributes to the advancement of financial inclusion in Nigeria. Moreover, in line with theoretical foundations, the increasing prevalence of web-based transactions in Nigeria is expected to further enhance financial inclusion over the long term, as evidenced by the positive and noteworthy influence of EOT on FI.

Considering the results obtained, the following recommendations are proposed:

- Data Availability: It is crucial for every financial institution to uphold precise and up-to-date records of their account holders and be prepared to share this information whenever required. To achieve seamless identification reconciliation, the Central Bank of Nigeria (CBN) should work in conjunction with other pertinent government or private agencies responsible for collecting identification data.

- Investment in Infrastructure: In order to effectively facilitate the shift to e-banking and cashless payment systems, it is essential for both the CBN and other banks to show a willingness to make substantial investments in e-banking infrastructure. This encompasses allocating funds for technological upgrades, implementing training programs, conducting marketing campaigns, enhancing security measures, and ensuring regular maintenance. The successful implementation of the policy requires a collaborative endeavor among all stakeholders involved.

- Security Measures: The CBN should work in conjunction with the National Assembly to enact appropriate security measures to safeguard electronic transactions and protect consumers from potential risks associated with cashless payment systems. Ensuring the security and integrity of digital transactions will foster confidence among users and promote wider adoption of cashless payment methods.

- To guarantee the policy's efficacy, it is imperative to enact suitable laws. The responsibility for enforcing these laws should be assigned to the Central Bank of Nigeria (CBN) and other pertinent government executive bodies, such as the EFCC, ICPC, and Nigeria Police. These agencies must display a strong commitment to training their personnel, while the judiciary should demonstrate sound judgment and expertise in handling related issues.

- Effective communication is of utmost importance for the successful execution of the policy. The unavailability of a reliable network poses a significant challenge to ATM and internet usage in Nigeria, directly impacting the policy's execution. Users face difficulties in carrying out their transactions at their preferred time due to this issue. Addressing the communication obstacles is crucial to improve user experience and promote seamless adoption of the policy.
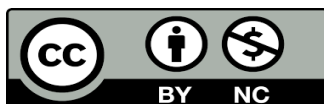
REFERENCES

1) Abubakar, F.M., & H.B. Ahmad (2013). The Moderating Effect of Technology Awareness on the Relationship between UTAUT Construct and Behavioral Intention to Use Technology: A Conceptual Paper. *Australian Journal of Business and Management Research,* 2 (3), 14-23.

2) Achor PN, Anuforo R. (2013) Shifting policy paradigm from cash based economy to cashless economy: The Nigeria experience. Afro Asian Journal of Social Sciences.; 4(4):1-16.

Cashless Payment System on Financial Inclusion in Nigeria

3) Adeola, O., & Evans, O. (2017).Financial Inclusion, Financial Development, and Economic Diversification in Nigeria, *The Journal of Developing Areas,* **51** (3), 1-15.

4) Ajayi SI, Ojo OO. (2006)   Money and banking: Analysis and policy in the Nigerian context. 2nd edn: Daily Graphics Nigeria Ltd: University of Ibadan, 2006.

5) Ajayi, L. B. (2014).Effect of cashless monetary policy on Nigerian banking industry: Issues,prospects and challenges. *International Journal of Finance and Business Management Research*, *2*, 29-41.

6) Akhalumeh PB, Ohiokha F. (2012)   Nigeria's Cashless Economy: the Imperatives. International Journal of Management and Business Studies; 2(2):31-36.

7) Al-Smadi, M. O. (2018).   The Role of Financial Inclusion in Financial Stability: Lesson from Jordan. *Banks and Bank Systems*, **13** (4), 31-39.

8) Baddeley, M. (2004),*"Using E-Cash in the New Economy: An Economic Analysis of Micropayment Systems"*, UK Cambridge, Journal of Electronic Commerce Research, Volume 5, Number 4.

9) Bayero, M. A. (2015).Effects of Cashless Economy Policy on Financial Inclusion in Nigeria: An Exploratory Study. *Procedia - Social and Behavioral Sciences*, **172,** 49-56.

10) Beck, T., Demirguc-Kunt, A., Soledad, M., & Peria, M. (2007),   Reaching out: Access to and Use of Banking Services Across Countries, Journal of Financial Economics, 85(1), 234-266.

11) Camara, N., & Tuesta, D. (2014). Measuring Financial Inclusion:A Multidimensional Index. BBVA Research Working Paper No. 14/26, Madrid, Spain. DOI: 10.2139/ssrn.2634616

12) Central Bank of Nigeria (2012)."Towards a Cashless Nigeria: Tools and Strategies." CBN Presentation at the 24thNational Conference of Nigeria Computer Society Held at Uyo, Nigeria. From Wednesday 25th-Friday 27th July. Retrieved from http://www.NCS.org/presentations/

13) Central Bank of Nigeria's Annual Report for the Year 2012, Abuja, CBN, pp. 6-7 Central Bank of Nigeria Cash-less Nigeria. https://www.cenbank.org/cashless/

14) Daniel, D.G., Swartz, R.W. and Fermar, A.L. (2004),*"Economics of a Cashless Society: An Analysis of Costs and Benefits of Payment Instruments"* AEI-Brookings Joint Center.

