IMPACT OF BANKING TECHNOLOGY ON ECONOMIC GROWTH IN NIGERIA

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ABSTRACT

This paper examines the impact of banking technology in the area of electronic fund transfer system and economic growth in Nigeria for the period, 2009-2016. Data are sourced from CBN Statistical Bulletin and annual report. The tests for stationarity revealed that in all, variables are stationary at 1(1) order. Johansen Cointegration test is employed and it is found out that there is existence of long-run relationship among the variables. The Granger Causality result reveals a unit-directional causality between Real Domestic Product (RGDP) and banking technology in the area of internet banking (WEB) with internet banking (WEB) granger causing Real Domestic Product (RGDP. From the Ordinary Least Square Estimation result, R^{-2} is 0.79, showing high explanatory power of our explanatory variables meaning that our model is of good fit. The F-statistics is 30.34 which shows a significant relationship between our explanatory variables as a group (ATM, MOBILE, POS, WEB) and the dependent variable (RGDP) at 5% level of significance. While individually using t-statistics, shows that there is significant relationship between ATM and RGDP while that of MOBILE, POS, WEB and RGDP is insignificant at 5% level of significance. We thereby reject our null hypothesis and conclude that there is significant relationship between Technological Advancement in banking in the area of Electronic Fund Transfer System and Economic Growth in Nigeria and recommend that efforts should be intensified in the awareness, provision, installation, security, accessibility and usage of ATM and internet banking in Nigeria in places where business and money are transacted no matter the location, value and volume to bring about sustained continuous increase in Gross Domestic Product in particular and economic growth in general.

Keywords: ATM, Banking Technology and Mobile Banking

INTRODUCTION

The world has become a global village with an array of developments on the information superhighway. Nigeria represents a part of this development; and the banking sector is not left out. Assisted by the deregulation measure introduced in the 1980s, there was an astronomical increase in the number of banks, both merchant and commercial. By 1989, the number of banks had increased from 32 to 81 together with numerous non-bank financial institutions. Prior to the current banking reformation programme by the Federal Government, there were about 82 approved commercial and merchant banking institutions in Nigeria by the Central Bank of Nigeria (CBN) even after the era of distress syndrome that swept away the industry in the mid-1990s leading to the collapse of many banks and finance houses. The financial restructuring of 2005, which necessitate N25 billion as minimum capital base, reduced the number of commercial banks to 25. The objective of the consolidation process is to strengthen the financial sector and to enable them to face foreign competition in the not too distant future. (Jegede, 2014).

In the world of banking and finance, nothing stands still. The biggest change of all is in the scope of the business of banking. Banking in its traditional from is concerned with the acceptance of deposits from the customers, the lending of surplus of deposited money to suitable customers who wish to borrow and transmission of funds. Apart from traditional business, banks nowadays provide a wide range of services to satisfy the financial and non-financial needs of all types of customers from the smallest account holder to the largest company and even to non-customers. The range of services offered differs from bank to bank depending mainly on the type and size of the bank. Technology has been one of the most important factors for the development of mankind. Information and communication technology is the major advent in the field of technology which is used to access, process, store and disseminate information electronically. Banking industry is fast growing with the use of technology in the form of Automated Teller Machines (ATMs), Point of Sale (POS), on-line banking, Telephone banking, Mobile banking etc. generally known as Electronic banking or Electronic Fund Transfer System (EFTS). Now, in a world, which is becoming increasingly open as a result of technology, Internet and the World Wide Web (WWW), electronic banking has been gaining ground around the globe. This offers banking institutions a new frontier of opportunities and challenges, further augmenting competition in the global banking market. This growth has been strongly supported by the development in the field of technology, without which this could not have been possible. (Manjusha, 2013).

The situation in Nigeria produced an interesting scenario. The global phenomenon in the development was accentuated by keen competition at home in view of the unprecedented upsurge in the number of banks and branches. There was the need to innovate and modernize banking operation in the face of increased market pressure and customers demand for improved service delivery and increased convenience which made the adoption of modern technology to become an imperative. This includes computerization and adoption of other electronic devices. Thus, Customers' insatiable appetite for

efficient services had compelled financial institutions to move fast to a more radical transformation of their business systems and models by embracing technology and electronic banking (Ovia, 2001).

Also, an increasing number of countries have adopted policies to accelerate the use of electronic channels and reduce the use of cash. The motivation for these policies vary, but typically revolves around reducing the cost of banking, encouraging financial inclusion, increasing the amount of capital available for investment within the banking system, driving real economic growth and reducing tax evasion. The policy should also reduce the incidences of robberies (bank and others). Nigeria is not left out.

In Nigeria, the modern payments system started out being completely paper-based with the use of bank notes, payment orders and cheques. In 1996, the payments system was modified to include card-based e-payment products when the Central Bank of Nigeria (CBN) granted Allstates Trust Bank approval to introduce a closed system electronic purse called ESCA. This was followed by the introduction of 'paycard' by diamond bank in February 1997. By 1999, card based payment products assumed an open platform with authorization from the CBN for the floating of two card service companies – Smartcard Nigeria and Gemcard Nigeria Limited – by a consortium of over 20 banks. In 2003, the CBN, in collaboration with the Bankers Committee, launched the first major initiative to modernize the payment system, granting approval to a number of banks to introduce international money transfer products, telephone banking and online banking via the internet on a limited scale. This however did not come without stated standards. These are as follows:

As stated earlier, Banking industry is fast growing with the use of technology in the form of Automated Teller Machines (ATMs), Point of Sale (POS), on-line banking, Telephone banking, Mobile banking etc. generally known as Electronic banking or Electronic Fund Transfer System (EFTS). Some of these and their evolution in Nigeria are discussed below.

a. Automated Teller Machines (ATMs)

ATMs are a computer-controlled device that dispenses cash, and may provide other services to customers who identify themselves with a Personal Identification Number. ATM dispenses cash at any time of the day and night, unlike the traditional method where customers have to queue for a very long time in order to withdraw cash or transfer funds. As its name suggests, Automatic Teller Machine acts as a teller in a bank giving and taking money over the counter. It is an electronic device that allows customers to have access to a financial institution in a public place, Akshay et al (2017). It provides facilities of any time money. People having ATM card will able to withdraw and deposit money at any time. ATM is run through identity such as card and password which help to identify customers.

