



## **Financial Innovation And Economic Growth In Nigeria**

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### **ABSTRACT**

The main objective of the study is to examine the effect of financial innovation on economic growth in Nigeria. An ex-post facto research design was adopted for this study because the data are time series data that were sourced from Central Bank of Nigeria, Statistical Bulletin and Annual Reports and Accounts, Nigeria Bureau of Statistics (NBS) for the period under review. Econometric techniques, including descriptive statistics, Augmented Dicker Fuller and Philip Perron tests for unit roots, and Ordinary Least Square (OLS) were used for the data analysis. The regression result indicates that automated teller machine, point of sale, mobile banking and internet banking have positive and significant effect on annual growth of gross domestic product (RGDP). The study thus concludes that financial innovation has positive effect on economic growth in Nigeria. In line with the objectives and findings of the study, we recommend that: There is significant need for increased public education and awareness on the benefits of automated teller machine to enhance financial innovation in Nigeria, Banks must improve their service quality and customer responsiveness in cases of lost or stolen cards, frauds, and other customer complaints in relation to point of sale. There is additional need for ensuring ease of use, and customer interactive features in mobile and on-line shopping systems in Nigeria

**Keywords:** Automated Teller Machine, Point of Sale, Mobile Banking, Internet Banking, Economic Growth

### **INTRODUCTION**

Financial innovation is the unanticipated improvement in the array of financial products and instruments that are stimulated by unexpected changes in customer needs and preferences, tax policy, technology and regulatory impulses (Tyavambiza, & Nyangara, 2015). The developments in the financial sector have not only led to the increase in the number of financial institutions, but also the development in the level of sophistication with new payment systems and asset alternatives to holding money. This has resulted mainly from technological advancement and increase in competition as the number of institutions increase. Developments in payment systems have started to create close substitutes for hard currency, thus affecting a core part of banking. Research studies on financial innovation in developing countries have so far focused mainly on welfare issues, particularly on its impact on financial inclusion (Adu-Asare Idun, & Aboagye, 2014). Financial innovation has transformed and restructured banking services globally, and its impact on economies is becoming increasingly noteworthy. The available literature confirms that financial innovation drives economic growth (Sekhar, 2013). From a historical perspective, Laeven, Levine and Michalopoulos (2015) point out that financial innovation has been a driving force behind financial deepening and economic development over the past centuries. In turn, Štreimikien, (2014) contends more specifically that “leapfrog” (financial) innovation is a driving force for broad economic growth. Despite mixed evidence on causality, there is also a broad consensus that a well functioning banking system promotes economic growth (Owusu, & Odhiambo, 2014).

Economic growth is defined as 'a rise in the total output (goods or services) produced by a country (Laeven, Levine & Michalopoulos, 2015). It is an increase in the capacity of an economy to produce

goods and services, compared from one period of time to another. Economic growth occurs whenever people take resources and rearrange them in ways that are more valuable. Economic growth refers only to the quantity of goods and services produced; it says nothing about the way in which they are produced (Mackinnon, 1973). The quest for profit forces companies, households and economic agents to look for new and improved products, services, processes and forms or structures of companies that will decrease their production costs, will satisfy, in a great range, their customers' demand and will bring higher profits. Sometimes this quest is made through official Research and Development (R&D) programmes or sectors of a company. Other times, it is a hazardous result of control processes or of the trial and mistake method. Today, more than ever before, innovation, enterprise and intellectual assets drive economic growth and increase standards of living. Hence innovation is instrumental in creating new jobs, providing higher incomes, offering investment opportunities, solving social problems, curing disease, safeguarding the environment, protecting our security and transparency in organization and governments (Štreimikien, 2014).

Markets and organizations produce various new products and services in order to satisfy the investors demand. Financial innovation is an ongoing process where new financial products, services and procedures are created and standardized products are differentiated in order to response at the continuously changing economic environment. This running process has various periods of uncertainty. thus, the purpose of the introduction of a financial innovation to market participants is the minimization of costs and the reduction of risk exposure among other function such as moving funds across time and space (e.g., savings accounts),the pooling of funds (e.g., mutual funds), managing risk (e.g., insurance and many derivatives products), extracting information to support decision-making (e.g., markets which provide price information, such as extracting default probabilities from bonds or credit default swaps), addressing moral hazard and asymmetric information problems (e.g., contracting by venture capital firms); and facilitating the sale or purchase of goods and services through a payment system (e.g., cash, debit cards, credit cards) (Laeven, Levine, & Michalopoulos, 2015).

