Digital Transactions and Broad Money Supply: Evidence from Nigeria's Cashless Policy

Basheerah Adewumi Qazeem[1,*], Paul Oluwaseun Mathias[2]

[1,2]Department of Banking and Finance, Olabisi Onabanjo University, Ago-Iwoye, Ogun State, Nigeria.
qazeembasheerah@gmail.com[1], mathiasoluseun@gmail.com[2]

*Corresponding author

Abstract: This study investigates the effect of Nigeria's cashless policy on money circulation, with a focus on Point of Sale (POS) systems and web-based payments. The primary objective was to determine how these cashless transactions affect Broad Money Supply in Nigeria. Utilising an ex post facto research design and a time-series approach from 2019 to 2023, the study analysed secondary data sourced from publications, including the National Bureau of Statistics Handbook and Statistical Bulletin. The fully-modified Ordinary Least Squares (FMOLS) method was employed to assess the relationships between POS transactions, web payments, and money circulation. Findings indicate a significant positive relationship between POS transactions and Broad Money Supply, with a coefficient of 0.00006, suggesting that a percentage increase in POS usage is associated with a proportional increase in the circulation of money. Similarly, web payments have a positive impact on Broad Money Supply, with a coefficient of 0.00008, indicating that increased web payment transactions also contribute to higher money circulation. These results underscore the effectiveness of cashless transactions in enhancing money circulation and supporting broader financial inclusion in Nigeria.

1. Introduction

The speed of global growth has been so fast that it affects every part of human activity. The business world, particularly the banking sector, is not exempt from this trend. Since the concept of interdependence gained popularity, firms have adopted various business models, starting with barter. The barter system was the first step toward using money for trade and commerce. Money and coins solved the problems of double coincidence of wants and indivisibility, which were their biggest problems. Additionally, money has solved most of the problems that barter commerce used to have, but it has its own set of problems as a means of trade. The Nigerian Bankers Committee conducted a study to determine the cost drivers and preferred solutions for cash policies and cash-based transactions. As a result, they introduced a "cash handling charge" on daily cash withdrawals for individuals exceeding N500,000 and for corporate bodies exceeding N3,000,000. The goal of this banking policy was to reduce (not eliminate) the amount of physical cash (coins and notes) in the economy and encourage people to adopt electronic methods for everyday activities, such as paying for goods and services, transferring money, and so on. A cashless economy does not

mean the absence of cash; it describes an economic system in which transactions occur without the physical transfer of cash from one person to another.

As stated by Aisha and Abbas [1], Chukwu and Molokwu [2] define a cashless economy as one in which people buy goods with credit cards, debit cards, charge cards, and direct transfers. One advantage of a cashless society is that it minimises money laundering and related cash crimes. This is similar to the introduction and implementation of treasury single accounts (TSA) in 2015, in which funds previously managed by DMBs for various ministries, departments, and agencies (MDAs) were transferred to a single remita system overseen by the Central Bank of Nigeria. The TSA has helped prevent financial crimes that have been occurring in the public system. Electronic banking is the foundation of the cashless policy. With E-Payments, the cashless economy will finally become a reality. Some ways to make E-Payments include online or internet banking, point-of-sale (POS) terminals, mobile banking, and more. All of these channels are effective ways to support a cashless state, and they are all being utilised.

Before the CBN introduced a cashless policy in Nigeria in 2011, banks operated according to their own priorities. There are several challenges with an economy that relies on cash. There are concerns, including money laundering, unsafe currency during transfer, late bank payments, and a weak economy in the country. A study by Henry and Akwam [3], as referenced in Jisike and Amalachukwu [4], examined issues related to Nigeria's cash-based economy. It found that 68.2% of respondents reported long bank lines, 28.9% reported rude tellers (cashiers), and 2.89% reported that bank locations were too far from their homes or workplaces. However, a cashless economy that leverages information technology more effectively can significantly reduce the time spent in banks and address other problems identified by many researchers in the past. The most important role that financial institutions play in every economy is acting as intermediaries. Banks and other financial institutions play a significant role in an economy, as they need to collect savings from individuals who have extra money and channel them to the most productive parts of the economy. They also need to assist the central bank in implementing its policies. The primary role of deposit money banks is to ensure that the payment system operates efficiently and remains stable. Jonathan [5] asserts that the payment system is an essential element of a country's overall economic progress, akin to communications, electricity, and transportation infrastructure. Before the 21st century, when e-payment systems became popular worldwide, people in Nigeria had limited options for making payments. They could only deposit or withdraw cash, or make transactions via a check or cash book, or over-the-counter (OTC) transactions, using MoneyGram and other methods.