Access to ATM is through the use of Personal Identification Number (PIN) and a plastic card that contains magnetic strips with which the customer is identified. Banks usually hand over the PIN to the customer personally and the customer is usually instructed not to disclose the number to a third party and to handle the card with care. ATM card is about the size of a normal credit card and apart from the need to ensure its safety, its surface strips could be mutilated which may make the machine to reject it even though the PIN number is entered correctly.

Automated Teller Machines (ATMs) are located in banks and customers' convenient areas. This allows customers to drive up and complete financial transaction without ever leaving the safety of their belongings. Automated Teller Machines (ATMs) are interconnected to allow anyone with a bank card, debit card, or credit card to have access anywhere in the world because each station is connected to an inter-bank network such as PULSE, PLUS, CIRRUS and LINK to mention but few.

Other functions which the machines are capable of performing include Printing of statements, Transfer of funds, Payment of bills, Cash advances and Display of promotional messages (Adeoti, 2011).

b. Mobile Banking

This mode of e-banking makes use of the Global System for Mobile communication (GSM) phones as the primary electronic device. GSM has improved the operational efficiency of many banks. In the words of Manjusha, 2013, banks, Taking advantages of the booming market for mobile phones and cellular services, introduced mobile banking which allows customers to perform banking transactions using their mobile phones. The mobile banking services basically allow customers to operate their accounts with the operating banks from mobile phones to a large extent as long as their phones and network support SMS (short messaging service). Mobile banking could be defined as a facility which provides banking services such as balance enquiry, funds transfer, bill payment, and transaction history via a user's mobile phone (Quick (2009). Segun (2011) defines mobile banking as an occurrence when customers access a bank's networks using cellular phones, pagers, personal digital assistants, or similar devices through telecommunication wireless networks. Akpan (2009) viewed mobile banking (M-banking) as an application of mobile commerce that enables customers to bank virtually at any convenient time and place. Mobile banking has been especially targeted at people who travel frequently and to keep track of their banking transactions. Mobile banking is a financial transaction conducted by logging on to the bank website through a mobile phone or Personal Digital Assistant (PDA) to view account balance, transfer funds, make payments etc. Today, the mobile banking service is performed mainly via SMS or the internet, Akshay, et al 2017.

C. Point Of Sale System

This is an electronic device that allows a customer to instantly pay for goods and services electronically by deducting the cost of each purchase directly from his or her account, Ndugbu, (2013). The customer presents an encoded debit card to the store clerk who inserts it into a computer terminal connected to the bank's computer system. The customer's account is charged for the purchase and funds are automatically transferred to the store's deposit account. Point of sale networks are divided between online and offline POS systems. The latter accumulate all of a customer's transactions until day's end and then the total of all transactions is subtracted from the customer's account. In contrast, online systems deduct each purchase from the customer's account as that purchase is made. Cost wise, banks would generally prefer offline POS systems, but online POS systems appear to reduce the frequency of customer overdrafts and, thus may be less costly in the long run. POS terminals are increasing rapidly all over the world. In Nigeria, POS terminals are in major cities of

Lagos, Abuja, Port Harcourt and many state capitals. The majority of the recently installed POS terminals are in Petrol Stations and big supermarkets.

The CBN developed guidelines for the provision of adequate financial services through PoS in Nigeria. In addition to defining the roles and responsibilities for all stakeholders in the PoS value chain, the CBN's guidelines also outline minimum standards for service provision and fees/charges by which all service providers must abide. These are outlined below:

MINIMUM STANDARDS

All industry stakeholders who process and/or store cardholder information are to ensure their terminals, applications and processing systems comply with the minimum requirements defined in Standards and Best Practices.

All terminals, applications and processing systems, should comply with standards specified by the various card schemes. Each vendor must provide valid certificates showing compliance with these standards, and must regularly review status of all terminals to ensure compliance as standards change.

There will be continuous review and recertification of compliance with these and other global industry standards from time to time.

FEES AND CHARGES

The maximum total fee a merchant is charged for any PoS transaction is 0.75% of the transaction value subject to a maximum of NGN1,200.

Fees and charges are only applicable to PoS transactions performed with Naira denominated cards; PoS transactions done with cards issued in foreign currencies still follow the pricing arrangement put in place by the relevant international card association/scheme.

D. Internet Banking

An internet bank can be defined as a bank that provides account balances and some transaction capabilities to retail customers over the World Wide Web. Technology has created internet banking, also called online banking. The creation of the internet through technology has led to many banking transactions or activity options via the internet. Some of these activities includes; paying bills, 24 hour view of accounts, transferring money and many others. Customers access their banking information from browser software that runs the banking programs on the World Wide Web (www). Customers can personally and privately access their account information through the internet via a modem. Technology has allowed us to dial into the bank via the modem system which allows us to download and run programs that make us access a wide variety of banking information such as; account balances, number and types of banking transactions, bank statements, among others. On the downside, the internet has decreased operation and transaction at physical-brick and mortar banks as customer can basically conduct almost all the transactions possible in a real bank. Today, technology has helped create many banks which have no physical location or brick and mortar branches. Thus, internet or online banking is an electronic payment system that enables customers of a financial institution to conduct financial transactions on a website operated by the institution. Customers' insatiable appetite for efficient service had compelled financial institutions to move fast to a more radical transformation of their business systems and

models by embracing Internet banking (Ovia, 2001).