15) Daniel, D. G., R. W. Swartz, and A. L. Fermar, (2004):   Economics of a Cashless Society: An Analysis of Costs and Benefits of Payment Instruments‖, AEI-Brookings Joint Center

16) Demirguc-Kunt, A., & Klapper, L. (2013).*Measuring Financial Inclusion: The Global Findex Database.* Washington, DC: World Bank

17) Demirgüç-Kunt, A., Thorsten, B., & Honohan, P. (2008).Finance for All? Policies and Pitfalls in Expanding Access.

18) World Bank Policy Research Report. Washington: World Bank.

19) Ehrbeck, T., Pickens, M., & Tarazi, M. (2012).Financially Inclusive Ecosystems: The roles of government today. CGAP, February. 1-11.

20) EFInA (2013).What does the CBN's Cash-less policy mean for financial inclusion in Nigeria? Available via www.EFInA.or.ng

21) Ezeamama, M.C., Ndubuisi, N. J., Marire, M. I. & Mgbodile, C, C. (2014).The Impact of Central Bank of Nigeria Cashless Policy in Nigeria Economy. *IOSR Journal of Business and Management*, 16(12), 84 – 95.Fletcher, 2016

22) Gangopadhayay, S. (2009).How can Technology Facilitate Financial Inclusion in India?A discussion paper. Review of Market Integration1(2), 223-256.

23) Gheysari, H., Rasli, A., Roghanian, P., & Jebur, H. (2012). The Role of information technology infrastructure capability (ITIC) in management. International Journal of Fundamental Psychology and Social Sciences, 2(2), 36-40.

24) Jack, W., & Suri, T. (2012).   M-PESA extends its reach, Mobile Money for the Unbanked Blog Post

25) Jack, W., Suri, T., 2011. Mobile Money:The Economics of M-PESA NBER Working Paper 16721. National Bureau of Economic Research, Cambridge, MA

26) Jenkins, B. (2008).Developing mobile money ecosystem.: International Finance Corporation and Harvard Kennedy School. Washington, DC

27) Jukan, M. K., & Softic, A. (2016).Comparative Analysis of Financial Inclusion in Developing Regions Around the World. *Economic Review: Journal of Economics and Business*, 14 (2), 56-65.

28) Kempson, E., Atikinson, A., & Pilley, O. (2004).*Policy Level Response to Financial Exclusion in Developed Economies: Lessons for Developing Countries.* Report of Personal Finance Research Centre, University of Bristol.

29) Klynveld, Peat, Marwick & Goerdeler (2009).Banking Industry Customers Satisfaction Survey. KPMG Professional Services: Nigeria

Cashless Payment System on Financial Inclusion in Nigeria

30) Mamudu, Z. U., & Gayuvwi, G. O. (2019) Cashless Policy and its Impact on the Nigerian Economy. International Journal of Education and Research, 7(3), 111 – 132.

31) Nwankwo, O., & Eze, O. R. (2012). Electronic Payment in cashless economy of Nigeria: Problems and prospect. Journal of Management Research, 5(1), 138-151.

32) Olanipekun, W. D., Brimah, A. N., & Akanni, L. F. (2013). Integrating cashless economic policy in Nigeria: challenges and prospects. International Journal of Business and Behavioral Sciences, 3(5), 1-8.

33) Ogbeide, S. O., & Fapohunda, F.M. (2017). Empirical assessment of cash less policy and banks financial performance in Nigeria. International Journal of Current Research, 9(7), 55247-55252.

34) Omar, M. A., and Inaba, K. (2020). Does Financial Inclusion Reduce Poverty and Income Inequality in Developing Countries? A Panel Data Analysis. Journal of Economic Structures, 9 (37), 1-25.

35) Ovat, O. (2012). The Central Bank of Nigeria's cashless policy in Nigeria: Benefits and challenges. *Journal of Economics and Sustainable Development*, *3*(14).Reffat, 2003

36) Osazevbaru, H. O., & Yomere, G. O. (2015). Benefits and challenges of Nigeria's cash-less policy. Kuwait Chapter of Arabian Journal of Business and Management Review, 33(2584), 1-10.

37) Sarma, M. (2008). *Index of Financial Inclusion*. ICRIER Working Paper 215, Retrieved on May 20, 2019, from http://icrier.org/pdf/Working_Paper_215.pdf

38) Sarma, M. (2012).Index of Financial Inclusion–A measure of financial sector inclusiveness: Hochschule fuer Technik und Wirtschaft, Berlin.

39) Shankar, S. (2013).Financial Inclusion in India: Do Microfinance Institutions Address Access Barriers. ACRN Journal of Entrepreneurship Perspectives, 2(1), 60-74.

40) Siyanbola, T.T. (2013).The Effect of Cashless Banking on Nigerian Economy. *Canadian Journal of Accounting and Finance*, 1(2), 9-19.

41) Visco, I. (2007). Financial deepening and the monetary policy transmission mechanism. Exchange, 400, 500-000. World Bank (2012). World Development Indicators. Washington, DC: World Bank

42) World Bank. (2012).Financial Inclusion Strategies Reference Framework. Washington DC: World Bank

43) World Bank. (2014).Global Financial Development Report 2014: Financial Inclusion. Washington, DC: World Bank. doi:10.1596/978-0-8213-9985-9

44) World Bank Report (Spring 2019). *Financial Inclusion, Europe and Central Asia Economic Update.* Washington DC: International Bank for Reconstruction and Development.

45) Yaqub, et al., 2013Yaqub, J. O., Bello, H. T., Adenuga, I. A., & Ogundeji, M. O. (2013). The cashless policy in Nigeria: prospects and challenges. *International Journal of Humanities and Social Science*, *3*(3), 200-212.