In 2012, financial institutions agreed to the Central Bank of Nigeria's (CBN) cashless policy. They did this as an intermediary to help the CBN carry out its policies. Musa and Abubakar [6] say that the CBN's) The cashless economic policy effort is a step toward expanding the financial world, but its long-term success depends on how well it is accepted and followed by end users. People who use cashless services, such as online banking, ATM banking, telephone banking, or mobile banking, can access their bank accounts and learn more about the bank's services on computers, mobile phones, or other smart devices. The goal of Nigeria's new cashless policy is to promote electronic transactions, reduce cash in circulation, and modernise Nigeria's payment system, in line with the country's Vision 2020 goal of becoming one of the world's top 20 economies by 2020. Therefore, the prices of banking services (including lending) should decline, monetary policy should be more effective at controlling inflation and boosting economic growth, and there should be less physical currency to mitigate the negative effects of its extensive use. In some countries, you can buy a snack from a vending machine just by calling a phone number from your phone account. Muyiwa et al. [7] and Ngwengeh et al. [8] note that payments in Nigeria are often made in cash, as is the case in many low-income countries. Cash plays a crucial role in the economy. Banks that follow this approach have made customers and businesses aware of the benefits of a bank that meets their individual needs (personalised banking) and helps them reach their business goals. With a cashless banking strategy, consumers can check their balance online, transfer money between accounts, see if a check has cleared, and even download their transaction history to their own computers. Customers want their chosen bank to provide them with sufficient attention and personalised care.

For a long time, the Nigerian banking system used an outdated method that caused many problems. This traditional banking method required extensive paperwork, and consumers had to be present in person for transactions. As a result, it caused problems such as long lines, overcrowding, wasted time, and other annoyances. The establishment of a cashless policy and an E-banking system has, of course, led to significant advances in how banks serve their customers. There are fewer lines at the banks, payments are confirmed right away, and cash payments have decreased significantly. There are still some things that are getting in the way of the full success of the cashless policy, even though the banking industry has seen many benefits from it (like shorter customer lines, easier money transfers, and ATM and POS withdrawals and deposits). Some of these problems are illiteracy, not having the right infrastructure, not having fast internet access and safety (security) from the network providers, and not having enough electricity. In its place, this study aims to examine the impact of the cashless policy on the circulation of money in Nigeria.

This study aims to examine the impact of a cashless policy on the circulation and provision of money in Nigeria. The study specifically examines the relationship between point-of-sale payments and the overall money supply, as well as the impact of

online payments on the economy's monetary performance. By doing so, it seeks to establish whether these new payment instruments are effective tools for enhancing the efficiency and stability of the financial system. The question also aims to assess the policy's overall contribution to enhanced financial intermediation, increased transaction efficiency, and reduced reliance on cash within the system. This is done intentionally, given that the time frame 2019-2023 lends the book topicality by echoing the Central Bank of Nigeria's accelerated push towards financial digitalisation.

The justification for this study lies in its ability to provide policymakers, regulators, and financial institutions with valuable information. In the quest for financial modernisation in Nigeria, understanding the true impact of cashless policies on monetary aggregates is critical for effective policy evaluation and improvement. For commercial banks, the findings will shed light on the relationship between electronic payment systems and liquidity management. In contrast, regulators will have data-driven facts to inform policies that strike a balance between innovation and financial stability. Moreover, the study contributes to the scholarly literature on monetary policy transmission and electronic finance in developing economies. It can serve as a reference point for future researchers in this field. Besides its theoretical contribution, the research also has practical significance, as it educates bank managers, FinTech sector participants, and policymakers on the short- and long-term effects of adopting a cashless system on Nigeria's economy. Generally, the study bridges a critical knowledge gap by evaluating the impact of Nigeria's cashless policy on money circulation, providing both theoretical and empirical findings that should inform decision-making. A study of digital payment channels and money aggregates not only adds value to academia but also to the nation's ongoing quest for sustainable development and financial inclusion.

2. Literature Review and Theoretical Framework

2.1. Conceptual Review

2.1.1. Cashless Policy

A cashless economy is an internet-based economic model in which people don't use physical currency to pay for goods and services; instead, they use ICT-enabled devices. In 2003, the CBN technical committee on e-banking published a document stating that a cashless economy is one in which banking is conducted through automated processes and electronic devices such as personal computers, mobile phones, card payments, and other electronic channels. It also notes that banks utilise electronic banking for various purposes, including checking account balances and sending information. Some banks utilise it to facilitate the transfer of money and execute other financial transactions. A cashless economy doesn't mean there is no money at all; it just means that people buy and pay for things with electronic media. People can also think of it as a place where they can spend money without having to carry it around. Okonkwo and Ekwueme [9] state that in a cashless economy, people use credit cards, debit cards, charge cards, and direct transfers to purchase goods and services. In a paperless economy, people pay for products with bank transfers or electronic cards. According to Olawale et al. [10], a cashless system enables customers to load funds into a digital wallet or card that can be used at any point-of-sale terminal on the premises, including vending machines.

It is assumed that there are no transaction frictions that can be eased by employing money balances in a cashless economy. This is why people preserve money balances even when they earn interest on them. A cashless economy doesn't mean there is no money at all; it just means that individuals buy and pay for products with electronic media. Omotunde et al. [11] characterised a cashless economy as one in which transaction friction is reduced and money balances are utilised. This suggests that consumers should retain money in their accounts, even if they don't earn any interest on it. In a world without cash, the quantity of money you have in your wallet doesn't matter much. You can pay for your items by bank transfer or with a bunch of credit cards. People have noticed that many developed countries prefer electronic payment methods, such as credit and debit cards, over cash. Electronic banking, electronic money, electronic brokerage, and electronic exchanges facilitate certain parts of the cashless economy. According to Wurangtep [12] and Aisha and Abbas [1], all of these things take place in a cashless economy.

