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Electronic Banking Payment System And Its Impact on The Nigerian Economy

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Abstract
This study examined electronic banking payment systems and its impact on the Nigerian economy with the application of the Phillips-Perron test statistics, Johansen cointegration techniques, the Pairwise Granger Causalitytechniques and the error correction mechanism on a log linear multiple regression framework. Quarterly time series data used were obtained from secondary sources, mainly from the CBN Statistical Bulletin (2019) from 2011(Q1–Q4) to 2019(Q1–Q4) on Value of Cheques Cleared (CHEV), Automated Teller Machine Payment Value (ATMV),Point of Sale Value (POSV), Web / Internet Transfers Payment Value (WEBP), Mobile Payment Value in Nigeria (MOBP), Nigerian Interbank Settlement Scheme Instant Payment value (NIPV) and National Electronic Funds Transfer Value (NEFT) as proxy for electronic banking payment systems and Gross Domestic Product (GDP) as proxy for the Nigerian economy.The results from the Phillips-Perron test statistics revealed that all the selected economic and electronic payment system variables (GDP, ATMV, POSV, WEBP, MOBV and NIPV) were stationary at first difference 1(1) except CHEV and NEFT which were stationary at level 1(0). The Johansen cointegration test results indicated a unique long run relationship between CHEV, ATMV, POSV, WEBP, MOBV, NIPV,NEFT and GDP as both the Trace and Max-Eigen statistics revealed the existenceof at least six cointegrating relationship in the modelat 5 per cent level of significance. The error correction model results revealed positive and significant impact between ATMV, WEBP, MOBP and NEFT on GDP, thusa unit change in automated teller machine payment value, web / internet transfers' payment value, mobile payment value and the national electronic funds transfer value incresed gross domestic product in Nigeria by 6.339550, 107.4928, 14.77938 and 1.276544 per cent respectively.The results further revealed that CHEV, POSV and NIPV had negative impact on gross domestic product in Nigeria. Meaning that a unit change in CHEV, POSV and NIPV reduced GDP by -0.160983,-2.375795 and -1.054403 per cent respectively.Finally, the results of the Pairwise Granger Causalitytest exhibited unidirectional causation running from CHEV, ATMV, POSV and MOBV to GDP as their pro-values are less than 0.05 ($P<0.05$). Thus, the null hypothesis of no causation was rejected as the feedback causation phenomenon was evident. The study therefore recommended, that the electronic banking payment systems should be strengthened in Nigeria by government and financial institutions, by investing positively on internet and electricity supply to help correct the negative value of cheques cleared, point of sale valueand the Nigerian interbank settlement scheme instant payment.

Keywords: Gross Domestic Product, Automated Teller Machine, Point of Sale, Mobile Payment

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INTRODUCTION

The battle for efficient and effective financial payment system in Nigeria dated back to 1894 when British Bank for West Africa (BBWA) successfully managed, circulated and distributed the British silver coins as a means of settlement of trade transaction and debts in the British West Africa colonies. Since then, the system has been changing baton and race with the hope of getting it right. While the effort towards effective payment mechanism is ongoing the system continues to expand the horizon of both local and foreign based financial products. Despite these developmental changes into the product and process mechanism, the continued cash and carry syndrome with volumes of cash in transit increased unabated [5];[43].

The payment system is an operational network governed by laws, rules and standards that links bank accounts and provides the functionality of monetary exchange using bank deposits [68]. The payment system is the infrastructure consisting of institutions, instruments, rules, procedures, standards and technical means established to effect the transfer of monetary value between parties discharging mutual obligations. Its technical efficiency determines the efficiency with

which transaction money is used in the economy and risk associated with its use.What makes it a "system" is that it employs cash substitutes with the use of electronic money and other ICT related equipment in its operations. Traditional payment systems are negotiable instruments such as drafts, cheques and documentary credits such as letter of credits. With the advent of computers and electronic communications a large number of alternative electronic payment systems have emerged. These include debit cards, credit cards, electronic funds transfers, direct credits, direct debits, internet banking and e-commerce payment systems. Some payments include credit mechanisms, but that is essentially a different aspect of payment. Payment systems are used in lieu of tendering cash in domestic and international transactions andconsist of a major service provided by banks and other financial institutions [58].

Payment systems may be physical or electronic and each has its own procedures and protocols.Standardization has allowed some of these systems and networks to grow at global scale, but there are still manycountries and product- specific systems. Examples of payment systems that have become globally available arecredit card and automated teller machine networks. Specific forms of payment systems are also used to settlefinancial transactions for products in the equity markets, bond markets, currency markets, futures markets,derivatives, option markets and to transfer fund between financial institutions both domestically using clearingand Real Time Gross Settlement (RTGS) Systems and internationally using the SWIFT network.

Electronic Payment Systems (EPS) apart from their convenience and safety also have a significant number of economic benefits which include mobilising savings and ensuring most of the cash available in thecountry are with banks. This will make funds available to borrowers both businesses and individuals. Furthermore, an electronic payment system has the ability to track individual spending; to facilitate the design ofproducts by the banks. This information is also useful to the government when making decisions. EPS also havethe ability to reduce cash handling and printing costs[58].

Egwurube[26] reported that the payment system is an arrangement that facilitates the transfer of monetary value among transferring parties (payer and payee), to a large extent, impacts on the stability of the financial system. Payment systems play a fundamental role in the economy by providing a range of mechanism through which transactions can be easily settled. A payment system is a defined set of instruments, procedures and rules for the transfer of fund from one bank to another'. Payment systems include payment mechanisms used by securities settlement systems, whether the payment mechanism is "embedded" within the securities settlement systems or external payment systems. The payment system adopted and the interface of settlement banks in any economy should target and encourage macro investments.

Today's globalization is the product of technological innovative efforts. Technological innovation has changed horizon of payment systems, drifting towards e-World[54]. Precisely, modern technology has changedconventional payment system into a more efficient andeffective system, devoid of 'cash and carry' syndrome. The easiness of transacting economic substances as well as a saferand quicker access to funds, among other factors, has placede-payment system on a more glorified pace than cash-based system [16];[56]. Interestingly, in Nigeria, e-payment system is gainingprominence to the extent that users have now preferred tocarry out monetary exchange without visiting brick and mortalbanks.Hence, era of cash-based payment system is gradually fadingas the need to operate cashless preponderate modern Nigerianeconomy[64]; [67].

According to Agba[7] electronic payment is a method of effecting payment from one end to another through the medium of the computer without manual intervention beyond inputting the payment data. This system promotes transparency, accountability and reduces the rate of fraudulent financial practices since only inputted payment data are of manual intervention. This view was supported by Ogedebe and Jacob [53] when they opined that e-payment minimized interaction of government officials and contractors to eliminate opportunities for corruption tendencies.

In recent time, e-payment system has become a medium through which monetary substance circulates conveniently, especially in developing economy like Nigeriawhere the carrying cash around is habitual. In Nigeria, e-payment system formed fundamental starting point of hermodern market economy; a well-functioning e-payment system has been recognized to have much relevance onfinancial stability, monetary policy and overall economicactivity [21].

Historically, Central Bank of Nigeria(CBN) introduced payment system which facilitated e-paymentin 2002. During this period, Nigeria Automated Clearing System (NACS) was introduced as a veritableplatform for development of electronic payment and to reduceclearing of cheques period. In addition, Automated Teller Machine (ATMs) was introduced by Interswitch in 2003followed by the implementation of Real Time Gross Settlement in 2006, migration to new uniform accountingsystem (NUBAN) in 2010. Subsequently, in the early of 2011, Nigerian Inter-bank

Settlement System announced instant payment services and the first set of cash deposit ATMs were launched. Consequently, transition to cashlesseconomy was proposed in December, 2011 and firstimplemented at Lagos in January, 2012. At the end of 2013, cashless policy is envisaged to have been effectivelyimplemented in Abuja, Port-Harcourt, Abia, Kano and Ogun State[54];[56].

In today's banking environment, the more technologically inclined a bank is the larger its customer base. This is because of the generational phase we live in, where a child of five (5) years knows how to operate computers and surf the internet. This has metamorphosed to even the daily buying and selling that takes place, outlets such as; Amazon, Jumia, Alibaba e.tc have created a platform where buyers all over the world can order for the stock of their choice and get it within days. Upon all the buying's and selling transaction that takes place, there is a common bond that fosters the smooth transactions of these outlets. The common bond is the services of the bank that serves as the settlement and clearing agents for all these transactions. The world today is termed a global village because of the electronic clearances and settlements made by banks all over the world. Therefore the importance of banks cannot be overemphasized because there are essential agents for the growth of an economy [29].