#### **Statement of the Problem**

Financial markets are becoming increasingly integrated and globalized, which has resulted in the demand for new types of financial products and investments. Various empirical studies exist on the ability to innovate new product in the financial market and its effects on economic growth. Nigeria is one of the developing economies that receives large chunk of financial innovation, yet the country's growth has been low. The situation is like a paradoxical deviation from the belief of the Technology Acceptance Model (TAM) and Diffusion of Innovation (DOI) model. Some empirical findings have shown that generally, financial innovation promote economic growth in Nigeria [(Tyavambiza, & Nyangara, 2015; Levine, & Michalopoulos, 2015; Adu-Asare, & Aboagye, 2014; Arnaboldi & Rossignoli, 2013; Beck, Chen, Lin, & Song, 2014); However, Owusu and Odhiambo (2014) posit that mobile banking and internet banking had negative effects on economic growth. This tends to suggest that there are still inconsistencies in empirical findings with regards to studies on the effect of financial innovation and economic growth in Nigeria. These shortcomings have contributed to the knowledge gap in literature. This study seeks to improve on past studies by making use of data covering a period of 13 years, 2008 – 2021.

#### **Objective of the Study**

The main objective of the study is to examine the effect of financial innovation on economic growth in Nigeria. The specific objectives are to:

- 1 Investigate the effect of automated teller machine on economic growth in Nigeria
- 2 Examine the effect of point of sale on economic growth in Nigeria
- 3 Assess the effect of mobile banking on economic growth in Nigeria
- 4 Examine the effect of internet banking on economic growth in Nigeria

#### **Research Questions**

The following research questions are formulated to guide this research work:

1. To what extent has automated teller machine affected economic growth in Nigeria?

2. To what degree has point of sale affected economic growth in Nigeria?
3. How far has mobile banking affected economic growth in Nigeria?
4. To what extent has internet banking affected economic growth in Nigeria?

#### **Research Hypotheses**

The following hypotheses are formulated to guide the study:

Ho<sub>1</sub>: Automated teller machine has no significant effect on economic growth in Nigeria

Ho<sub>2</sub>: Point of sale has no significant effect on economic growth in Nigeria

Ho<sub>3</sub>: Mobile banking has no significant effect on economic growth in Nigeria

Ho<sub>4</sub>: Internet banking has no significant effect on economic growth in Nigeria

## **REVIEW OF RELATED LITERATURE**

### **Conceptual Review**

#### **Financial Innovation**

Financial innovation is the improvement in the array of financial products and instruments that are stimulated by unexpected change in customer needs and preferences, tax policy, technology and regulatory impulses (Bhattacharyya & Nanda, 2000). Innovation in the financial sector is the act of creating and then popularizing new financial instruments as well as new financial technologies, institutions, and markets (Tufano, 2002). It may be viewed as the design, development, and implementation of innovative financial instruments and processes, and the formulation of creative solutions to problems in finance. According to Sandvik (2003), financial innovations is one of the most important competitive weapons and generally seen as a firm's core value capability. It is considered as an effective way to improve firm's productivity due to the resource constraint issue facing a firm.

The developments in the financial sector have not only led to the increase in the number of financial institutions, but also the development in level of sophistication with new payment systems and asset alternatives to holding money. This has resulted mainly from technological advancement and increase in competition as the number of institutions increase. Developments in payment systems have started to create close substitutes for hard currency, thus affecting a core part of banking. The quest for profit forces companies, households and economic agents to look for new and improved products, services, processes and forms or structures of companies that will decrease their production costs, will satisfy, in a great range, their customers' demand and will bring higher profits. Sometimes this quest is made through official Research & Development (R&D) programs or sectors of a company. Other times, it is a hazardous result of control processes or of the trial and mistake method. Today, more than ever before, innovation, enterprise and intellectual assets drive economic growth and increase standards of living. Hence Innovation is instrumental in creating new jobs, providing higher incomes, offering investment opportunities, solving social problems, curing disease, safeguarding the environment, protecting our security and transparency in organization and governments.