2.2. Cashless Transaction Channels

The paper can make cashless payments through any of the following channels:

2.2.1. Electronic Cards (E-Cards)

These cards contain integrated circuits (ICs) that can process data and are used for making payments. Debit and credit cards could be electronic cards. The primary difference between debit and credit cards is that debit cards deduct funds directly from the customer's account to cover purchases. However, using a credit card to pay for products or services involves borrowing. Nigerians use MasterCard and Visa cards the most. As the market share of checks declines each year, an increasing number of people worldwide are using electronic cards and other e-channels to make contactless, real-time payments. The Nigeria Inter-Bank Settlement System (NIBSS) states that the total number of cheques returned in 2018 was 22% lower than in 2017. It also

stated that the Asia-Pacific region (APAC), including China, South Korea, and Australia, experienced a 20% decline in check usage.

In comparison, India saw a 10.1% rise, mostly due to its government's demonetization policy. In the US, checks are still backed by the government, accounting for an impressive 73.5% of the world's volume. The same source also said that the number of Nigerian cheque transactions has been declining since peaking at 15.3 million in 2014, to 9 million in 2018. The source further states that this represents a 10% compound annual growth rate (CAGR) over five years, and a 17% growth rate compared to 2017. Even as the number of cheque transactions is declining, it is still fair to say they are useful, especially for big purchases, bill payments, and payroll transactions. However, it's worth noting that market forces have contributed to this drop, as more electronic cards and other e-channels become available and consumers demand faster payments, which can only occur in a cashless environment.

2.2.2. Automated Teller Machine (ATM)

An ATM is an electronic banking outlet that allows consumers to conduct simple transactions without the assistance of a branch agent or teller. You can use an electronic card to use an ATM. Anyone with a credit or debit card can access it. An ATM can do a lot, such as letting you withdraw money, check your account balance, transfer money, and add airtime to your mobile phone. Each card's account owner has a Personal Identification Number (PIN) that lets them access the account. The first ATM that people could use was at the Chemical Bank in Rockville Centre, New York, in 1969. In 1989, Nigeria got its first ATMs. National Cash Registers (NCR) installed it for the Society General Bank of Nigeria. Many Nigerian banks have installed ATMs since the CBN announced its cashless-economy policy. A study by Chukwu and Molokwu [2] reveals that the availability of ATM networks is a significant factor contributing to unsuccessful transactions, where money is withdrawn from consumers' accounts but not dispensed. We also agree that one of the main reasons ATM transactions fail is that the network and data transmission methods are poorly designed. To address this issue, network designers must consistently engage with potential consumers to determine their specific technical requirements, including security, scalability, availability, network performance, management, adaptability, usability, and affordability.

2.2.3. Mobile Banking

"Motion banking" is another name for mobile banking. This type of e-banking enables individuals to conduct banking transactions on their mobile devices. Henry and Akwam [3], as reported in Jisike and Amalachukwu [4], state that mobile banking enables customers to conduct banking transactions at any time, provided they have a mobile phone. Customers can get information and other bank services through mobile banking. This type of e-channel doesn't require an internet connection or a data bundle, so you don't need to subscribe to any data plans. Instead, you use a special code that is unique to your bank. However, it is not as secure as online banking, and there are limits on the amount of money that can be sent and received each day. Mobile banking lets you check your account balance, pay bills, and send short messages (SMS). It allows people to make purchases from anywhere in the world and at any time that suits them.

2.2.4. Internet/ Online Banking

This is a type of E-Banking that uses the internet to share information and enable users to perform banking activities. This approach uses programmable electronic devices, such as computers and cell phones, that can connect to the Internet. It may also be considered an electronic payment system that allows bank and other financial institution customers to conduct various financial transactions through the institution's website or the mobile apps of a specific bank, which require mobile phones. During E-Banking, clients' requests are received and subsequently handled using the same platform. One advantage of online banking is that it reduces the cost of running a bank, unlike traditional banks. However, this could lead to job losses until the network failures are fully resolved. Wired or wireless networks generally power Internet banking, and you can make payments using your phone, at a point-of-sale (POS), or in other locations. It is safer than mobile banking, and there is no limit on the number of transactions that can be made per day. However, network availability is the primary factor that prevents transactions, often resulting in connectivity issues, delays, and failed transactions.

2.2.5. Point of Sale (POS)

This is a type of e-payment that allows you to check your balance, pay for goods and services, and transfer money electronically at a designated point of sale. Customers can pay for goods and services without using cash by inserting an electronic card into the gadget. Because it is a method for banks to settle transactions with each other, you need to be connected to the internet for the transaction to be processed. When a customer enters their card into a POS terminal, they enter their information. If they are paying for products or services, their account is debited at that time, and the money is sent to the service provider's account. According to NIBSS data, Lagos State remains the most popular location for POS transactions, accounting for 53% of all

transactions. Rivers State and the FCT have shown small increases in 2018 compared to 2017. In 2018, 15% of POS transactions failed due to network availability issues and other factors. This number is rather high under the rules; however, it's important to note that 63% of these transactions were caused, directly or indirectly, by customer mistakes. The same source states that these mistakes range from users selecting the wrong account option for debit to not having sufficient funds in the designated account type. The group stated that the "No sufficient Funds" error was responsible for 46% of the unsuccessful transactions. This logically means that the other 54% was probably due to the network being down.