Change is the only constant factor in this dynamic world and the banking sector is not an exception [32]. A cashless economy does not mean the absence of cashin the economy, it only describes an economic system in which transactions occur without thephysical carrying of cash from one person to another. According to Dugeri[24]a cashlesseconomy is a society whereby credit cards, debit cards, charge cards, and direct transfer areused for making purchases. Some benefits of a cashless society is that it reduces moneylaundering and other related cash crimes to a minimum; just as the introduction andimplementation of the treasury single accounts (TSA) in 2015where the funds of variousministries, departments and agencies (MDAs) which were previously maintained by DMBs,are transferred to a single remita system maintained by Central Bank of Nigeria.

The TSA hashelped to curb financial malpractices that have hovered in the public system. Electronicbanking forms the bedrock of cashless policy through E-Payments, the cashless economy willeventually be achieved. Some of the means of E-Payments include online/internet banking,point of sale terminals (POS), mobile banking, etc. All these channels are effective meanswhich are adopted and thereby improves a cashless state. To complement implementation of electronic payment system, CBN introduced cashless policy into Nigerian financial system with the sole aim of achieving Vision 2020. According to CBN [21] an effective and modern payment system is positively correlated with economic development and is a key enabler for economic growth.

However, for the fact that e-payment system is gaining prominence in Nigeria does not guarantee successful transition to cashless economy nor positive relationship found between e-payment system and economic growth in developed countries and/or other developing countries preconditions its implementation in Nigeria. Meanwhile the drive for a cashless economy as a preference for new generation should be supported with sound education, age advantage, and possession of appropriate relevant technological infrastructures, among other factors, rightly put in place by all concerned members of the financial system and efficiently regulated before citizens are forced to comply[55].

It is on this background that the current study sought to empirically investigate the electronic banking payment systems and its impact on the Nigerian economy with clarifications on issues, benefits and challenges of payment systems using quarterly time series data from 2011(Q1-Q4) to 2019(Q1–Q4) on a log linear model on Value of Cheques Cleared (CHEV), Automated Teller Machine Payment Value (ATMV),Point of Sale Value (POSV), Web / Internet Transfers Payment Value (WEBP), Mobile Payment Value in Nigeria (MOBP), the Nigerian Interbank Settlement Scheme Instant Payment (NIPV), National Electronic Funds Transfer Value (NEFT) as proxy for the electronic banking payment systems and Gross Domestic Product as proxy for its impact on the Nigerian economy.

LITERATURE REVIEW

The term electronic payment system is all-inclusive, depicting different dimensions of electronic delivery multichannel. Its usage for different purposes presents increases imprecision of defining e-payment in the literature. E-payment could be viewed from its functions as m-payment, e-banking, e-money, online banking, internet banking, e-finance, e-broking, etc. Nevertheless, researches showed some attempts to define e-payment [31]. Oginni, El-maude, Mohammed and Michael[55] viewed e-payment as an electronic preservation of economic substance on an intelligent device generally employed to make payments of undertakings apart from the person who issues it without involving bank accounts in the transaction, though acting as a prepaid bearer instrument, elsewhere e-payment is viewed as the use of credit cards, automated teller machines, debit cards, stored value cards, mobile wallets and others of similar nature to make payments

Similarly, Humphrey [30] defined e-payments as any payment service that makes use of information and communications technologies including Integrated Circuit (IC) cards, cryptography and telecommunications. However, in this study, e-payment refers to delivery multichannel that provides for electronic exchange of monetary substances without physical contact of the transacting parties. It includes all electronic transactions as well as e-cheque payment. E-payment provides means of transacting business and settling financial commitment electronically without necessarily touching cash in a cashless society.

Payment system according to Balino, Omotunde and Sundarajan[20] is defined as the instruments, organization, operating procedures, and information and communication from payer to payee and to settle payments, that is, transfers of money. Ojo[57]reported that payment instruments take many forms, such as cash, cheques, dividend warrants, travelers' cheques, money orders, debit and credit cards, wire travelers, automated clearing house transfers, smartcard value card, point-of-sale(POS) and automated teller machines. Anyanwaokoro[13]clarified that payment system is a system where settlement of financial obligations are done by the use of credit cards or even payers pressing some bottoms that transfer the amount in their banks to the accounts of other persons through the computer. Ayodele[17] added that payment system is a system which consists of different methods of payments which are cheques, credit cards, bankers' drafts, standing order, documentary credit swift etc. for the efficient settlement of transactions.

The increasingly competitive environment in the financial service market has resulted in pressure to develop and utilize alternative delivery channels. The most recently delivery channel introduced is online banking. Online banking is otherwise refers to as electronic banking; and electronic banking, similarly is term as e-banking. Online or electronic banking systems give everybody the opportunity for easy access to banking activities, thus promoting financial inclusion. These banking activities may include retrieving an account balance, electronic money transfers and retrieving an account history electronically. Electronic banking (E-banking) has gradually become an indispensable part of modern day banking services. All over the world, banking industry is one of the industries that have adopted technology which helped in rendering better and quality services to customers. The quality of services is enhanced using technological innovations. Technological innovations have continued to engender speed of transactions and prompt service delivery in banks, thus promoting customers convenience and satisfaction [19].

The payments system plays a very crucial role in any economy, being the channel through which financial resources flow from one segment of the economy to the other. It, therefore, represents the major foundation of the modern market economy. Essentially, there are three pivotal roles for the payments system namely; a) the monetary policy role, b) the financial stability role and c) the overall economic role [26].Ayodele[17] reported that an efficient payment system performs the following functions: a) fostering a sound financial system and economic growth; b) development of financial sector in order to serve the needs of the real economy; c) transformation of banking systems and emerging money markets; d) development of business transactions both locally and internationally and e) promotion of efficient allocation of financial resources through the reduction in payment risks and transaction costs.

However, modern technology has changed conventional payment system into a more efficient and effective system, devoid of cash and carry syndrome [69]. The easiness of transacting economic substances as well as a safer and quicker access to funds, among other factors, has placed electronic payment (e-payment) system on a more glorified pace than cash based system [16]. In this new era, e-payment system has become a medium through which monetary substance circulates conveniently and its evolution, as well as the convenience of e-money transactions has furthered the transition and the argument of society into a cashless one[69]. Abaenewe, Ogbulu and Ndugbu[1] reported that electronic banking involves driving the banks immediate and future goals through the use of information technology. It involves carrying out banking business electronically. E-Banking involves delivering banks new and traditional products or services to bank customers automatically.

E-banking services are beneficial to both banks and customers. For banks, it is used as artillery to aid them in achieving competitive advantage and increase market share price. Moreover, using e-banking can saves cost compared to traditional banking style [39]. According to Robinson [66]the cost of an online transaction is less when compared to a branch. Electronic banking is the conduct of banking business electronically which involves the use of information communication technology to drive-banking business for immediate and future goals. E-banking is seen to be an innovative service delivery style that offers different financial services [66]. Similarly, Garuba and Aigbe[28]saw e-banking as a procedure by which a customer performs banking operations online without operations from any location like home or office. The root of e-banking in Nigeria was the downfall of the Structural Adjustment Programme (SAP) in 1986 which ended the "Arm Chair Banking" the first

generation banks were using that time, it changed both the structure and the content of banking business in Nigeria. This however threatened the existing banks; hence, aggressive marketing methods were adopted by the existing banks. The increased competition among the banks changed to the adoption of e-banking as a necessity to survive the business environment[34].

Humphrey [30] observed that developed countries of the world to a large extent, are moving away from paper payment instruments toward electronic ones, especially payment cards. Some aspects of the functioning of the cashless economy are enhanced by e-finance, e-money, e-brokering and e-exchanges. All these media refer to how transactions and payments are effected in a cashless economy [47]. Marco and Bandiera[44] argue that increased usage of cashless banking instruments strengthens monetary policy effectiveness and that the current level of e-money usage does not pose a threat to the stability of the financial system. However, it does conclude that central banks can lose control over monetary policy if the government does not run a responsible fiscal policy. For the cashless economy to work effectively, illiteracy which is a serious impediment for the adoption of e-payment need to be reduced to the bearest minimum and also the cost of internet which must be supported with uninterrupted power supply along with the acceptance of new technology among customer's and staff.