#### **Financial Innovation and Economic Growth**

Theoretical relation between financial innovation and economic growth has been argued to be positive but remain unclear. Financial development and innovation and economic growth are thus clearly related, and this relationship has occupied the minds of economists from Smith to Schumpeter and the direction of causality have remained unresolved in both theory and empirics. Moreover, the wide range of organizational forms involved precluded any clear conclusion as to what kind of financial institutions might maximize economic growth. Hence Financial innovations can be instrumental to lead a higher level of savings, capital accumulation and hence a higher level of economic growth. Financial innovations can be seen as playing a role akin to that of the general purpose technologies delineated by Bresnahan and Trajtenberg (1995) and Helpman (1998): not only do these breakthroughs generate returns for the innovators, but they have the potential to affect the entire economic system and can lead to far-reaching changes. For instance, these innovations may have broad implications for households, enabling new choices for investment and consumption, and reducing the costs of raising and deploying funds.

Aghion (2005) and Arcand (2012) found that financial innovation is associated with higher levels of economic growth, even when controlling for aggregate indicators of financial development, in their sample of high-income countries, suggests that it is not so much the level of financial development, but rather the innovative activity of financial intermediaries, which helps countries grow faster at high levels of income. Their results, however, point again to the double-sided nature of financial innovation, bringing opportunities but containing risks, which calls for appropriate regulatory policies. There is a link between financial development and innovation and reduced income inequality and poverty alleviation (Beck, Demirguc-Kunt and Levine, 2007).

**Automated Teller Machine (ATM):** 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. However, despite its popularity, the ATM has done very little in reducing the amount of cash in the economy. This is because most Nigerians use ATM only for cash withdrawal. Although 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. This is largely due to ignorance and the absence of merchants. Because ATM machines are mainly used for cash withdrawals, they do not go far enough in turning Nigeria into a cashless economy. ATM only makes more cash available in the economy because of the ease at which depositors can withdraw cash. To turn Nigeria into a cashless economy Nigerians need more than just ATM cards, Nigerians need credit/debit cards.

**Point of Sale:** Point of Sale (POS) terminals are deployed to merchant locations where users swipe their electronic cards through them in order to make payment for purchases or services instead of using raw cash. As the POS terminals are online real-time, the customers bank account is debited immediately for value of purchases made or services enjoyed. (Alilonu, 2012). There are indeed alternatives to handling or transacting in cash for transfers and for payments of goods and services purchased. These include: ATMs, which can be mobile banking that can be done through the use of mobile phones for balance inquiry, funds transfers and bills payment ; internet banking, which can be used for instant balance enquiries, funds transfer, bills payment and other transactions. Most banks require you to have a token device for internet banking services in order to give some security for customers banking applications. Yet other alternative includes Point of Sales (POS) terminals which allow merchants access to card payments for sale of products and services. They also allow merchants to make commission from sales of third party products and services e.g. recharge cards, bill payments, lottery tickets etc., and finally there is electronic funds transfer through which one can transfer money electronically from his account to other accounts. Some banks also offer an instant electronic funds transfer service. However, most of these e-payments channels require you to have an ATM/Debit card (Oyetade and Ofoelue, 2012).

It has to be noted that the operation of the cashless economy (electronic payment) system is not entirely free. It is noted that using the POS comes with a hefty price tag of 1.25 percent of the cost of every purchase or transaction that is affected in addition to the N5 for every N1000 commission on turnover that our deposit money banks are allowed by CBN to charge every time money is taken from our account (Omose, 2011).

**Mobile Banking:** This involves the use of mobile phone for settlement of financial transactions. This is more or less fund transfer process between customers with immediate availability of funds for the beneficiary. It uses card infrastructure for movement of payment instructions as well as secure SMS messaging for confirmation of receipts to the beneficiary. It is very popular and exciting to the customers given low infrastructure requirements and a rapidly increasing mobile phone penetration in the country. Services covered by this product include account enquiry; funds transfer; recharge phones; changing

passwords, bill payments. Even though the product is exciting most customers are yet to fully buy into it in Nigeria, hence, both the apex bank and other banks still have a lot to do in terms of increasing awareness of the product to the saving populace in the country (Siyanbola, 2013).