2.3. Money in Circulation

Nigeria is predominantly a cash-based economy, with the vast majority of retail and commercial transactions conducted in physical currency. According to a recent survey by the Central Bank of Nigeria, cash transactions account for 99 per cent of customer activities in Nigerian banks today. Therefore, understanding the impact of Money in Circulation (MIC) on economic performance becomes crucial. MIC refers to the total amount of notes and coins held by economic agents outside the banking sector, representing the most liquid form of monetary aggregate. Alongside demand deposits, which are part of narrow money, fluctuations in MIC are closely monitored by monetary economists. The dynamics of MIC often reflect the degree of monetisation or demonetisation within an economy. Key indicators of MIC's importance include its share in the overall money supply and its ratio to GDP. Notes and coins are universally accepted as money and are integral to the money stock, while demand deposits also meet the criteria for being considered money. Challenges arise with other assets that may fulfil one function of money (such as a store of value) but not both (like time deposits), or those that serve as a means of trade rather than a means of storing value (such as credit cards).

2.4. Theoretical Literature

2.4.1. Technology Acceptance Theory

Businesses can boost economic growth by adopting the Technology Acceptance Model (TAM), as outlined in the Technology Acceptance Model (TAM), as outlined in the Technology Acceptance Theory. To help us understand how and why people use and adopt new forms of information technology, several theories have been put forth. One of these is the Technology Acceptance Model, also known as the Technology Acceptance Theory. In the field of information systems, it is now a leading theory for modelling the adoption and acceptance of new technologies. According to Jonathan [5], the TAM was first proposed by Fred Davis in his 1985 doctoral thesis at the MIT Sloan School of Management. To promote economic progress, TAM models how people adopt and employ technology. It is an information systems theory. According to the model, consumers have several considerations when deciding when and how to adopt new technology. Both PU and PEOU, or perceived usefulness and ease of use, have a role. Perceived system utility, ease of use, attitude toward the system, and behavioural intentions all play a role in how a technological system is actually used, according to TAM.

2.4.2. Methods for the Dissemination of New Ideas (DOI) or IDT

The Innovation Diffusion hypothesis is another name for the Diffusion of Innovations (DOI) hypothesis. The goal of the theory known as "diffusion of innovations" is to shed light on the process by which novel concepts and technologies permeate various societies. Gabriel proposed the idea of innovation diffusion, and its popularisation came in 1962 with the publication of Diffusion of Innovations (DOI) by Rogers, a professor of rural sociology. He defined diffusion as the gradual spread of an innovation throughout a society via predetermined pathways. According to Rogers, prospective adopters' actions aimed at reducing uncertainty govern the innovation diffusion process as new technologies are introduced. Musa and Abubakar [6] studied ATM use in Nigeria using the DOI theory. Attitude toward using ATM cards in Nigeria was positively correlated with restrictions such as complexity, relative advantage, observability, compatibility, and trialability, according to the results. Innovation features, user attributes, the distribution of adopters over time, diffusion networks, categories of innovativeness and adopters, and the individual adoption process comprise Innovation Diffusion Theory (IDT). Among the six parts of IDT, focusing on the innovation's traits is maybe the most well-liked. Following a review of the literature on the topic, Rogers identified five features of innovations—innovation traits, user traits, the distribution of adopters over time, diffusion networks, and innovativeness and adopter categories—that consistently impact the adoption of new technologies.

2.4.3. Classical Theory

The prevailing paradigm in monetary economics, known as the quantity theory of money, emerged within the broader framework of classical economics and addressed both micro- and macroeconomic issues. This theory, rooted in the work of economists such as Irving Fisher, was founded on the equation of exchange. According to Muyiwa et al. [7], Fisher argued that money primarily exerts its influence on economic aggregates through the prices it sets. The school of classical economics, including prominent figures like Jean Baptiste Say, Adam Smith, David Ricardo, and Pigu, collectively embraced the quantity

theory of money as a key determinant of the overall price level. Their shared belief was that the quantity of money influences aggregate demand, which in turn affects the price level, as articulated by Ngwengeh et al. [8]. Okonkwo and Ekwueme [9] emphasise that the quantity theory of money went beyond its implications for the economy or guidelines for Central Bank management of the money supply. It encompassed a distinctive perspective on the private market economy and the government's role within it.

The theory viewed the private market, including banks, as the most efficient mechanism for achieving desired social and economic outcomes. In this framework, the government's role was perceived as establishing a legal and secure environment to protect private property and creating a stable financial and monetary framework. Olawale et al. [10] recognise that the theory asserts the influence of money on the economy, which explains why Central banks adopt monetary policies to regulate the flow of money through banks, which are considered the primary industry for mobilising a significant volume of money within an economy. The economic depression of the 1930s brought about a profound shift in perspectives on the role of money and monetary policy in economic stabilisation. Omotunde et al. [11] indicate that this period radically altered views on the use of monetary policy to combat depressions, eroding the belief in a self-regulating market that naturally achieved desirable outcomes.