Reasons for automation of banking operation according to idowu (2005) are as follows:

a. To the bank

i. Facilitation of decision making.
ii. Availability of essential information at finger tipsl
iii. Improved service delivery.
iv. New product development.
v. Savings in space and running costs.
vi. Relevance among league of global financial institution.

b. To the customer

i. Quality services enjoyed.
ii. Great reduction in time being spent in banking halls.
iii. Confidentiality.
iv. Bank statement, balance etc obtained with ease.
v. 24/7 service delivery.
vi. Account could be accessed almost anywhere in the world.

c. To the economy

i. Creation of jobs and specialization.
ii. Improvement in commerce.
iii. Technological development/advancement.
iv. Data bank for National planning.

STATEMENT OF THE PROBLEM

In the world of banking and finance, nothing stands still. The biggest change of all is in the scope of the business of banking. Information and communication technology is a major advent in the field of technology which is used to access, process, store and disseminate information electronically. Financial institutions are moving fast to a more radical transformation of their business systems and models, by embracing technology and electronic banking (Ovia, 2001). Electronic banking is a kind of banking that involves electronic form of money transmission. Here, banking services are fully automated such that transactions are concluded in a jiffy. It involves the use of computer network in dispensing cash and transfer of funds. This has come in the form of Automated Teller Machines (ATMs), Point of Sale (POS), on-line banking, Telephone banking, Mobile banking etc. Thus, Electronic banking aids purchases. This means that one can purchase goods and services without having to carry physical cash about. Also one can take advantage of opportunities to make purchases at discount or of scarce commodities spontaneously as they come, not minding the time of the day, through Electronic Fund Transfer System (ETFS) which may elapse if the customer had to first go to the bank during banking hours, queue up and make cash withdrawal. Furthermore, buyers and sellers do not have to meet physically to transact business. This means that someone in Owerri can transfer fund to a supplier in Lagos and have his goods supplied to him without having to travel all the way to Lagos. This is also

applicable to international transactions. This is to say that with ETFS, distance and physical cash availability are not barriers to business transactions. This brings about increase in demand, sales and purchases. This increase in sales means increase in profit for producers and increase in demand will also compel producers to produce more leading to increase in the Gross Domestic Product in particular and economic growth in general. Does this really hold sway in the Nigerian context? This, we will like to know from this study. Thus, the relationship between the electronic aspect of technological advancement in banking in relation to payment system and economic growth in Nigeria is what this study sought to find out.

OBJECTIVE OF STUDY

This study seeks to find out the impact of technological advancement in banking in the area of Electronic Fund Transfer System (ETFS) on Economic Growth in Nigeria. Namely, the long-run relationship between Real Gross Domestic Product and Electronic Fund Transfer Systems such as Automated Teller Machines' use in fund dispensation and transfer, mobile banking, Point of sale (POS) service and internet banking in Nigeria.

RESEARCH QUESTION

What is the impact of technological advancement in banking in the area of Electronic Fund Transfer System (ETFS) on Economic Growth in Nigeria?

RESEARCH HYPOTHESIS

H_0: Technological advancement in banking in the area of Electronic Fund Transfer System (ETFS) has no significant impact on Economic Growth in Nigeria.

H_1: Technological advancement in banking in the area of Electronic Fund Transfer System (ETFS) has significant impact on Economic Growth in Nigeria.

REVIEW OF RELATED LITERATURE

Review of Concepts and Theories

Business organizations, especially the banking industry of the 21st century, operate in a complex and competitive environment characterized by changing factors and highly unpredictable climate, Adewuyi (2011). This makes it imperative for banks to continually seek ways to advance and improve its human and material resources to bring about better customer satisfaction and increased patronage at lesser cost. Technological advancement is the key. One is Information and Communication Technology. Information and Communication Technology (ICT) is the automation of process, controls and information production using computers, telecommunication, software and ancillary equipment such as Automated Teller Machine and Debit Cards. Laudon D. and Laudon J. (2001), assert that Information and Communication Technology deals with the physical devices and software that link various computer hardware components and transfer data from one physical location to another. The adoption of Information and Communication Technology in banking sector is generally referred to as electronic banking (E-banking), in business E-business and so on. According to Report of Technical Committee on e-banking (CBN, 2003), e-banking can be defined as a means whereby banking business is transacted using automated processes and electronic devices such as personal computers, telephones, Internet, card payments and other electronic channels. Onyediemekwu and Oruan (2013) described Electronic Banking System as a technological banking platform that enables customers to assess banking services

through intelligent electronic devices, such as Computers (Internet Banking), Personal Data Assistants (PDAs), Mobile phones (Mobile Banking and Mobile Money), Point of Sales Terminal (PoS), and Automated Teller Machines (ATMs).

E-business is globally widespread, becoming an integral part of IT within businesses as well as many homes (Akpore, 1998). A vast market has developed electronically. E-purchasing and banking have been by-products of this growth. Many businesses have been quick to recognize and exploit the niche. In this rapidly evolving modern society of which we are all a part, convenience has become crucial to survive the ever increasing pace of life. In particular, e-business, one of the IT applications with the highest impact upon the global economy, is creating a new business environment (Adetayo, 1999). As a growing number of companies launch new Internet-based business lines, many of the new technology advances occur as a result of their using Internet Technology (IT) to improve business processes. This often involves using the IT to carry out business transactions. E-business has revolutionized the business sector in a way unprecedented in the past centuries. It has fostered a new set of economic and social relationships. A critical use of the Internet Technology is to develop and experiment with new models. It is not technology by itself that makes or breaks an Internet venture, but the underlying innovation and adequacy of the adopted business approach. IT and e-banking have now become the key elements for strengthening the competitiveness of the national economy and improving the productivity and efficiency of both private and government banks. The application of concepts, techniques, policies, and implementation strategies of Information and Communication Technology to banking services has become a subject of fundamental importance and concern to all banks and indeed a pre-requisite for local and global competitiveness because, it directly affects the management decision plan and products and services to be offered by banks. It has continued to change the way banks and the corporate relationships are organized worldwide and the variety of innovation of service delivery, Adewuyi (2011).