Mobile banking (m-banking) refers to provision and availment of banking and financial services through the help of mobile telecommunication devices. The scope of services offered may include facilities to conduct bank and stock market transactions, administer accounts and to access customized information (Kennedy & Jacky, 2013).

Mobile banking is an electronic banking product that allows customers to access banking services through a dedicated telephone line from the comfort of their homes, offices etc. Services rendered here include; balance transfer, change of pin, authorization of inter-branch money transfer, transaction alert (withdrawal or deposit) and enquiry (Adewuyi, 2011). This is the most familiar of the electronic banking devices and it allows customers to transact banking business over the phone. It can be used as an alternative to the traditional branch banking or in conjunction with it (Agboola, 2001). The customer can access their accounts using telephone lines as a link to the financial institutions computer centre. Services rendered here include account balance, transfer, change of pin etc. This product has also experienced low patronage due to inadequate awareness and education of the customer on how to maximally use their phone to transact simple banking operations (Siyanbola, 2013).

**Electronic Banking:** Different authors have defined Electronic Banking in different ways based on their understanding of its application. E-banking is the term used for new age banking system and it is also called online banking (Auta, 2010). E-banking uses the internet as the delivery channel by which to conduct banking activities, for example, transferring funds, paying bills, viewing checking and savings account balances, paying mortgages and purchasing financial instruments and certificates of deposits (Auta, 2010). Electronic banking is the delivery of banking services and products through the use of electronic means irrespective of place, time and distance. Such products and services can include deposit-taking, lending, account management, the provision of financial advice, electronic bill payment, and the provision of other electronic payment products and services such as electronic money. Electronic banking is also known as the automated delivery of new and traditional banking products and services directly to customers through electronic, interactive communication channels (Echekoba & Ezu (2012). As has been pointed out by (Akinyele & Olorunleke, 2010), electronic banking means the provision of information about the bank and its product via a page on the internet. Izogo, Nnaemeka, Ezema and Onuoha (2012) assert that electronic banking is a means where by banking business is transacted using automated processes and electronic devices such as personal computers, telephones, fax machines, internet, card payments and other electronic channels.

### **Economic Growth**

Economic growth is defined as 'a rise in the total output of goods or services produced by a country. It is an increase in the capacity of an economy to produce goods and services, compared from one period of time to another. Economic growth occurs whenever people take resources and rearrange them in ways that are more valuable. Economic growth refers only to the quantity of goods and services produced; it says nothing about the way in which they are produced (Mackinnon, 1973). The performance of an economy is usually assessed in terms of the achievement of economic objectives. These objectives can be long term, such as sustainable growth and development, or short term, such as the stabilization of the economy in response to sudden and unpredictable events, called economic shocks which are very common in Kenya such political instability, ranging interest rates and labour unrest which are also common in emerging markets. Hence in order to measure economic growth it's in order to analyze, control and measure the following economic indicators such as Growth in real national income, investment levels and the relationship between capital investment and national output, levels of savings and savings ratios, price levels and inflation, competitiveness of exports, levels and types of unemployment, employment levels and patterns of employment, trade deficits and surpluses with specific countries or the rest of the world, debt levels with other countries, the proportion of debt to national income, the terms of trade of a country, the purchasing power of a country's currency, wider measures of

human development, including literacy rates and health care provision. Economic growth can be measured in nominal terms, which include inflation, or in real terms, which are adjusted for inflation i.e. by the percent rate of increase in the gross domestic product (GDP). Economic growth measures growth in monetary terms and looks at no other aspects of development (Ayres, Robert, Warr, & Benjamin, 2006).

### **Theoretical Framework**

The study is anchored on the Technology Acceptance Model (TAM) and Diffusion of Innovation (DOI) Theory by Fred Davis (1985). TAM is an information systems theory that models how users come to accept financial innovation and use a technology that will enhance economic growth. TAM is one of the models that have been developed to provide a better understanding of the usage and adoption of information technology which is the base of cashless policy that will promote the performance of money deposit banks in Nigeria. It is presently a prominent theory used in modeling technology acceptance and adoption in information systems research. 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. DOI theory seeks to explain how, why, and at what rate new ideas and technology spread through cultures. 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 which are the bases of cashless policy that promote the performance of money deposit banks in Nigeria.