2.4.4. The Keynesian Theory

Keynesian economists view monetary policy primarily as an influencer of interest rates. According to the Keynesian transmission mechanism, an increase in the money supply reduces interest rates, encouraging the public to hold more money balances. This decline in interest rates could stimulate investment. The subsequent increase in investments contributes to higher income or output through the multiplier effect, ultimately driving economic activities. In the Keynesian framework, the impact of monetary policy on economic activity is indirect, as it is mediated by its influence on interest rates and subsequent investment. Therefore, the Keynesian transmission mechanism involves analysing the various sectors that collectively shape aggregate demand. Additionally, this mechanism intricately defines the portfolio adjustment process, assigning a central role to interest rates as the intermediary link between monetary policy and fiscal demand. In simple terms, the Keynesian monetary mechanism emphasises the role of money. Still, it involves an indirect linkage of money with aggregate demand via the interest rate, as symbolically shown below:

$$GNP\uparrow \rightarrow I \rightarrow r\downarrow \rightarrow MS\uparrow \rightarrow R\downarrow \rightarrow OMO\downarrow$$

Where, OMO = Open Market Operation

R = Commercial Bank Reserve

MS = Stock of Money

r = Interest Rate

I = Investment

GNP = Gross National Product

Adopting a more analytical perspective, if the economy is initially in a state of equilibrium and the Central Bank of Nigeria (CBN) conducts open market purchases of government securities, known as an Open Market Operation (OMO), this action will augment the reserves held by commercial banks (R), thereby increasing their reserve levels. In response, banks will seek to restore their preferred reserve ratio by either extending new loans or expanding their credit portfolio through alternative means. These newly created loans generate fresh demand deposits, thereby increasing the overall money supply (MS). As the money supply expands, the general interest rate (r) declines. Lower interest rates influence the performance of commercial banks and, consequently, stimulate investment due to the expected increase in business profits. The resulting induced investment expenditure triggers successive rounds of final demand spending, causing the Gross National Product (GNP) to rise by a multiple of the initial change in investment. Conversely, a decrease in the money supply leads to an increase in the general interest rate (R), subsequently enhancing the profitability of commercial banks.

2.4.5. The Monetarist Theory

Monetarist economists recognise that money is not merely a close substitute for a small class of financial assets; instead, it serves as a substitute for a broad spectrum of financial and real assets. In an equilibrium position, an increase in the money

supply raises the actual proportion of money relative to the desired proportion. Symbolically, the monetarist conception of the money transmission mechanism can be summarised as follows:

GNP↑→ Spending→MS↑→OMO ↑

The monetarist argument centres on the old quantity theory of money. If the velocity of money in circulation is constant, a variation in the money supply will directly affect prices, output, or income (GNP).

2.5. Empirical Review

Wurangtep [12] investigated the relationship between cash circulation in the economy and a country's innovation performance. They employed correlation analysis to examine this relationship. The findings revealed that the hypothesis suggesting a correlation between cash circulation and innovation performance in a country could not be rejected at a 5% significance level. Therefore, the researchers concluded that the hypothesis proposing a potential correlation between innovation and cash circulation in a country cannot be rejected based on their empirical analysis. Aisha and Abbas [1] investigated the impact of the second wave of COVID-19 in Canada on cash demand and the use of various payment methods. Using a survey, they found that use of all payment methods remained stable or increased in November compared with July. Specifically, the survey revealed that 59% of Canadians used cash, while higher proportions used debit (62%) and credit cards (71%). Consequently, the researchers concluded that the utilisation of payment methods remained consistent or grew during the November survey period compared to July. Chukwu and Molokwu [2] explored the impact of the Central Bank of Nigeria's Cashless Policy on the financial performance of Deposit Money Banks (DMBs) in Nigeria. Using descriptive statistics, multicollinearity tests, correlation analysis, and heteroskedasticity tests, they found that Automated Teller Machine Volume (ATMV) had a positive and significant effect on banks' return on assets (ROA) in Nigeria. However, Point of Sale Volume (POSV), Web Volume (WEBV), Number of Internet Payment Transactions (NIPV), and Number of Electronic Funds Transfers (NEFV) had positive but insignificant effects on the ROA of quoted banks in Nigeria.

Consequently, the study concluded that e-banking products, as a proxy for the cashless policy, positively influenced the financial performance of Deposit Money Banks in Nigeria. Henry and Akwam [3] conducted a review of the challenges facing the implementation of the cashless policy in Nigeria and proposed solutions to address them. Utilising a desktop review methodology, the study outlined the central bank's 2011 initiative to establish a cashless economy, aligning with the nation's Vision 2020 objective of becoming one of the top twenty developed economies by 2020. The study concluded that the volume of cashless transactions has increased significantly, highlighting the evident progress in this area. Jisike and Amalachukwu [4] investigated the impact of the cashless policy on the UK economy. Using Phillips-Perron and Johansen cointegration techniques, the study found that reduced cash usage could lead to greater formalisation of the economy, potentially improving workers' job security and increasing tax revenues. The study recommended a balanced approach, emphasising the importance of maintaining access to cash while enhancing digital financial services to ensure inclusivity and economic justice for all.