The Central Bank of Nigeria and other regulatory agencies in the financial sector must ensure that service providers adhere to minimum security standards on their web-based platform, as security issue is a major challenge in the development of the cashless system [45]. Akhalumeh and Ohiokha[11] in a related study found that limited POS/ATM constitute a problem of the cashless system, this was why they opined in their study in 2012 that provision of adequate terminals and Automated Teller Machines (ATMs) are essentials of a cashless economy, this submission was supported by the CBN in their directive to banks and independent service providers to deploy more ATMs and ensure their efficiency for a smooth implementation of the cashless policy [27]. These verify the claim of Echekoba and Ezu[25] on the problem of cash based economy and cashless policy in Nigeria. For effective cashless implementation in Nigeria availability of sufficient and well-functioning infrastructure (notably electricity), harmonization of fiscal and monetary policy, regular assessment of the performance of cashless banking channels, consideration of the present state and structure of the economy, redesign of monetary policy framework and greater efforts towards economic growth whilst managing inflation should be considered [51].

Anyanwokoro[14] see electronic banking as the application of computer technology to banking especially the payment (deposit transfer) aspects of banking. He also defined e-banking as a system of banking with an electronic communication network which permits on-line processing of the same day credit and debit transfers of funds between member institutions of a clearing system.Electronic banking offers the convenience of conducting most of the bankingtransactions at a time that suits the customer. The customer can access funds and transferfunds between accounts, pay bills and make purchases 24 hours a day as well as 7 days aweek.

Omotayo[62] defined electronic banking as a system in which funds are movedbetween different accounts using computerized online or real time systems without the use ofwritten cheques.Aburime[2]added that electronic banking includes systems that enable financialinstitutions, customer, individual and businesses to access accounts, transact business orobtain information on financial products and services through public or private networksincluding the internet. Customers access electronic banking services using an intelligentelectronic device such as a personal computer (PC) personal digital assistant (PDA), Automated Teller Machine (ATM), among others.Khrawish and Al-Sadi[41] defined electronic banking as the adoption of electronicmeans in the delivery of banking products and services. Such products and services includedeposit taking, lending and payment products and provision of other electronic paymentproduct and services such as electronic money.

Okoro[59] clarified that electronic banking has to do with the delivery of banking products and services to the customers and general publicelectronically through the use of electronic banking instruments or products like AutomatedTeller Machine (ATM), Mobile, internet (Web) and point of sales (POS) among others.

The global digital technology has come up with lots of innovations and with it comes different names to identify and enhance performance of this technology driven payment instruments and services [63].Giving furtherand more robust conceptual clarifications on e-banking facilities, instruments, products and services in modern day economy will help in understanding the efficacy of the electronic banking payment systems in Nigeria. Point of Sale (POS) terminals is the mode of e-banking that handles Cheque verification, credit authorization, cash deposit and withdrawal, and cash payment. It enhances electronic fund transfer at the point of sales. Thus customers account would be debited immediately with the cost of purchase in an outlet such as a petrol station or supermarket. The implication of this is that customers can make payment for goods and services without necessarily coming in

contact with physical cash as the purchase price would be debited on the buyer's card account and credited on the seller's account. They are indeed alternatives to handling or transacting cash for transfers and for payments of goods and services purchased. POS terminals allow merchants access to card payments for sale of products and services e.g recharge cards, bill payments, lottery tickets etc. **GSM/Mobile banking** is the mode of e-banking primarily uses mobile phones as the electronic devices. Mobile phone gives customer the opportunity to operate their account with bank as long as their phones and network services provider support the short messaging service (SMS) which would enable the customer check account balance [3].

Automated teller machine (ATM) is a computer controlled device that dispenses and provides other services to customers who identify them with a personal identification number (PIN). The physical carriage of cash as well as frequent visit to the banks is being reduced. The principal advantage of ATM is that it dispenses cash at anytime of the day even as it needs not to be located within the banking premises but in stores, shopping malls, fuel stations etc, unlike the traditional method where customers have to queue for a very long period of time to withdraw cash or transfer funds. The ATM is the most popular e-transaction solution in Nigeria. ATM is popular because of its convenience. With ATM, it is a lot easier to withdraw money or to check account balance. Also, ATM machines can perform other functions like fund/cash transfer, mobile phone credit recharge and bills payment, cash withdrawals and balance inquiry remain the most popular applications sort after by users in Nigeria. **Card System** is a unique electronic payment type which involves the use of smart cards. Smart cards are devices with embedded integrated circuit being used for settlement of financial obligations. It can be used as credit card, debit card and even ATM cards. The power of these cards lies in its sophistication and acceptability to store and manipulate data as well as handling of multiple applications on one card securely. Credit cards, debit cards and e-wallets (like mobile money) make cashless shopping a lot more convenient. Hence to turn the country to a cashless economy the drive should be towards credit cards, e-wallets and debit cards [6];[10]; [65].

The Nigerian Interbank Settlement Scheme (NIBSS) fund transfer is an online platform where banks exchange value thereby enabling the performance of interbank transfer such as NEFT (National Electronic Funds Transfer) and NIBSS instant transferring funds between banks for single or multiple beneficiaries for individual amounts not exceeding N10million. NEFT transfers (National Electronic Funds Transfer), once affected works with the next available clearing session of CBN and is received in the beneficiary's account the same day or next working day, but NIBSS instant payments are immediate. **Real Time Gross Settlements (RTGS)** is used to transfer sums above N10million in favour of a single beneficiary. It is used for big ticket transactions which must have been effected before noon for most banks if the funds are to reach the recipient bank the same day. 6. Mobile Money: This is a product that enables users to conduct fund transfer, make payment or receive balance enquiries on their mobile phones [6];[10]; [65].Zango[71] added that the Nigerian interbank settlement system (NIBSS) also known as Nigeria Central Switch (NCS) is responsible for the inter connection between the various players in the financial system. This system allow the various players such banks, mobile payment operators, non-bank financial institutions, payment terminal providers, card acquirers, government institutions and all other customers to process, send and receive funds, instruments and other documents commonly and electronically. In order to create a level playing field for all players, these switches allow both old and new players in the financial industry to seamlessly plug into the financial services sector for easy interface with their customers.

Web (E-transfers) refer to electronic transfers which can be affected via the internet on (Personal Computers) PCs, laptops and other devices. Bank customers who have subscribed to internet banking can do basic banking transactions via the web. **Personal Computer (PC) banking** is one of the technologies of e-banking that has a universe of possible applications. Online banking for example provides the opportunity of paying bills and performing transactions of any kind through personal electronic devices. The availability of online information has provided banking and customer with a powerful vehicle for research. **Bankers automated clearing services** is the automation focus of the instrument to reduce the number of clearing days and improve on security arrangement in the course of settlement and collection of Cheque. This involves the use of magnetic ink character reader (MCR) for Cheque processing which makes it capable to encode, read and sort out changes even as request for Cheque books can be made via electronic devices. A cheque is a financial instrument issued by banks to customer (person(s), association(s), organization(s) or corporate bodies) for the purpose of making financial transactions [3];[10].

Nigeria Instant Payment (NIP)is the first and only revolutionary point to point innovative e-payment solution transfer service that guarantees instant value to the beneficiary in the banking industry. This e-service system is offered in both bank branch network and mobile internet banking platforms for corporate entities and individuals. This Nigeria's internet service solution

is in fact the only one in Africa and indeed, the world over [40].**Nigeria Automated Payment Services (NAPS)**is an integrated multi-bank payroll and bulk e-payment and e-collection platform. NAPS is designed for pension personnel records, instant processing of payroll, schedule delivery and payment, fund transfer execution, proceeds collection, direct debit and other payment instructions. This is an inter-bank transaction services which came about as a result of the desire by Nigeria inter-bank settlement system (NIBSS Plc.) to strengthen, improve and enhance its bulk payment processing and operational efficiencies to its customers. **National Electronic Funds Transfer (NEFT)** is an electronic funds transfer system, which facilitates transfer of funds to other bank accounts across the country. This is a simple, secure, safe, fast and cost effective way to transfer funds especially for retail banking remittances. This e-payment system was first used by the reserve bank of India in 2005 [22]. The e-digital solution was designed, established and maintained by the Indian Institute for development and research in banking technology (IIDRBT). NEFT has gained popularity among the e-payment systems in Nigeria due to its time saving and the ease of transactions. Although not all banks in Nigeria use the NEFT, one of Nigeria's old generation banks-the Union Bank of Nigeria currently offers this facility to customers across branches[71].

THEORETICAL LITERATURE

Technology Acceptance Theory

The technology acceptance theory postulates the adoption of Technology Acceptance Model (TAM) in businesses to increase economic growth[9]. The technology acceptance theory is one of the theories that have been developed to provide a better understanding of the usage and adoption of information technology. It is presently a prominent theory used in modeling technology acceptance and adoption in information systems research.