Harold and Jeff (1995) contend that financial service providers should modify their traditional operating practices to remain viable in the 1990s and decades that follow. They claimed that most significant shortcomings in the banking industry today is a wide spread failure on the part of senior management in banks to grasp the improvement of technology and incorporate it into their strategic plans. Woherem (2000) claims that, only banks that overhaul the whole of their payment and delivery systems and apply advanced Technology to their operations are likely to survive and prosper in the new millennium. He advises that banks should re-examine their service and delivery systems in order to properly position themselves within the framework of electronic banking. Electronic banking has provided self-service facilities (automated customer service machine) from where prospective customers can complete their account opening direct online. It assists customers to validate their account numbers and receive instructions on when and how to receive their cheque books, credit and debit cards. E-banking is a kind of banking that involves electronic form of money transmission. Here, banking services are fully automated such that transactions are concluded in a jiffy. He further states that, e-

banking involves the use of computer network in dispensing cash and transfer of funds.

However, access to and use of these technologies remains extremely uneven, Agboola, (2000). Less developed economies are being left behind in the expansion of a global economy where knowledge is a key factor driving productivity growth. IT and e-banking contribute to the future of developing countries, Nigeria inclusive; underestimating their importance may ultimately increase the gap with industrialized countries. Most banks in the country look towards opportunities arising from the new marketplace. They also hope to benefit from the more pervasive and enduring effects of e-banking upon their business organizations. They are adopting Internet-based technologies to craft lean production systems and improve their distribution efficiency. In this way, the competitiveness of banks can be greatly enhanced. Furthermore banks have to provide an excellent service to customers who are sophisticated and will not accept less than above average service. Thus, the issue of service marketing in general, and banking services in particular has become one of the most important and modern directions which have witnessed a substantial expansion during the last years in almost all societies Agboola, (2003). This is because of the increasingly significant role which banking services have with the widening and variety that these services are characterized with, thus banking services have touched most aspects of contemporary societies' life and activities.

REVIEW OF EMPIRICAL AND METHODOLOGICAL ISSUES

This section of the study seeks to review relevant empirical studies on Banking Technology and the Growth of the Nigerian Economy. Differing opinions have indeed continued to emerge on how technological advancement in banking in the area Electronic Fund Transfer systems otherwise known as Electronic Banking has impacted on economic growth.

Mohammed and Dada 2014, empirically investigated the impact of Automated Teller Machines (ATMs) on customers' satisfaction in Ilorin metropolis, the capital city of Kwara state, Nigeria, using three purposively selected commercial banks in the city, that is; First Bank of Nigeria Plc., Guaranty Trust Bank Plc. and First City Monument Bank Plc. The objective was to ascertain the relationship between ATM usage and customers' satisfaction in Nigeria. The study employed primary data sourced through structured questionnaires as the data collection procedure. The questionnaires were administered to 180 customers (60 from each bank), selected randomly at the banks' ATM terminals during the course of transactions. Descriptive and inferential statistical technique tools such as tables, percentages and charts were used to present and analyze the data, while the chi-square technique was applied to test the hypothesis. The result revealed that there is a significant relationship between ATM usage and customers' satisfaction. The study thus recommended among others, that restriction on cash withdrawals by customers per day should be abolished by Monetary Authority in order to enhance customer satisfaction and to promote financial inclusion in Nigeria.

Tijani and Ilugbemi 2015 examined the impact of electronic payments channels (EPC) on National development (ND). The survey was targeted at current and savings accounts customers of deposit money banks

in Nigeria. One hundred and twenty (120) questionnaires were administered in six (06) banks in Ado –Ekiti metropolis and the data were analyzed using inferential statistics, specifically, with the use of chi-square. The study revealed that electronic payment channels (EPC) have contributed positively to national development (ND) and recommended that the Central Bank of Nigeria (CBN) should mount other e-payment products for the promotion of trade and commerce in Nigeria and also embark on intensive campaign for complete adoption of e-payment products especially at the grassroots level among others.

Salawu and Salawu (2007) evaluated the tangible benefits of e-business as an organizational tool and its influence on banking activities, as well as customer satisfaction practices with IBTC-Chartered Bank as case study. Using Cross tabulations and Chi-square to analyze the data, the study revealed that there is a linear relationship between high-level automation of banking services and improvement in service delivery and existence of a significant relationship between customer's choice of bank and implementation of e-business. Therefore, bank managers need to be knowledgeable and apply internet technologies in their banking activities and for the banking industry to move forward technologically at a faster rate, there is need for the nation to be adequately connected to the global village provided by Internet facilities.

Odusina (2014) investigated the level of ATM usage and customers satisfaction in Nigeria using comparative analysis of three banks in Ogun State Metropolis of Nigeria. The study employed primary data, sourced through questionnaires which were administered to a total of 200 respondents, cutting across the three banks. The data were analyzed using the Chi-square statistical tool. The study revealed that there is a positive and significant relationship between ATM usage and customers' satisfaction.

Alex (2014) examined the impact of e-banking on customer services and profitability of banks in Ghana. The random sampling technique was used to select ten banks and two hundred and fifty customers all in Accra for the study. The study found that e-banking has impacted positively on customer service and profitability of banks/,Though the study identified a number of challenges, it thus recommended among others that there should be 24/7 monitoring of ATMs so that any failure is addressed as soon as possible to guarantee customer retention.