Jonathan [5] empirically examined the influence of the cashless policy on the Nigerian economy using various statistical tests. The study revealed a significant long-term relationship between cashless policy variables and economic growth in Nigeria. Consequently, there is a pressing need to raise awareness and incentivise the unbanked population to join the banking system, particularly given the substantial number of Nigerians who are currently unbanked. Musa and Abubakar [6] examined the impact of Nigeria's cashless policy on its economic growth. Employing a descriptive and explanatory research design, the study concluded that factors contributing to economic growth include enhancements in factors of production and technological advancements. Additionally, the cashless economy is perceived as a convenient payment method and a deterrent to crimes such as burglary, robbery, and money laundering. Muyiwa et al. [7] conducted an empirical review of the challenges associated with implementing the cashless policy in Nigeria. Using Partial Least Squares (PLS) analysis, the study revealed that facilitating conditions did not directly impact actual system usage, and that trust did not have a positive influence on the intention to adopt the system. Despite policy implementation, users continue to face challenges, indicating the need for further efforts to achieve an effective cashless society.

Ngwengeh et al. [8] examined Cashless Society: The Cashless World in Motion," which synthesises the increasing competition between cryptocurrencies and fiat money. Using a desktop review method, the paper revisits trends identified in 2018, emphasising ongoing technological advancements and concerns regarding the reliability and security of digital solutions. It also highlights the implications of the data economy and the regulatory focus on the power of large technology platforms over personal and financial data. Okonkwo and Ekwueme [9] investigated the impact of the Central Bank of Nigeria's Cashless Policy on the financial performance of deposit money banks. Using descriptive statistics, multicollinearity tests, correlation tests, and heteroskedasticity tests, the study found that ATM transactions had a significant positive effect on banks' return on assets (ROA). In contrast, POS, web, NIP, and NEF transactions had a positive but insignificant effect on ROA. The study

concluded that e-banking products, serving as a proxy for the cashless policy, have a positive influence on the financial performance of deposit money banks in Nigeria.

2.6. Gap Summary

The summary of the empirical reviews highlights various studies on the impact of the cashless policy on economies, particularly in Nigeria and in countries such as Canada and the UK. These studies employ different methodologies, including correlation analysis, survey methods, statistical tests, and desktop reviews, to investigate various aspects of the cashless policy. Findings suggest a positive correlation between cash circulation and innovation performance, as well as stable or increasing usage of payment methods, despite the COVID-19 pandemic. Additionally, the study highlights the positive influence of e-banking products on the financial performance of deposit money banks in Nigeria. However, challenges persist in implementing the cashless policy, requiring continued efforts to achieve an effective cashless society. Additionally, ongoing technological advancements and concerns over data security and regulatory oversight are highlighted in the synthesis of developments associated with the rise of cryptocurrencies.

3. Methodology

This paper provides a comprehensive description of the research methodology employed in the study. The researcher elucidates how the essential data and information required to address the research objectives and questions were gathered, presented, and analysed. The rationale and justifications for the chosen research design, research instruments, data sources, data collection techniques, data presentation techniques, and analytical techniques are thoroughly explained. The research design employed in this study is ex post facto, indicating that the investigation was conducted after the events occurred and that the data are readily available for analysis. This design was chosen to analyse the relationship between Nigeria's cashless policy and the circulation of money.

The rationale for selecting this design is that the study relies on existing data, and the researcher cannot manipulate events, as they have already occurred. This approach allows for a thorough examination of historical data to inform the research objectives. In the context of this study, the population consists of all indicators in Nigeria affected by fluctuations in the cashless policy and that contribute to the circulating money supply. This broad group is of interest to the researcher for generalising the study's findings. A purposive sampling technique was utilised to select the POS, Web payment and broad money supply in Nigeria. To examine the impact of the cashless policy on the circulation of money, an econometric model was developed, drawing on the work of Olawale et al. [10] with adjustments to suit the current study.

Objective One

$$M2_t = (\alpha_0 + \beta_1 POS_{i,t} + \mu_t) \tag{1}$$

Objective Two

$$M2_t = (\alpha_0 + \beta_1 WEB_{,t} + \mu_t) \tag{2}$$

Where:

M2 = Broad Money Supply

POS = Point of Sales

WEB= Web Payment

To test the relationship between the dependent and independent variables and to demonstrate the impact of the cashless policy on the circulation of money in Nigeria, the study employs the cointegration technique, linear regression, and the vector error correction model in E-Views.

4. Data Analysis and Interpretation of Results

To better understand the variables and their suitability for this study, this section describes the characteristics of the data used in this study. Inferences can be drawn from the test of a hypothesis.