Ajayi[9] reported that Fred Davis in 1985 proposed the TAM in his doctoral thesis at the MIT Sloan School of Management. TAM is an information systems theory that models how users come to accept and use a technology that will encourage economic growth. The model suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it. The factors are Perceived Usefulness (PU) and Perceived Ease-of-Use (PEOU). According to TAM, one's actual use of a technology system is influenced directly or indirectly by the user's behavioral intentions, attitude, perceived usefulness of the system, and perceived ease of the system.

Diffusion of Innovations (DOI) or Innovation Diffusion Theory (IDT)

The Diffusion of Innovations (DOI) theory is also known as Innovation Diffusion Theory. Diffusion of innovations theory seeks to explain how, why and at what rate new ideas and technology spread through cultures. Innovation diffusion theory was developed by Gabriel and Rogers (a professor of rural sociology), popularized the theory in their 1962 book Diffusion of Innovations (DOI). He said diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. Rogers explained the process of Innovation diffusion as one which is dictated by uncertainty reduction behavior amongst potential adopters during the introduction of technological innovations. Olatokun and Igbinedion[60] used DOI theory to investigate the adoption of ATM in Nigeria. They findings showed that constraints such as relative advantage, complexity, observability, compatibility and trialability were positively related to attitude to the use of ATM cards in Nigeria.

Innovation Diffusion Theory (IDT) consists of six major components: innovation characteristics, individual user characteristics, adopter distribution over time, diffusion networks, innovativeness and adopter categories, and the individual adoption process. Arguably the most popular of the six components of IDT centers on the characteristics of the innovation itself. After analyzing a variety of previous innovation diffusion studies, Rogers singled out the following five characteristics of innovations that consistently influence the adoption of new technologies: innovation characteristics, individual user characteristics, adopter distribution over time, diffusion networks, and innovativeness and adopter categories [9].

EMPIRICAL LITERATURE

James [36] used Statistical Package for Social Sciences (SPSS) to investigate the acceptance of e-banking in Nigeria. The result showed that acceptance of e-banking in Nigeria was significantly influenced by age, educational background, income, perceived benefits, perceived ease of use, perceived risk and perceived enjoyment. Echekoba and Ezu[25] in a research carried out in Nigeria observed that 68.2% of the respondent complained about long queues in the bank, 28.9% complained of bad attitude of teller officers (cashiers) while 2.89% complained of long distance of bank locations to their home or work places. Likewise, in her 24th NCS national conference in December 2011, CBN data shows that 51% of withdrawal done in Nigeria was through Automated Teller Machine (ATM), while 33.6% was through Over the Counter (OTC) cash withdrawals and 13.6% through cheques. Payment was also done through point of sales machine (POS) which accounted for 0.5% and web 1.3%.Therefore, if the

introduction of ATM in Nigeria cash withdrawals system reduced OTC withdrawal; then it will implies that introduction of cashless policy supported by application of information technology can achieve more to reduce over dependent on cash payment in the Nigerian economic system.

Egwurube[26] examined the role played by payment systems and settlement institution in the growth of small and medium enterprises in Nigeria using primary data on 200 SMEs selected randomly from different skills and vocations analyzed using rational analysis. The findings indicated the payment systems in Nigeria are effective given its relevance to Small and Medium scale Enterprises. He recommended that the payment systems should be encouraged because of its supports to SMEs growth. Morufu and Taibat[46] used qualitative survey to ascertain banker's perceptions of electronic banking in Nigeria. The results suggest that bankers in Nigeria perceive electronic banking as a tool for minimizing inconvenience, reducing transaction costs, altering customers queuing pattern and saving customers banking time.

James [37] used Rogers Diffusion of Innovation theory to investigate the determinants of the adoption of mobile banking in Nigeria. The study empirically showed that age, educational qualification, relative advantage, complexity, compatibility, observability and trialability were important determinants of the adoption of mobile banking. This therefore makes it imperative for relevant stakeholders to make efforts to positively influence these independent variables so as to make mobile banking more popular. Adewoye[4] empirically studied the impact of mobile banking on service delivery in the Nigerian Commercial Banks through the use of questionnaire. He found out that the introduction of e-banking services has improved banking efficiency in rendering services to customer. His findings shows that mobile banking improve banks service delivery in a form of transactional convenience, savings of time, quick transaction alert and save of service cost which has recuperate customer's relationship and satisfaction. To this end, he recommended that banks management should create awareness to inform the public about the benefits derived on the e-banking service products, collaboration among banks should perfectly maintained, skilled manpower and computer wizard should be employed by every banks, in other to prevent fraudulent personal and hackers from manipulating the banks data and stealing money from the banks accounts. Finally, provision and maintenance of public network system such as telephone (Nitel) and the availability of these basic infrastructures is fundamental to the efficient functioning of the mobile banking services.

Oginni, El-maude, Mohammed and Michael[55] worked on electronic payment systems and its impact on economic growth in Nigeria and their study found that e-payment system has a positive impact on economic growth in terms of real GDP and that the introduction of ATMs in doing financial transaction impacts directly on economic growth, while other forms of e-payment channels showed a negative impact on economic development.

Mallat and Tuunainen[42] examined the adoption of mobile payment systems by merchants and found that the main purpose of mobile payment adoption is to increase sales and reduce the costs of payment processing and showed a positive influence on business sales growth. But, it carries challenges such as: complexity of the systems, unfavorable revenue sharing models, lack of critical mass, and lack of standardization. Nwankwo[50] carried out a study to ascertain the extent to which electronic payment affect the cashless economy in Nigeria. The results showed that the electronic payment has a great implication in cashless economy of Nigeria but it will lead to a significant decrease in deposit mobilization and credit extension by Nigerian Deposit Money Banks. The authors finalized their results by saying there should be an improvement in infrastructural development so as to enhance the e-payment system.

Okifo and Igbunu[58] examination on electronic payment system in Nigeria and its economic benefits and challenges revealed that the arrival of the internet has taken electronic payments and transactions to an exponential growth level. They added that consumers purchases goods and services from the internet and pay via electronic payment systems since new secured network payment schemes have been developed for transaction purposes. These benefits of e-payment galvanized Nigeria into cashless society. They concluded that e-payment is faced with challenges, like public acceptability, lack of uniform platform being operated by the banks, lack of adequate infrastructure and issues of security, with the proper use of e-payment system, corruption which is a cancer in government arena will be holistically addressed.

Oluwatosin and James[61] work on cash and electronic based transactions in Nigeria and the role of a national aggregatorrevealed that the national aggregator (NIBBS) facilitated more of electronic payments than cash payments within the period of study, even with some fluctuations though. This is an indication that the cashless policy is gradually taking root and ready to replace the existing cash payment system. Ayodele[17]examined the payment systems through electronic banking (e- banking) as implemented in Nigeria. The study revealed that e- banking in Nigeria has impacted positively on the Nigerian economy,

reduction in cash transaction was also experienced, fast settlement of bill, convenience in cash withdrawals and other benefits functions of implementation of the e-banking. He added that a lot still need to be tackled by the various agencies concerned in terms of upgrading of infrastructural facilities in the country, provision of security, internet connection, education of the illiterates, obeying the monetary rules as set by the Central Bank of Nigeria (CBN) are vital issues to smooth-run the e-banking policy.

Ugwueze and Nwezeaku[70] study on e-banking and commercial bank performance in Nigeria using Engle-Granger cointegration and causality approach. Their results revealed that POS is not cointegrated with both the savings and time deposits but cointegrated with demand deposits. They recommended that the monetary authorities andcommercial banks should embark on an all-inclusive enlightenment campaign for the banking public on thebenefits, convenience and importance of adopting e-banking channels in completing their transactions.

Babatunde and Sunday [19]work on e-banking in Nigeria, issues and challenges revealed that employee's job security, customers satisfaction, security of financial transactions had a positive and significant relationship with e-banking in Nigeria they therefore recommended that for effective e-bankingpenetration, investors education and marketing of e-banking products should be the key strategy banksshould use to attract more customers towards embracing e-banking and increasing security for e-bankingproducts, reduction of charges on e-banking products and increasing more ATM outlets in Nigeria.Mustapha [48]added with his investigation on market risk exposure of Nigerian banks due to electronic payment technology by employing panel least square autoregressive model. Findings from the study revealed that bank performance have increased due to the adoption of the electronic payment technology.

Isibor, Omankhanlen, Okoye, Achugamonu, Adebayo, Afolabi and Ayodeji[35]studied the impact of electronic banking technology on customers' satisfaction and economic growth in Nigeria using Pair Sample t-test on SPSS statistical package. The study rejects both null hypotheses which mean that e-banking has improved both customers' satisfaction and caused economic growth in Nigeria. Their study recommends adequate legislation on all aspects of e-banking so that both the operators of the system and the public can be adequately protected. They concluded that banks should charge low or no fees for e-banking services in order to motivate their customers to take advantage of e-banking services.