Ogunlowore and Oladele (2014) also examined the impact of electronic banking on satisfaction of corporate bank customers in Nigeria. Data were collected with a structured questionnaire and also analyzed with descriptive statistics while the hypotheses of the study were tested using Chi-square technique. The study revealed that there is a significant relationship between electronic banking and customers' satisfaction and also suggested that critical infrastructure like power, security and telecommunication should be strengthened to ensure the application of electronic banking in Nigeria and optimum satisfaction on the part of customers.

Alabar (2012) conducted research in electronic banking services and customers' satisfaction in the Nigerian banking industry. He sampled 400 respondents of some selected banks across the six geo-political zones of the country. Using regression analysis, the study revealed that electronic

banking services have significant effect on customers' satisfaction in Nigeria.

Similarly, Ebiringa (2010) investigated the effect of ATM infrastructure on the success of e-payment. The analysis of the study was based on primary data collected from the users of ATMs. A total of 1141 users of ATM were sampled. The data were analyzed using the factor analysis simulation model. The study also modeled five strategic decision clusters, in which inadequate availability of quality infrastructure was identified as the most critical limitation to the efficient e-payment via ATMs. The study thus concluded that provision of adequate infrastructure such as power is critical for effective integration of the Nigerian banking system to the global network of electronic payment via ATMs; and for this to be possible, the study advocated for concerted effort by stakeholders to resolve the lingering crises in the energy sector.

Chinedu, et al (2012) analyzed the negative effect of the ATM as a channel for delivery of banking services in Nigeria using a sample of 600 respondents conveniently selected from two states of the federation. The data were analyzed using Chi-square. The study found that the ATM system of delivery of banking service not only contribute to the increasing rate of bank fraud, but equally lures Nigerians into profligate expenditures. They therefore recommended that banks should strive to increase their security layers to subvert the tricks of web scammers and limit the amount which customers may be allowed to withdraw at a time.

In another instance, Alabar and Agema (2013) also investigated the effect of information and communication technology and customer satisfaction in the Nigerian banking industry. The study employed primary data and four hundred banks' customers were served with questionnaire and regression analysis was used in testing the hypothesis. The study discovered that the present state of ICT had significant influence on customer satisfaction. They therefore suggested that banks should raise the standard of ICT based services to customers in the country.

Fenuga and Oladejo (2010) investigated the effect of electronic payment on customer service delivery in Nigerian banks. 100 respondents were stratified proportionately amongst customers of the selected banks with the aid of questionnaire which was randomly administered to customers of four selected commercial banks in the country. Chi-square and regression analysis were employed to analyze the data. The study concluded that electronic payment has significant impact on the services rendered by the banking industry in Nigeria.

Adewoye (2013) equally examined the impact of mobile banking on service delivery in the Nigerian banks. The study employed primary data sourced through questionnaires, which were administered to staff and customers of some selected banks in the country. The data collected were analyzed using Chi-square statistical technique. The results of the findings show that mobile banking improves banks service delivery in a form of transactional convenience, saving time and so on. To this end, the study recommended that banks management should create awareness to inform the public about the benefits delivered on the e-banking service products.

Jegede (2014) studied the effects of Automated Teller Machine on the performance of Nigerian banks motivated by the astronomical challenges confronting the

proliferation of ATM infrastructure and attendant financial losses to banks which are often under reported. The study used primary data collected through questionnaires analyzed statistically by using the Software Package for Social Science (SPSS Version 20.0) and chi-square technique with results indicating that less than the benefits, the deployment of ATMs terminals have averagely improved the performance of Nigerian banks because of the alarming rate of ATM fraud; with ATM service quality being less correlated to security and privacy of users and providers and concluded therefore that banks should strive to increase their security layers to subvert the tricks of web scammers, limit the amount which customers may be allowed to withdraw at a time and provide electronic alerts to customers' phone for all transactions carried out on their bank accounts through ATMs and the provisions of extra security layer that can prevent third party to make use of someone else's ATM card for unauthorized withdrawals electronically.

Agwu and Carter (2014) carried out a research work on the benefits, problems and prospects of mobile phone banking in Nigeria where they used data gathered over a two month period using an unstructured set of interview questions with data analysis done through thematic evidences arising from the data analyzed and discovered that phone banking was more established than internet banking and ATM services, but ATM services had a wider reach with the overriding factors affecting this situation being the cost and maintenance involved, education of customers, poverty and infrastructure availability. They recommended awareness creation about the services and associated business environment, security improvement of the services and tough government regulations for general electronic banking services in the Nigerian context.

Olanipekun et al (2013) examined the impact of e-banking on human resources performance and customer satisfaction. Primary data were adopted for the study which was sourced via a structured questionnaire administered to fifty randomly selected respondents. The Chi-square technique was used to analyze the data. The study revealed that introduction of electronic banking has impacted positively on the bank's human resource performance and has also enhanced customers' satisfaction. They therefore recommended that critical infrastructure that will aid the usage of e-banking products should be provided.

Berger (2003) argues that technological advances in the financial system, including internet banking, electronic payments technologies, and information exchanges (much of which have advanced significantly in Nigeria in the last five (5) years) may increase productivity through improvements in bank services. Berger further tests this proposition empirically and finds that switching from paper to electronic payments reduces the costs of banks back-office activities, thus reducing banks operating costs. He thus confined significant effects in terms of productivity gains and economies of scale in the context of the US Economy.

Humphrey et al (2006) claim, with some support, that if a country shifts from all paper based to fully electronic based payment systems and substitutes branch offices with ATMs, annual savings can reach 1% of GDP!

Hassan et al (2012) also demonstrates that technological improvements in payments systems show benefits not only in terms of bank operating costs, but also in terms of revenue as well.