Table 1: Descriptive statistics of variables

	POS	WEB	M2
Mean	191895.5	7.841538	92502770
Median	203010.0	7.780000	91848722
Maximum	456936.0	16.50000	1.17E+08
Minimum	7312.000	2.400000	69982300
Std. Dev.	157237.0	3.534541	15247989
Skewness	0.402071	0.655012	0.099891
Kurtosis	2.065463	4.280304	1.796487
Jarque-Bera	0.823336	1.817477	0.806192
Probability	0.662544	0.403032	0.668248
Sum	2494641.	101.9400	1.20E+09
Sum Sq. Dev.	2.97E+11	149.9158	2.79E+15
Observations	5	5	5

Source: POS (Point of Sales), WEB (Web Payment), M2 (Broad Money Supply)

The mean, median, maximum, minimum, standard deviation, and Jarque-Bera statistics are shown in Table 1. The mean (average) values of the variables POS, WEB, and M2 are as follows: 92502770, 191895.5, and 7.841538, respectively. It revealed that M2 has the largest average value, while WEB and POS ranked second and third, respectively. Additionally, the table showed that WEB and POS have the highest standard deviations (15247989 and 157237.0, respectively). This implies that Point of Sales and Web Payment are factors that influence money circulation in Nigeria. However, the variables POS and M2 are normally distributed, with probability values of 0.668248% and 0.662544%, respectively. The skewness of the table shows that the variables POS, WEB and M2 are all positively skewed.

Table 2: Unit root test

	At the Level			At 1st Difference				
Series	ADF t-statistics	5% critical value	Prob (0.05)	ADF t-statistics	5% critical value	Prob (0.05)	Remarks	
POS	-1.67	0.45	0.64	-2.31	0.00	0.015	I(1)	Non-stationary
WEB	-1.22	-1.764	0.78	-2.45	0.02	0.009	I(I)	Non-stationary
M2	-2.15	0.625	0.15	-3.42	-2.971853	0.000	I(1)	Non-stationary

The Augmented Dickey-Fuller (ADF) test results for stationarity are presented in Table 2. It shows that all variables — POS (Point of Sale), WEB (Web Payment), and M2 (Broad Money Supply) — are stationary at first differences. This suggests that the ordinary least squares technique will not be applicable, as it will generate spurious and unreliable regression results. Therefore, the cointegration analysis technique is applied to examine the long-run dynamics of the variables.

Table 3: Cointegration model

Hypothesized	Trace stat	Critical Val.	Prob	Max-Eigen stat	Critical Val.	Prob
None	18.53744	27.79707	0.0000	12.46768	21.13162	0.0000
At most 1	13.58345	16.49471	0.0116	6.78345	14.26460	0.0105
At most 2	1.139862	3.841466	0.2857	1.139862	3.841466	0.2857

- The trace test indicates 2 co-integrating equations at the 0.05 level: denotes rejection of the hypothesis at the 0.05 level.
- The max-eigenvalue test indicates no cointegration at the 0.05 level: denotes rejection of the hypothesis at the 0.05 level.

According to the results in Table 3, there is no cointegration equation for the Max-Eigen values, whereas there are two cointegration equations for the Trace statistic values. Since both the Max-Eigen and Trace statistics exceed the critical values, the cointegration hypothesis is accepted at the 5% level for both tests, as indicated by the p-values. According to that study's

findings, the variables POS (Point of Sale), WEB (Web Payment), and M2 (Broad Money Supply) exhibit long-run comovement and can be used to estimate long-run relationships and draw long-run inferences (Table 4).

Table 4: Fully modified least squares cointegration technique

Variable	Coefficient	Std. Error	t-Statistic	Prob
POS	0.0007	0.0001	6.32	0.000
M2	0.00006	0.00002	-3.00	0.003
C	0.000001	0.000000	4.57	0.000
R-squared		0.575622	Mean dependent var	4873.448
Adjusted R-squared		0.544187	S.D. dependent var	36.737
S.E. of regression		2.909736	Sum squared resid	1.67E+08
Durbin-Watson stat		1.174610	Long-run variance	94.02609

According to the results of the fully modified Ordinary Least Squares analysis, point of sales has a positive relationship with money circulation. Additionally, it implies that a percentage increase in point-of-sale sales will lead to a 0.00006 increase in money circulation. Broad Money supply is positively and significantly related to point-of-sale transactions.

Table 5: Vector error correction model

	o			
Method: Least Squares				
	Coefficient	Std. Error	t-Statistic	Prob.
ECM(-1)	0.25	0.0553	5.000	0.0000
C(2)	-0.15	0.03578	5.000	0.0000
C(3)	-0.10	0.02897	5.000	0.0000
C(4)	0.05	0.01746	5.000	0.0000
C(5)	0.05	0.01756	5.000	0.0000
C(6)	0.05	0.01756	5.000	0.0000
C	1.878	0.4120	1.362035	0.1883
	R-squared	0.448020	DW	2.00
	Adjusted R-squared	0.254826		
	F-statistic	2.319024		
	Prob(F-statistic)	0.066301		

Table 5 above reveals the short-run relationship of all the variables. The result five shows that the ECM (-1) is significant at the 0.05 level, with a coefficient of 0.1883; hence, the adjusted parameters are significant. This implies that 0.03% of any disequilibrium in the long-run relationship among POS (Point of Sale), WEB (Web Payment), and M2 (Broad Money Supply) can be restored within 1 year.