Ikpefan, Akpan, Osuma, Evbuomwan and Ndigwe[33] examined electronic banking and cashless policy in Nigeria. They used the ordinary least square method to analyze the data collected from the Central Bank of Nigeria (CBN) annual report and the Nigerian Interbank Settlement System (NIBSS) website. Their findings showed that there is no significant impact of electronic banking tools on the currency in circulation. The study recommends that transaction charges should be further reviewed to a little (single digit) or no charge, to encourage more patronage of e-payment platforms and CBN, Deposit money banks (DMBs), and other non-banks financial institutions should provide public enlightenment and awareness programs that will create awareness and entice the unbanked individuals into the banking system especially those in the informal sector in Nigeria.

Agbi and Yusuf [8] on the impact of electronic payments and cash-less policy on the shadow economy in Nigeria using a longitudinal data for the period from 2003 to 2015 The study revealed that a larger portion of the shadow economic activities inNigeria relates to the committed shadow economic activities, thus, increased use of electronicpayments may not lead to a significant reduction in shadow economic activities. From the findings,it is, therefore, recommended that the FGN should put in place adequate mechanism to reduceunreported economic activities while the CBN cash-less policy should be vigorously pursued,especially in areas where large unbanked citizens reside. This can be done by creating awareness ofelectronic payment media especially mobile money.

Ibe and Odi[72] empirically investigated the impact of cashless policy on Nigeria Economy using quarterly time series data from 2009 to 2016 which were collected from the CBN annual bulletin and reports. Gross domestic product GDP was used as the dependent variable while Automated teller machine (ATM), mobile banking (MOBK) and point of sales (POS) were the independent variables. Their findings revealed the existence of a long run significant relationship between the variables of cashless policy and economic growth in Nigeria. Also, ATM is the best and most common means of effecting cashless policy based on its positive and relationship with GDP. They therefore concluded by suggesting the need to create more awareness to entice the unbanked people into the banking system becomes imperative since a large percentage of the Nigerian population is unbanked.

Zango[71] critically examined the effect of e-payment transactions employing both volume and value of digital instruments currently applicable in the Nigerian financial market using the secondary data from 2012 to 2017 on the Ordinary Least Square Regression methodology.Finding from the study revealed a

positive relationship between value of e-payment channels andthe percentage of financial institutions in real gross domestic product in Nigeriawhile negative relationship between volumes of e-payment channels to the percentage of financial institutions in real gross domestic product. He concluded with a call for cooperation between government and the private sector in Nigeria in order to raise the literacy level of e-payment users.

Mamudu and Gayovwi[43]examined cashless policy and its impact on Nigerian economy with clarifications on issues, benefits and challenges of classless economy using quarterly time series data from 2011(Q1–Q4) to 2017 (Q1–Q4) on Cheques Cleared Value (CHEV), Automated Teller Machine Payment Value (ATMV),Point of Sale Value (POSV), Web / Internet Transfers Payment Value (WEBP), Mobile Payment Value in Nigeria (MOBP) and National Electronic Funds Transfer Value (NEFT) as proxy for the adoption of cashless policy and Gross Domestic Product (GDP) as proxy for its impact on Nigerian economy. Their results from the Johansen cointegration techniques revealed a long run relationship between CHEV, ATMV, POSV, MOBP, NEFT and GDP while the short run regression results revealed that the use of cashless policy instruments particularly ATM, WEB and NEFT have positive and significant impact on gross domestic product in Nigeria. They added that the positive impact is as a result of usage of e-transactions through technology acceptance and diffusion of innovation of cashless policy in Nigeria. Their results also revealed that CHEV, POSV and MOBPhad inverse and insignificant impact on Gross Domestic Product in Nigeria. They recommended that the cashless policy should be strengthened in Nigeria by government and DMBs by investing positively on internet, electricity (power supply) to help correct the bottle necks of point of sales and internet mobile transactions.

RESEARCH METHODS

Theoretical Framework

Technology Acceptance Model (TAM) and Diffusion of Innovation (DOI) Theory

The theoretical framework of this study is Technology Acceptance Model (TAM) and Diffusion of Innovation (DOI) Theory. TAM and DOI are information systems theories that model how users come to accept and use a technology that encourage economic growth. The Mechanics of the Cashless Policy in Nigeria on cashless policy is an alternative to cash transactions through electronic means using information and communications technology (ICT) [3].

Ndifon and Okpa[49] maintain that the future of all business, particularly those in the service industry lies in information technology. This technology as far as cashless policy is concerned is not only computer. Information technology for banks takes different forms; computerization of customers' accounts and account information storage and retrieval; deposit and withdrawal through Automated Teller Machines (ATMs); and networking to facilitate access to accounts from any branch of the bank, bio-metrics, use of mobile phones to consummate transactions, internet, and websites. It also involves the use of credit cards, debit cards, mobile pay and many other forms of payment, but always only in digital ways, as paper currency does not come into play. Babalola[18] identified seven different electronic payment channels in Nigeria, Automated Teller Machines (ATM), points of sales terminals, mobile voice, web, inter-bank branch and kiosks. Ogbuji, Onuoha and Izogo[52] noted that ATM allows a bank customer to conduct his/her banking transactions from almost every other ATM machine in the world.

In this type of economy, the amount of cash in one's wallet is not relevant. One can pay for purchases by any one of the forms of transactions in cashless economy which includes the use of credit cards or bank transfer. Cashless economy is enhanced by e-finance, e-money, e-brokering and e-exchanges [47]. Central Bank of Nigeria introduced Point of sale and gave the guidelines in 2011 with maximum service commission of 1.25% or a maximum of NGN2000 and limiting the role of connecting and maintaining POS devices only to licensed Payment Terminal Service Providers (PTSPs). These POS terminals serve like the Automatic Teller Machines (ATM) across commercial points in the country. At the completion of a transaction and the value ascertained, the amount is entered into a POS terminal into which the electronic card has been slotted. The cash equivalent of the amount will be automatically transferred from the payer's account into the account of the payee's account. In Nigeria today, private enterprise, religious bodies, educational institutions and other service providers such as hotels, transport firms etc. have embraced the POS option in their transactions.

Users are issued with a card (the electronic purse). The electronic purse is topped up using revaluation terminals. There are different types of terminals: coin & note, credit card and payroll deduction terminals. The cards are simply inserted into the revaluation terminal and certain programmed instructions are followed, and money is added onto the electronic purse. This can then be used to pay for goods / services by inserting them into the POS terminals. When the card is inserted into the POS, and the transaction amount entered, the reader reads the amount and is quickly deducted from the e-purse (the card) [11]. It can be used to pay for school fees, shopping bills, utility bills and others bills.

The aspect of cashless policy streamlining the permitted limits of cash transactions for individuals and institutions beyond which charges apply cover all accounts types especially savings and current with exception of government revenue generation; primary mortgage institutions, microfinance banks and embassies' accounts. The policy clearly states that the cash withdrawal and deposit limit for individuals is N500, 000 and N3,000,000 for corporations, although the policy does not prohibit withdrawals above the stipulated amounts, but such transactions will be subjected to cash handling charges. The interesting thing about the way banks are implementing this policy is that at the end of each transaction, they send alert to the customer indicating the amount withdrawn and the balance. Banks have equally made available different types of cards to enhance the electronic transactions which consist of Verve, Master, Platinum cards; some customized means of making payments include: pay pal and payoneer and so many others. It is good to mention that these e- transactions are not without charge.

This policy facilitates fund transfer, thereby reducing time wasted in bank(s). The transactional ease and other advantages of cashless economy may explain its growing popularity. For instance, Wizzit, a fast growing mobile banking company in South Africa has over three hundred thousand customers across South Africa. Likewise, MPESA was introduced in Kenya as a small value electronic system that is accessible from ordinary mobile phones. It has experienced exceptional growth since its introduction by mobile phone operator (Safaricom) in Kenya in March, 2007 and has already been adopted by nine million customers, which is about 40% of Kenya's adult population. The success of M-PESA has been attributed to its flexibility enabling users to carryout financial transactions across long distances with their cell phones, thereby reducing their travelling costs, eliminating the risks of carrying cash and also avoiding most banking charges [12]. In Sweden, it is almost impossible to find a shop that does not accept electronic payment cards, and most locals almost never carry any cash on them.