Hassan et al indeed provided evidence, based on retail payments data for all 27 European Union member states from 1995 to 2009, that migration to efficient electronic retail payment systems has a positive effect on GDP, consumption and trade, and that this relationship is strongest for card payments. They find also that proliferation of ATMs has a positive impact on GDP and trade and provide evidence that integration and harmonization of retail payment markets foster trade and consumption, thus benefiting the whole economy.

Based on research contextualised in a developing economy -Egypt, El Gawadi argues that the impact of e-commerce on developing countries could be even stronger than on developed countries because the scope for reducing inefficiencies and increasing productivity is much larger in developing countries. His conclusion is that e-commerce could be an important tool for development by cutting costs, increasing efficiency and reducing time and distance.

Lastly, Ray and Ghosh (2014) empirically examined the impact of internet banking service quality dimensions on customer satisfaction. The study employed pre-structured questionnaire in collecting the primary data from a sample of 120 respondents through personal contact, field survey and email. The data were analyzed through SPSS version 21.0. The analysis revealed that there are three dimensions of service quality, namely; Assured service, Service efficiency and convenient service, which impact customer satisfaction and that customers are more satisfied with additional service dimensions like trustworthiness, sincerity, accessibility and awareness.

Meanwhile, from the previous research efforts, one could say, with all modesty, that the relationship between ATM usage and the level of satisfaction derived by banks' customers has received a fair share of empirical studies and a number of recommendations from both administrative and monetary analysts across the globe. However, as it is observed, none of these studies have investigated the relationship between customers' satisfaction and ATM usage in the Ilorin metropolis, thus creating a research gap, which necessitated the study.

Electronic payment systems have developed significantly in recent years both globally and in the Nigerian financial and payments space. Officially government policy especially from the Central Bank of Nigeria (CBN) has sought to promote electronic payments and other non-traditional; noncash based payment mechanisms in order to reduce the overwhelming cash based banking which predominates in the Nigerian banking system. The Nigeria banks and global payment companies, as well as other industry participants such as switch companies, ICT providers, have also collaborated to deepen the electronic payments space in Nigeria. The question that arises however is whether there is any relationship between the development of banking technology in the area of electronic fund transfer systems and overall economic growth? And whether there are any positive effects, of electronic payments on the Gross Domestic Product (GDP). We sought, by this research project, to discover how and by how much banking technology in the area of electronic fund transfer systems could boost

economic growth in a developing country like Nigeria. No literature has sought to find out empirically if banking technology in the area of electronic fund transfer systems otherwise known as electronic banking has any impact on the Gross Domestic Product (GDP) in particular and economic growth in general in Nigeria. This study is out to fill this gap.

RESEARCH METHODOLOGY

This paper employed the Ordinary Least Square Method to develop a model on the relationship between the information and communication Technology employed by banks in the area of Electronic Fund Transfer Systems which includes Automated Teller Machines (ATM), Mobile Banking, Point Of Sale (POS) and internet banking (WEB) technology; and Nigerian economic growth proxied by Real Gross Domestic Product (RGDP). The time series properties of the variables were examined through the use of Augmented Dickey Fuller (ADF) unit root test. The long-run relationship among the variables was tested using the Johansen co-integration test while the Granger causality test was applied to establish if there is a causal relationship between the variables.

MODEL SPECIFICATION

In analyzing the impact of technological advancement in banking in the area of Electronic Fund Transfer System (ETFS) and Economic Growth in Nigeria from 2009 to 2016, econometric method is used;

We have the functional model of our estimation equation as follows:

RGDP = F (ATM, MOBILE, POS, WEB)……..……(3.I)

And our econometric model in the form:

$$y = \alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 x_3 + \alpha_4 x_4 + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.2)$$

as stated below:

$$RGDP_t = \alpha_0 + \alpha_1 ATM_t + \alpha_2 MOBILE_t + \alpha_3 POS_t + \alpha_4 WEB_t \ldots\ldots\ldots\ldots\ldots\ldots (3.3)$$

A priori signs are $\alpha_1 > 0, \alpha_2 > 0, \alpha_3 > 0, \alpha_4 > 0$.

Where:

RGDP = Real Gross Domestic Product.

F = Functional Notation.

ATM = Automated Teller Machine.

MOBILE = Mobile Banking.

POS = Point Of Sale.

WEB = Internet Banking.

α_0 =Constant

ε = Error Term

$\alpha_1, \alpha_2, \alpha_3, \alpha_4$ = Coefficients

ESTIMATION PROCEDURE

Having stated above that the researcher employed the Ordinary Least Square Method to develop a model on the relationship between Banking Technology employed by banks in the area of Electronic Fund Transfer Systems which includes Automated Teller Machines (ATM), Mobile Banking, Point Of Sale (POS) and internet banking (WEB) technology; and Nigerian economic growth proxied by Real Gross Domestic Product (RGDP), examined the time series properties of the variables through the use of

Augmented Dickey Fuller (ADF) unit root test, tested the long-run relationship among the variables using the Johansen co-integration test and applied the Granger causality test to establish if there is a causal relationship between variables; the researcher also used the Econometric view (E-view 9.0) software in running this regression because of its currency and wide acceptance in the econometric world. The various tests carried out in this study include:

1. Unit Root Tests: To test for a unit root in the series; we employ the Augmented Dickey-Fuller tests (ADF test) to test for the stationarity of our data at level and at differences.

2. Cointegration Tests: To investigate the existence of a long run relationship between Gross Domestic Product (GDP) and selected electronic fund transfer systems in the study, we explore existence of a long run relationship among the variables in our model. If the variables we are using in the study are found to be cointegrated, it will provide statistical evidence for the existence of a long run relationship. We employ the Maximum Eigenvalue test procedure established by Johansen (1991) and Juselius (1990).