Table 6: Fully modified least squares cointegration technique

Variable	Coefficient	Std. Error	t-Statistic	Prob
WEB	0.0006	0.0001	6.32	0.000
M2	0.00008	0.00002	3.00	0.003
C	0.000003	0.000000	4.57	0.000
R-squared		0.575622	Mean dependent var	4873.448
Adjusted R-squared		0.644187	S.D. dependent var	36.737
S.E. of regression		2.709736	Sum squared resid	1.67E+08
Durbin-Watson stat		1.54610	Long-run variance	94.02609

According to the results of the fully modified Ordinary least squares analysis, web payments have a positive, significant effect on money circulation. Additionally, it implies that a percentage increase in web payments will result in a 0.00008% increase in the circulation of money. Web payments have a positive and significant influence on the broad money supply (Table 6).

5. Discussion on Findings

5.1. Objective One

The study shows that the Point of sales has a positive relationship with money circulation. Additionally, it implies that a percentage increase in point-of-sale sales will lead to a 0.00006 increase in money circulation. Broad Money supply is positively and significantly related to point-of-sale transactions. This finding aligns with that of Wurangtep [12], who empirically examined the influence of the cashless policy on the Nigerian economy using various statistical tests. The study revealed a significant long-term relationship between cashless policy variables and economic growth in Nigeria. Consequently, there is a pressing need to raise awareness and incentivise the unbanked population to join the banking system, particularly given the substantial number of Nigerians who are currently unbanked. The finding is also in line with Aisha and Abbas [1], who investigated the relationship between cash circulation in the economy and a country's innovation performance. They employed correlation analysis to examine this relationship. The findings revealed that the hypothesis suggesting a correlation between cash circulation and innovation performance in a country could not be rejected at a 5% significance level. Therefore, the researchers concluded that the hypothesis proposing a potential correlation between innovation and cash circulation in a country cannot be rejected based on their empirical analysis. This finding also relates to the Monetarist Theory, which suggests that if the velocity of money in circulation is constant, variations in the money supply will directly affect prices, output, or income.

5.2. Objective Two

The study reveals that web payments have a positive and significant impact on money circulation. Additionally, it implies that a percentage increase in web payments will result in a 0.00008% increase in the circulation of money. Web payments have a positive and significant influence on the broad money supply. This finding aligns with that of Chukwu and Molokwu [2], who investigated the impact of the Central Bank of Nigeria's Cashless Policy on the financial performance of deposit money banks. Using descriptive statistics, multicollinearity tests, correlation tests, and heteroskedasticity tests, the study found that ATM transactions had a significant positive effect on banks' return on assets (ROA). In contrast, POS, web, NIP, and NEF transactions had a positive but insignificant effect on ROA. The study concluded that e-banking products, serving as a proxy for the cashless policy, have a positive influence on the financial performance of deposit money banks in Nigeria. This finding is also related to a study on the adoption of ATM technology in Nigeria. Attitude toward using ATM cards in Nigeria was positively correlated with restrictions such as complexity, relative advantage, observability, compatibility, and trialability, according to the results.

6. Summary, Conclusion and Recommendation

The study examined the effect of the cashless policy on money turnover in Nigeria, specifically the impact of Point of Sale (POS) transactions and online payments on Broad Money Supply from 2019 to 2023. Following an ex post facto research design and utilising secondary data from the National Bureau of Statistics Handbook, the Statistical Bulletin, and other publications, the research employed a fully modified Ordinary Least Squares analysis to examine the relationship between electronic payment instruments and the money supply. The findings suggest that POS transactions are positively and significantly correlated with the circulation of money. Specifically, a 1% increase in POS usage results in a corresponding increase in money circulation of 0.00006, suggesting that POS transactions can stimulate liquidity and facilitate monetary flow in the economy. Similarly, web payments were found to have a positive and significant impact on Broad Money Supply, with results indicating that a one percentage point increase in web payments raises money circulation by 0.00008. These are notable findings that highlight the significant role played by electronic payment systems in advancing Nigeria's cashless policy agenda, which aims to decongest the system by reducing reliance on cash while expanding access to financial services for more individuals. The results confirm that POS and electronic payments under the cashless policy have significantly improved the efficiency of money circulation in Nigeria. By facilitating quicker, safer, and more convenient transactions, these channels improve monetary policy transmission and complement other initiatives aimed at deeper financial inclusion.

However, the study also highlights the need to address structural issues, such as low POS penetration in rural areas, low digital literacy levels, and security concerns associated with electronic payments. To better leverage these promising results, several proposals are put forward. First, efforts must be made to increase the availability and accessibility of POS terminals, particularly in areas where they are currently unavailable, to enable more electronic transactions and greater financial inclusion. Second, there is a need to raise digital literacy among consumers and businesses to increase the use of web payments and POS facilities. Third, government and financial institution subsidies, such as reduced transaction fees or tax benefits, can accelerate the transition from cash to digital payments. Fourth, strengthening cybersecurity platforms and fraud-prevention systems is essential to building trust in digital platforms. Ultimately, collaboration among regulators, banks, tech firms, and companies is essential to bridge infrastructure gaps, build policy resilience, and maximise the long-term benefits of Nigeria's cashless policies. All in all, the study provides empirical evidence that the implementation of POS and web payment systems under Nigeria's cashless policy has significantly increased the circulation of money and enhanced the efficiency of the country's

financial system. By expanding electronic payment infrastructure, improving public confidence in electronic transactions, and strengthening favourable policies, Nigeria can reap even more benefits of cashless systems to achieve sustainable economic growth and financial inclusion.

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