Model Specifications

This study adapted the model of Ikpefan, Akpan, Osuma, Evbuomwan and Ndigwe (2018) with the following specifications:

$$GDP = f(ATM, POS, MB, WEB) \quad (3.1)$$

The linear form of equation (3.1) is presented as equation (3.2)

$$GDP = \beta 0 + \beta 1ATM + \beta 2POS + \beta 3MB + \beta 4\ WEB + \mu \quad (3.2)$$

Where: GDP = Gross Domestic Product; CIC = Currency in Circulation; ATM = Automated Teller Machine; POS = Point of Sale Machine; MB = Mobile Banking; WEB = Web/Online Banking and μ = Error term.

The current study modified equation 3.1 by including the Value of Cheques Cleared (CHEV), the Nigerian Interbank Settlement Scheme Instant Payment (NIPV)andNational Electronic Funds Transfer (NEFT) on a log linear specifications. The reason for this modification is to empirically capture the electronic banking payment systems and its impact on the Nigerian economy.

$$InGDP_t = f(InCHEV_t, InATMV_t, InPOSV_t, InWEBP_t, InMOBP_t, InNIPV_t, InNEFT_t) \quad (3.3)$$

Equation (3.3) is expressed more specifically for the purpose of statistical test as equation (3.4):

$$InGDP_t = \beta_0 + \beta_1 InCHEV_t + \beta_2 InATMV_t + \beta_3 InPOSV_t + \beta_4 InWEBP_t + \beta_5 InMOBP_t + \beta_6 InNIPV_t + \beta_7 NEFT_t + U_t \quad (3.4)$$

(Apriori expectation $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ and $\beta_7 > 0$)

Where, InGDP = Log of Gross Domestic Product, InCHEV = Log of Value of Cheques Cleared, InATMV = Log of Automated Teller Machine Payment Value,InPOSV = Log of Point of Sale Value,InWEBP = Log of Web / Internet Transfers Payment Value, InMOBPV = Log of Mobile Payment Value in Nigeria, NIPV = Log of the Nigerian Interbank Settlement Scheme Instant Payment, InNEFT = Log of National Electronic Funds Transfer, U = Disturbance term or error term, β_0 = Intercept or constant, $\beta_1 - \beta_7$ = Coefficient of the independent variables and t is the time trend.

The error correction specification of equation (3.4) is presented as equations (3.5):

$$\Delta InGDP_t = \beta_0 + \beta_1 \Delta InCHEV_t + \beta_2 In\Delta ATMV_t + \beta_3 \Delta InPOSV_t + \beta_4 \Delta InWEBP_t + \beta_5 \Delta InMOBP_t + \beta_6 \Delta InNIPV_t + \beta_7 \Delta NEFT_t + U_t \quad (3.5)$$

The ECM in equation (3.5) above is the error correction mechanism which indicates the speed of adjustment to equilibrium whenever disequilibrium occurs in the Nigerian electronic banking payment systems.

METHOD OF DATA ANALYSIS

This study used the Phillips-Perron test statistics, Johansen Cointegration techniques, Pairwise Granger Causality techniques and the error correction mechanism on alog linear modeling specification because log linear modeling is superior and more effective to linear form and gives more favorable results [15].These methods used in analyzing the data collected for this research are basically statistical and econometric in nature. The Phillips-Perron test statistics was employed to determine the unit root stationarity test. Statistical theory requires that variables be stationary before application of standard

econometric techniques. This was done in order to avoid spurious (misleading) results.

The Johansen cointegration test was also employed to determines the existence or otherwise of a long run relationship among the variables in the models. The error correction model was thereafter estimated to determine the speed of adjustment to long run equilibrium. Diagnostic and stability tests were also conducted to confirm the robustness of the models. Finally, the Pairwise Granger Causality techniques was used to determine the direction of causality between electronic payment system and economic growth in Nigeria.

DATA PRESENTATION, ANALYSIS AND DISCUSSION OF RESULTS

The quarterly time series data from 2011(Q1–Q4) to 2019(Q1–Q4) on economic and electronic payment system variables used in this analysis are presented in Appendix A.

Unit Root Test

The stationarity status of the selected log value of the electronic payment systemvariables and gross domestic productin Nigeria were examined using the Phillips-Perron test statistics. The results which are displayed in Table 1 showed that all the variables are stationary at first difference 1(1)except CHEV and NEFT which are stationary at level 1(0). This implies that the hypothesis of non-stationarity is rejected for all the variables at their first difference. This justified the need to test for co-integration.

Table 1: The Philips-PerronUnit Root Test Results

Variable	Level	First Difference	Order of Integration
InGDP	-2.829666 (0.0644)	-9.001553 (0.0000)	1(1)
InCHEV	-3.986078 (0.0040)	-6.544079 (0.0000)	1(0)
InATMV	-1.114051 (0.6993)	-8.747238 (0.0000)	1(1)
InPOSV	14.34315 (1.0000)	-3.742876 (0.0077)	1(1)
InWEBP	-1.411113 (0.5657)	-12.04504 (0.0000)	1(1)
InMOBP	2.228927 (0.9999)	-6.719886 (0.0000)	1(1)
InNIPV	11.70820 (1.0000)	-3.552972 (0.0132)	1(1)
InNEFT	-4.783844 (0.0008)	-16.52480 (0.0001)	1(0)
5% C.V	5% = -2.976263	5% = -2.981038	-12.04504

Source: Author Unit Root Test Output from EViews 9.

Note: i. Pro-value are reported in parenthesis, ii. The Philips-Perron statistics are compared to 5 per cent critical value (C.V).

Cointegration Test using the Johansen Methodology

The results of the Johansen Unrestricted Cointegration Rank test for the model is presented in Table 2. Starting with the null hypothesis that there are no cointegrating vector (r = 0) in the model, the results showed that there exists at least sixcointegrating relationship in the model as both the Trace and Max-Eigen statistics rejected the null hypothesis of r = 0 at 5 per cent level of significance which means that there is a unique longrun relationship between the Value of Cheques Cleared (CHEV), Automated Teller Machine Payment Value (ATMV), Point of Sale Value (POSV), Web/Internet Transfers Payment Value (WEBP), Mobile Payment Value in Nigeria (MOBV), the Nigerian Interbank Settlement Scheme Instant Payment (NIPV), the National Electronic Funds Transfer Value (InNETF)and the Gross Domestic Product (GDP) in Nigeria.

Table 2: Unrestricted Cointegration Rank Test result for model

Hypothesised No. of CE(s)	Trace Stat.	Critical Value (0.05)	Prob**	Hypothesised No. of CE(s)	Max-Eigen Stat.	Critical Value (0.05)	Prob**
None *	538.7959	159.5297	0.0000	None *	215.1765	52.36261	0.0001
At most 1 *	323.6194	125.6154	0.0000	At most 1 *	99.85958	46.23142	0.0000
At most 2 *	223.7598	95.75366	0.0000	At most 2 *	76.32679	40.07757	0.0000
At most 3 *	147.4330	69.81889	0.0000	At most 3 *	57.15233	33.87687	0.0000
At most 4 *	90.28067	47.85613	0.0000	At most 4 *	49.51962	27.58434	0.0000
At most 5 *	40.76106	29.79707	0.0019	At most 5 *	26.77721	21.13162	0.0072
At most 6	13.98385	15.49471	0.0834	At most 6	12.95189	14.26460	0.0797
At most 7	1.031962	3.841466	0.3097	At most 7	1.031962	3.841466	0.3097

Source: Author Cointegration Rank Test Outputfrom EViews 9.

Note:

i. r represents number of cointegrating vectors. ii. Both Trace and Max Eigenvalue tests indicates 6cointegrating equations respectively at the 0.05 level. iii. *****denotes rejection of the hypothesis at the 0.05 level and IV. ****** Mackinnon-Haug-Michelis(1999) p-values

Short-run Error Correction Representation

The results of the log linear short-run error correction representation of the model is reported in Table 3.

Table 3: Short-run Error Correction Representation for the Model

Regressor	Coefficient	Std. Error	T-Ratio	Prob
C	167.3778	342.4445	0.488774	0.6312
D(InCHEV)	-0.160983	2.498307	-0.064437	0.9494
D(InATMV)	6.339550	1.881934	3.368636	0.0036
D(InPOSV)	-2.375795	14.76636	-0.160892	0.8741
D(InWEBP)	107.4928	49.55063	2.169353	0.0445
D(InMOBP)	14.77938	10.88919	1.357253	0.1924
D(InNIPV)	-1.054403	0.456887	-2.307801	0.0339
D(InNEFT)	1.276544	0.364534	3.501852	0.0024
ECM(-1)	-0.910602	0.284041	-3.205886	0.0052

Source: Author Regression Output from EViews 9.
Dependent Variable: D(GDP)
Method: Least Squares
Date: 09/20/20 Time: 20:22
Sample (adjusted): 2012Q2 2018Q3
Included observations: 26 after adjustments

The short run error correction results presented in Table 3 showed that the entire explanatory variables of the economic and electronic payment system in Nigeria met their expected signs except the value of cheques cleared (InCHEV), Point of Sale Value (InPOSV) and the Nigerian Interbank Settlement Scheme Instant Payment (InNIPV) with negative sign. The empirical results also revealed that the value of cheques cleared (InCHEV) and Point of Sale Value (InPOSV) hadinverse and insignificant impact on gross domestic product (InGDP)in Nigeria. Though, the Nigerian Interbank Settlement Scheme Instant Payment (InNIPV) was negative but statistically significant in explaining its impact on the gross domestic product in Nigeria. This result is consistent with previous empirical studies of Mamudu and Gayovwi[43].