3. Granger Causality Test: Correlation does not necessarily imply causation in any meaningful sense of the word. The Granger (1969) approach to the question of whether x causes y is to see how much of the current y can be explained by past values of y and then to see whether adding lagged values of x can improve the explanation. Y is said to be Granger-caused by x if x helps in the prediction of y.

ANALYSIS AND INTERPRETATION OF RESULTS

UNIT ROOT TESTS

The results of the Augmented Dickey-Fuller (ADF) unit root tests of stationarity are presented below. The time series of our data was examined by conducting the unit root tests using the Augmented Dickey-Fuller (ADF) test. The result is presented below:

Table 1

Unit Root Tests Using Augmented Dickey-Fuller (ADF) method

Variables	T – ADF	5% Critical Value	Order of Integration
RGDP	-21.86860	-2.976263	1 (1)
ATM	-3.106296	-2.963972	1 (1)
MOBILE	3.010678	-2.960411	1 (1)
POS	5.313518	-2.960411	1 (1)
WEB	-8.909498	-2.967767	1 (1)

NB: At level or any differencing where the calculated T-ADF is greater than the chosen critical values (5%), the data is stationary.

The results in **Table 1** above shows that all the variables have been found to be stationary at first differencing. We therefore, proceed to Cointegration tests involving the variables to detect any possible long-run relationship between the series.

COINTEGRATION TESTS

In **Table 2** below, the null hypothesis of no cointegrating vector can be rejected for all the variables used in the study (see **Table 2** below) and the empirical findings reinforce the

conclusions about the presence of long-run relationship between Nigeria's Real Gross Domestic product and our selected Electronic Transfer Systems (ATM, Mobile, POS and WEB).

Table 2: Johansen Cointegration Test

Sample (adjusted): 3 32
Included observations: 30 after adjustments
Trend assumption: Linear deterministic trend
Series: RGDP ATM MOBILE POS WEB
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.865760	113.0932	69.81889	0.0000
At most 1 *	0.587861	52.84936	47.85613	0.0158
At most 2	0.450474	26.25752	29.79707	0.1212
At most 3	0.224567	8.296534	15.49471	0.4342
At most 4	0.021973	0.666532	3.841466	0.4143

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.865760	60.24388	33.87687	0.0000
At most 1	0.587861	26.59185	27.58434	0.0666
At most 2	0.450474	17.96098	21.13162	0.1313
At most 3	0.224567	7.630002	14.26460	0.4176
At most 4	0.021973	0.666532	3.841466	0.4143

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

GRANGER CAUSALITY TEST

Table 3: Pairwise Granger Causality Tests

Pairwise Granger Causality Tests

Sample: 1 32
Lags: 4

Null Hypothesis:	Obs	F-Statistic	Prob.
ATM does not Granger Cause RGDP	28	0.37764	0.8217
RGDP does not Granger Cause ATM		0.59726	0.6690
MOBILE does not Granger Cause RGDP	28	1.30307	0.3044
RGDP does not Granger Cause MOBILE		1.24059	0.3273
POS does not Granger Cause RGDP	28	1.15547	0.3613
RGDP does not Granger Cause POS		1.20757	0.3401
WEB does not Granger Cause RGDP	28	3.80801	0.0195
RGDP does not Granger Cause WEB		1.86176	0.1588
MOBILE does not Granger Cause ATM	28	1.80429	0.1697
ATM does not Granger Cause MOBILE		1.44864	0.2568
POS does not Granger Cause ATM	28	2.14906	0.1142
ATM does not Granger Cause POS		1.14024	0.3677
WEB does not Granger Cause ATM	28	0.20644	0.9317
ATM does not Granger Cause WEB		1.35722	0.2858
POS does not Granger Cause MOBILE	28	9.80577	0.0002
MOBILE does not Granger Cause POS		6.93812	0.0013
WEB does not Granger Cause MOBILE	28	0.18620	0.9427
MOBILE does not Granger Cause WEB		4.72932	0.0081
WEB does not Granger Cause POS	28	0.06499	0.9916
POS does not Granger Cause WEB		4.12985	0.0142

In considering the relationship between Real Gross Domestic Product (RGDP) and Automated Teller Machine (ATM), it was found that there is no causality between RGDP and ATM. With the same level of significance, it was found that MOBILE does not Granger because RGDP and RGDP does not Granger cause MOBILE: Therefore, there is neither unit nor bi-directional causality between the two variables. The test for causality between internet banking (WEB) and RGDP showed that there is a unit-directional causality between RGDP and internet banking (WEB) with internet banking (WEB) Granger causing RGDP. Also, there exists no causality between POS and

RGDP. Therefore, POS does not Granger cause POS. cause RGDP and RGDP does not Granger

EVALUATION OF THE APRIORI TEST

Table 4: Regression result for RGDP = F(ATM ,MOBILE, POS, WEB)

Dependent Variable: RGDP
Method: Least Squares
Date: 06/14/17 Time: 21:45
Sample: 1 32
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ATM	5.486931	1.011438	5.424884	0.0000
MOBILE	8.924188	15.91028	0.560907	0.5795
POS	-16.24170	16.63765	-0.976201	0.3376
WEB	-17.21942	17.42026	-0.988471	0.3317
C	12579.35	451.7650	27.84489	0.0000

R-squared	0.817996	Mean dependent var	15290.28
Adjusted R-squared	0.791033	S.D. dependent var	1880.742
S.E. of regression	859.7424	Akaike info criterion	16.49374
Sum squared resid	19957240	Schwarz criterion	16.72276
Log likelihood	-258.8999	Hannan-Quinn criter.	16.56966
F-statistic	30.33716	Durbin-Watson stat	1.666314
Prob(F-statistic)	0.000000		

From our regression result in **Table .4** above, we have our estimated regression equation as:

RGDP = 12579.35+ 5.486931ATM + 8.924188MOBILE - 16.24170POS – 17.21942WEB……(4.1)

(4.845291) (-0.272055) (0.282781) (-1.607793)

NB: the t-values are in parentheses

The result above implies that there is a positive relationship between Real Gross Domestic Product (RGDP) and Automated Teller Machine fund transfer system (ATM) together with Mobile banking (MOBILE). It also shows negative relationship between Real Gross Domestic Product (RGDP) and Point Of Sale (POS) and also Internet banking (WEB). The implication is that a unit increase in Real Gross Domestic Product (RGDP) is brought about by 5.486931 units increase in Automated Teller Machine fund transfer system (ATM), 8.924188 units increase in Mobile banking (MOBILE) fund transfer system, 16.24170 units decrease in Point Of Sale (POS) fund transfer system and 17.21942 units decrease in Internet banking (WEB).

EVALUATION OF THE STATISTICAL TEST

The Coefficient of Determination (R^2) is 0.82 (see **Table 4**). This shows that the independent variables included in the model explains 82% of the variations in the dependent variable. Therefore, the model is a good fit to the relationship. The result has an F-statistic value of 30.34 with associated probability of less than 1% indicating that the joint statistical significance hypothesis of the model cannot be rejected. The evaluation of the contribution to significance of the model by each of the explanatory variables revealed that in the case of RGDP versus ATM, probability of 0.0000 was observed while the observed probabilities in the case of RGDP versus MOBILE, POS and WEB are 0.5795, 0.3376 and 0.3317 respectively. We thereby conclude that the relationship between RGDP and ATM is very significant while that of RGDP versus MOBILE, POS and WEB is not significant enough at 5% level of significance.

EVALUATION OF THE ECONOMETRIC TESTS: AUTOCORRELATION TEST

The computed Durbin-Watson (DW) is 1.7 showing no autocorrelation.

EVALUATION OF WORKING HYPOTHESIS

The researchers use the F-Statistics to test the working hypothesis. This is aimed at finding out if our explanatory variables jointly exert significant impact on the whole regression plane. Since F-calculated (42.21) has a probability of less than 1%, we reject our null hypotheses and accept our alternative hypotheses that Technological advancement in banking in the area of Electronic Fund Transfer System (ETFS) has significant impact on Economic Growth in Nigeria.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This paper examined the relationship between Economic Growth proxied by Real Gross Domestic Product and Banking Technology in the area of Electronic Fund Transfer systems, otherwise known as Electronic Banking, represented by selected electronic payment systems – Automated Teller Machine (ATM), Mobile phone banking (MOBILE), Point of sale (POS) service and internet banking (WEB) in Nigeria for the period 2009 – 2016.

In the empirical exercise, we have used the Augmented Dickey-Fuller (ADF) method for finding out the presence of unit root in all the variables and have found that all our series does not have a unit root.

We employed Johansen's Cointegration test to check for the cointegration of these variables in a bid to ascertain if there is long run relationship between our dependent and independent variables. We found that there is the presence of long-run relationship between our dependent variable which is Economic Growth proxied by Real Gross Domestic Product and our independent variable which is Banking Technology in the area of Electronic Fund Transfer systems otherwise known as Electronic Banking represented by selected electronic payment systems – Automated Teller Machine (ATM), Mobile phone banking (MOBILE), Point of sale (POS) service and internet banking (WEB) in Nigeria.

The Granger Causality result revealed that there is no causality between Real Domestic Product (RGDP) and banking technology in the area of Automated Teller Machine (ATM) use as an electronic payment system; a unit-directional causality between Real Domestic Product (RGDP) and banking technology in the area of internet banking (WEB) with internet banking (WEB) granger causing Real Domestic Product (RGDP); no causality

between Real Domestic Product (RGDP) and banking technology in the area of mobile phone banking (MOBILE); and also no causality between Real Domestic Product (RGDP) and banking technology in the area of Point of sale (POS).

From our Ordinary Least Square Estimation result, our R-squared adjusted is 0.79, showing high explanatory power of our explanatory variables meaning that our model is of good fit. Our joint test using F-statistics is 30.34 with probability of 0.000 showing significant relationship between our explanatory variables as a group (ATM, MOBILE, POS,WEB) and our dependent variable (RGDP) at 5% level of significance. While individually using t-statistics shows that there is significant relationship between ATM and RGDP while that of MOBILE, POS, WEB and RGDP was insignificant at 5% level of significance. Our Durbin-Watson tends to two (2) indicating absence of auto correlation in our model.

We thereby reject our null hypothesis and conclude that there is significant relationship between Technological Advancement in banking in the area of Electronic Fund Transfer System and Economic Growth in Nigeria. We recommend as follows:

1. Since there is a positive significant relationship recorded between Real Gross Domestic Product and technological advancement in banking in the area of Automated Teller Machine (ATM) as a fund transfer and payment system, efforts should be intensified in its provision, installation, security, accessibility and usage in Nigeria to bring about sustained continuous increase in Gross Domestic Product in particular and economic growth in general.
2. From our causality test result, we saw technological advancement in banking in the area of Internet banking (WEB) as a fund transfer and payment system granger causing Real Gross Domestic Product (RGDP). This shows that Internet banking (WEB) as a fund transfer and payment system has impact on Gross Domestic Product and as such, efforts should be intensified in its awareness, provision, accessibility and usage in Nigeria in places where business and money are transacted no matter the location, value and volume. If possible, a reward system should be put in place for its use to bring about increase in its patronage. This increase, it is hoped, will make the relationship recorded between real gross domestic product and technological advancement in banking in the area of Internet banking (WEB) as a fund transfer and payment system positive and significant bringing about sustained continuous increase in Nigeria's Gross Domestic Product in particular and economic growth in general.

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