The short run results further revealed that the Automated Teller Machine Payment Value (InATMV) and Web/Internet Transfers Payment Value (InWEBP)both had positive and significant effect on gross domestic product (InGDP) in Nigeria. A unit change in Automated teller machine payment value and the web/internet transfers' payment valueincreased gross domestic product in Nigeria by 6.339550 and 107.4928 per cent respectively. These finding supports the findings of Ibe and Odi[72].

The results also revealed that Mobile Payment Value (InMOBV) and the National Electronic Funds Transfer Value (InNETF) had direct relationship with gross domestic product in Nigeria. Thus, 1 per cent change in mobile payment value and the national electronic funds transfer value raised gross domestic product in Nigeria by 14.77938 and 1.276544 per cent respectively. These results are consistent with previous studies of Ibe and Odi[72].

Finally, the error correction mechanism (ECM) which is -0.910602 is statistically significant and has the appropriate negative sign. It suggests however, that there is a very high adjustment process in the practice of theelectronic banking payment systems in Nigeria. It is also a confirmation that indeed the automated teller machine payment value, point of sale value, web/internet transfers payment value, mobile payment value in Nigeria, the Nigerian interbank settlement scheme instant payment, national electronic funds transfer value and gross domestic product in Nigeriaare cointegrated.

Diagnostic Test

To confirm the robustness of the model, a diagnostic test was performed as shown in Table 4.

Table 4: Key Regression and Diagnostic Statistics for Model

R-squared	0.677926	Mean dependent var	160.2243
Adjusted R-squared	0.526362	S.D. dependent var	1353.089
S.E. of regression	931.2139	Akaike info criterion	16.77828
Sum squared resid	14741710	Schwarz criterion	17.21377
Log likelihood	-209.1176	Hannan-Quinn criter.	16.90369
F-statistic	4.472870	Durbin-Watson stat	1.845957
Prob(F-statistic)	0.004557		

Source: Author Regression Output from EViews 9.

The coefficient of determination R^2 indicates that 73 per cent of the total variation of gross domestic product of the Nigerian economy is jointly explained by the value of cheques cleared, automated teller machine payment value, point of sale value, web / internet transfers payment value, mobile payment value in Nigeria, the Nigerian interbank settlement scheme instant payment and national electronic funds transfer value. The Akaike information criterion, Schwarz criterion and Hannan-Quinn criterion showed that the model is correctly specified. F statistic measuring the joint significant of all regressors in the model is statistically significant at the 5 per cent level. The Durbin-Watson statistic of 1.845957 approximately 2 revealed the absence of autocorrelation among the explanatory variables.

Granger Causality Test Results

The Pairwise Granger Causality test was employed to examine the existence of causal relationships between

electronic payment system and development of the Nigerian economy, and the results of these estimations are reported in Table 5.

Table 5: Pairwise Granger Causality Test Results for the Model

Null Hypothesis:	F-Statistic	Prob.	Decision
CHEV does not Granger Cause GDP	5.98606	0.0067	Reject
GDP does not Granger Cause CHEV	1.37408	0.2691	Accept
ATMV does not Granger Cause GDP	12.1376	0.0001	Reject
GDP does not Granger Cause ATMV	0.98464	0.3857	Accept
POSV does not Granger Cause GDP	4.20195	0.0250	Reject
GDP does not Granger Cause POSV	0.64312	0.5330	Accept
WEBP does not Granger Cause GDP	2.93069	0.0693	Accept
GDP does not Granger Cause WEBP	2.79398	0.0777	Accept
MOBP does not Granger Cause GDP	4.19806	0.0250	Reject
GDP does not Granger Cause MOBP	1.78765	0.1853	Accept
NIPV does not Granger Cause GDP	16.6106	3.E-05	Accept
GDP does not Granger Cause NIPV	2.48802	0.1034	Accept
NEFT does not Granger Cause GDP	0.57299	0.5728	Accept
GDP does not Granger Cause NEFT	0.17434	0.8413	Accept

Source: Author Regression Output from EViews 9.

Pairwise Granger Causality Tests
Date: 09/20/20 Time: 20:00
Sample: 2011Q1 2019Q4
Lags: 2

The Pairwise Granger Causality test results between CHEV and GDP; ATMV and GDP; POSV and GDP; MOBV and GDP exhibited unidirectional causation running from the value of cheques cleared to gross domestic product, automated teller machine payment value to gross domestic product, point of sale value to gross domestic product and mobile payment value to gross domestic productin Nigeriaas their pro-values are less than 0.05(P<0.05). Thus, the null hypothesis of no causation was rejected as the feedback causation phenomenon was evident.The results also revealed that the test for the null hypothesis of no causation betweenWEBP and GDP; NIPV and GDP; and NEFT and GDP were accepted as the pro-values were greater than 0.05 (P > 0.05). This implies no evidence of causation between web / internet transfers' payment value, the Nigerian interbank settlement scheme instant payment,national electronic funds transfer value and gross domestic product during the period.

Stability Test

Stability test was conducted using cumulative sum (CUSUM) and cumulative sum of squares (CUSUM Q) of recursive residuals as shown in figure 1 and 2 respectively. The existence of parameter instability is established if the cumulative sum and the cumulative sum of square of the residuals goes outside the area between the critical (straight bounded upper and lower) lines.

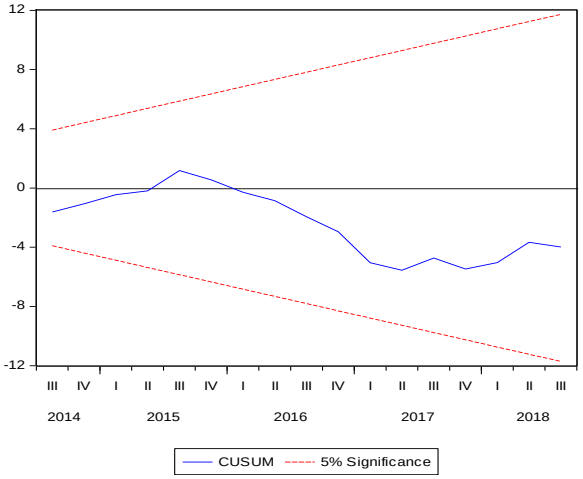

Figure 1: Cumulative Sum of Recursive Residuals

From figure 4.1 and 4.2, it was observed that the model at 5 per cent level of significance, CUSUM and CUSUM Q were stable over time because the observed bound lied between the upper and lower limits. In conclusion, at 5 per cent critical value both CUSUM and CUSUM Q explained the stability of the model overtime.

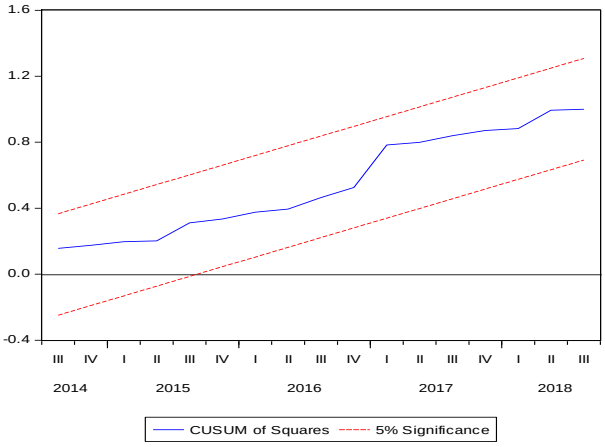

Figure 2: Cumulative Sum of Squares of Recursive Residuals

CONCLUSION

The empirical investigation on electronic banking payment system and its impact on the Nigerian economy between 2011(Q1–Q4) to 2019(Q1–Q4) was examined with the application of the Phillips-Perron test statistics, Johansen Cointegration techniques, Pairwise Granger Causality techniques and the error correction mechanismon a log linear regression framework. The results from the Phillips-Perron test statistics confirms the stationarity of the selected economic and payment system variables (Gross Domestic Product (GDP), Value of Cheques Cleared (CHEV), Automated Teller Machine Payment Value (ATMV), Point of Sale Value (POSV), Web/Internet Transfers Payment Value (WEBP), Mobile Payment Value in Nigeria (MOBV), Nigerian Interbank Settlement Scheme Instant Payment (NIPV) and National Electronic Funds Transfer Value (NETF) were stationary at first difference 1(1) except CHEV and NEFT which were stationary at level 1(0). The Johansen cointegration test results indicated a unique long run relationship between CHEV, ATMV, POSV, WEBP, MOBV, NIPV and gross domestic product in Nigeriaas both the Trace and Max-Eigen statistics revealed the existence of at least six cointegrating equations in the model at 5 per cent level of significance, while the results of the error correction model showed a high adjustment process in the Nigerian electronic payment system since the speed of adjustment to long run equilibrium was above 50 per cent.

Also from the findings, the significant impact of ATMV,WEBP, NIPV and NEFTon gross domestic product in Nigeriais traceable tothe heavy acceptance of the electronic payment system in Nigeria. While the positive relationship between ATMV,WEBP, MOBP andNEFTcan be attributed to the usage of e-transactions through technology acceptance and diffusion of innovation of electronic payment systems in Nigeria. The results also revealed that CHEV, POSV and NIPVhad negative impact on gross domestic product in Nigeria. This negative impact can be ascribed to poor power / internet infrastructures, inadequate supply of point of sales devices and unfriendly mobile applications of some banks in the country.

Finally, the results of The causality between CHEV and GDP; ATMV and GDP; POSV and GDP; MOBV and GDP exhibited unidirectional causation running from the value of cheques cleared to gross domestic product, automated teller machine payment value to gross domestic product, point of sale value to gross domestic product and mobile payment value to gross domestic product in Nigeria as their pro-values are less than 0.05 ($P<0.05$). Thus, the null hypothesis of no causation was rejected as the feedback causation phenomenon was evident.

Conclusively, the Nigerian electronic banking payment systems stand a chance of providing better and secure cashless economy on a long term prospect, for efficient transactions that will facilitates the development of socio-economic facilities that lead to economic growth and development in Nigeria.

RECOMMENDATION

Nigerians should generally accept and appreciate the electronic banking payment systems policy because it will cause economic stability and enhance economic development.

The central bank of Nigeria and the deposit money banks should provide more electronic banking payment facilities to enhance the ultimate utilization of electronic banking payment systemsin Nigeria.

Deposit money banks should be mindful of customer protection, customer complaint management and dispute resolution strategies on electronic payment transactions in Nigeria.

There is need for massive sensitization, awareness campaign and enlightenment of people on the need for and importance of electronic banking payment systemsin Nigeria.

Unavailability of POS at some purchase centers, poor internet access on electronic transactions, malfunctioning of ATM machines causing cards to get stuck, long queues at ATM a, internet fraud, ATM robbery andundue charges upon the usageof electronic transactions should be addressed by financial institutions, Government and Security Agencies. This will go a long way to facilitating the proficient utilization of electronic banking payment systems in Nigeria.

RESEARCH LIMITATIONS

This study is limited to the data available at hand. Data outside the study scope were not made use of. Other limitations militating against this study are financial constraints and time factor.

CONTRIBUTION TO KNOWLEDGE

This study contributes to knowledge in the following ways:

(a) The findings of this study confirmed the previous studies which showed that electronic banking payment systems exerted positive impact on the Nigerian economy. This shows that there has been consistency in their results on electronic banking payment system in Nigeria as this study has helped to further reinforce the fact that the electronic

payment systems has the ability to sustain economic growth and development. Therefore, policy makers need to deepened ways of managing electronic payment system in Nigeria.

(b) The study is different from previous studies in scope. Other studies stopped at 2015 but this study extended its scope to 2019. This will help to enrich the growing empirical literature on electronic banking payment system and its impact on the Nigerian economy.

(c) The addition of Value of Cheques Cleared (CHEV), the Nigerian Interbank Settlement Scheme Instant Payment (NIPV) and National Electronic Funds Transfer (NEFT) further created a robust estimation and this showed that there is need for policy makers to have concrete framework on electronic banking payment systems in Nigeria.

(d) Finally, the study also contributes to knowledgeusing log linear multiple regression framework with the application of different statistical and econometric methodologies (Phillips-Perron test statistics, Johansen cointegration techniques, the Pairwise Granger Causality techniques and the error correction mechanism (ecm) to capture the impact ofelectronic banking payment systemand its stimulatingsignificant impact on the Nigerian economy.

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APPENDIX

Appendix A: Selected Economic and Payment System Variables for the Regression Analysis

PERIOD	GDP	CHEV	ATMV	POSV	WEBP	MOBP	NIPV	NEFT
2011Q1	13450.72	5417.80	333.51	6.28	24.13	3.32	n. a.	n. a.
2011Q2	13757.73	5227.00	364.67	6.45	22.01	3.72	n. a.	n. a.
2011Q3	14819.62	5548.60	387.48	8.64	6.36	5.01	n. a.	n. a.
2011Q4	15482.97	6109.30	476.08	9.65	7.11	6.93	n. a.	n. a.
2012Q1	13915.51	1995.20	454.79	1.87	6.38	1.08	306.72	3447.14
2012Q2	14323.05	1903.10	483.25	8.74	6.93	4.93	711.54	3398.26
2012Q3	15645.43	1832.80	499.71	14.75	7.53	7.26	1200.04	3287.94
2012Q4	16045.90	1730.50	546.91	22.66	10.72	18.24	1672.73	3526.70
2013Q1	14535.42	1713.60	611.26	26.28	11.37	22.88	1893.47	3439.46
2013Q2	15096.76	1888.10	675.01	30.94	9.36	28.92	2285.28	3298.69
2013Q3	16454.37	2112.80	729.23	43.15	12.30	33.92	2847.35	3527.23
2013Q4	17132.16	1960.40	813.36	60.64	14.29	57.08	3818.82	4041.95
2014Q1	15438.68	1894.10	784.05	67.47	16.6	66.36	4420.75	3845.41
2014Q2	16084.62	1816.60	852.36	70.25	14.13	74.16	4717.01	3511.50
2014Q3	17479.13	1802.30	1027.92	78.00	18.94	86.48	5,090.15	3658.97
2014Q4	18150.36	1756.20	1015.55	96.35	24.37	119.47	5693.59	3600.71
2015Q1	16050.60	1654.30	937.96	96.31	22.76	91.61	5794.86	3477.91
2015Q2	16463.34	1540.40	962.43	104.57	17.05	100.43	6260.48	3293.67
2015Q3	17976.23	1499.00	1011.48	112.42	22.39	109.3	6593.45	3281.45
2015Q4	18533.75	1501.80	1058.38	135.20	29.38	141.01	7000.27	3034.07
2016Q1	15943.71	1453.29	1069.99	144.76	31.69	135.24	7637.183	2757.68
2016Q2	16218.54	1441.50	1134.50	163.71	26.28	168.28	8728.079	3041.71
2016Q3	17555.44	1414.90	1246.80	189.95	30.76	223.06	9591.12	5460.30
2016Q4	18213.54	1519.86	1536.85	260.58	43.63	230.31	12152.68	3325.11
2017Q1	15797.97	1479.10	1502.06	285.98	46.57	260.59	13127.92	3087.02
2017Q2	16334.72	1302.39	1544.23	324.13	37.09	295.24	13363.27	3963.30
2017Q3	17760.23	1308.67	1558.76	364.55	45.58	239.36	13962.66	3757.19
2017Q4	18598.07	1291.76	1832.55	435.15	55.35	306.82	15711.82	4138.96
2018Q1	16096.65	1316.89	1568.95	474.73	60.74	329.12	17802.22	3869.85
2018Q2	16580.51	1279.08	1603.17	543.63	53.26	410.57	19090.78	3579.12
2018Q3	18081.34	1180.95	1591.01	650.41	69.07	498.08	19955.33	3581.99
2018Q4	19041.44	1258.42	1716.96	714.35	221.53	592.94	23574.70	n. a.
2019Q1	16434.55	1152.75	1539.26	633.81	107.64	100.69	24167.25	n. a.
2019Q2	16931.43	1118.17	1699.16	749.82	116.26	1155.64	25182.93	n. a.
2019Q3	18494.11	1099.70	1622.93	856.86	120.57	1428.12	26181.89	n. a.
2019Q4	19527.72	1111.05	1651.25	964.27	133.66	1687.10	29690.50	n. a.

Source: Central Bank of Nigeria Statistical Bulletin [23].

Note: n. a. means not available