### **Empirical Review**

Various empirical studies have been carried out on financial innovation and economic growth in Nigeria with different conclusions and results. However, this study reviewed those studies variable by variable using the objective of the study Jegede, (2014). Investigates the effects of ATM on economic growth in Nigerian. Questionnaire was used to collect the data from a convenience sample of 125 employees of five selected banks in Lagos State with inters witch network. Thereafter, data collected through the questionnaire were analyzed statistically by using the Software Package for Social Science (SPSS Version 20.0 for Student Version) and chi-square technique. The results indicate that less than the benefits, the deployment of ATMs terminals have averagely improved economic growth in Nigeria. Similarly, ATM service quality is less correlated to security and privacy of users and providers. The study concluded 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 someone else's ATM card for unauthorized withdrawals electronically.

Odusina, (2014) examined ATM usage and customers' satisfaction in Nigeria (2009-2013). The study found that despite the increasing number of ATM installations in Nigeria, customers' needs are not satisfactorily as customers are always seen on queue in large numbers at various ATM designated centers as well as poor service delivery of some of these machines. The research engages comparative analysis of three banks in Ogun State, Metropolis of Nigeria viz-a-viz First Bank, Guaranty Trust Bank and Skye Bank. A total of 200 respondents answered the questionnaire cutting across the three banks. The chi-square statistical tool was used to analyze the data and the results showed a positive and significant relationship between ATM Usage and Customers' Satisfaction.

Mohammed, Mohammed, and Alexander (2014) examine the advent of technology brought with it relative ease with which the banking industry transact their businesses electronically without direct contact especially as it relate to their numerous customers. One of such intricate technology is the

introduction of the ATM. This technology has made customer's access to their cash relatively easy as well safe their time from endless queues. The ATM machine soon gave rise to certain problems such as losses on customers being addressed in this research work. Again, the loss of cash due to failed transactions at ATM across the Metropolis. Some respondents argue that just like any other technology, this one does not work in isolation. There are other factors such as power, internet connectivity and so on needs to function optimally for ATM to deliver efficiently but while the argument goes on, customers are being affected negatively there by leading to apathy and discontent in the use of ATM especially in Maiduguri Metropolis. The research reveals that weak government policy on banks, illiteracy as well as non-challant attitudes of customer care services is to blame for the dwindling use of ATM in the state

Alagh and Emeka(2014), examines the impact of cashless banking on the profitability of banks in Nigeria. The study used proxies for cashless banking such as Automated teller machine (ATM), Point of sale (POS), and web based transaction (WBT) to examine its impact on the aggregate return on equity (ROE) of deposit money banks in Nigeria, through an ordinary least square (OLS) multiple regression method of analysis. The result showed that ATM and POS are positively related to ROE, while WBT related negatively to ROE. This is as a result of high rates of bank charges on online deposits and as a result, most customers do not patronize the product. Non-usage of the WBT for online deposits had created a negative impact on profitability of Nigerian banks.

Alao and Sorinola, (2015).Examined cashless policy and customers' satisfaction: A Study of Commercial Banks in Ogun State, Nigeria. The study seeks to investigate the customers' satisfaction of the recently introduced cashless policy in Ogun State, Nigeria with a survey of bank customers in Abeokuta. Data was collected with a well structured questionnaire and analyzed with descriptive statistics, while hypotheses formulated for the study were tested with correlation co-efficient. The findings of the study reveal that cashless policy contributed significantly to customers' satisfaction in Ogun State. Also, the study revealed that cashless policy contributed significantly to customers' satisfaction through electronic channels.

Osazevbaru and Yomere (2015). Investigated the benefits and challenges of Nigeria's cashless policy. Secondary data were collected and content analysis applied in data analysis. The study found banks' income higher in cashless setting than in cash based arrangement.

Ochei, Achugamonu, Areghan and Edwin (2015) examined the fraud, unemployment and cashless system. The methodology employed for testing the hypotheses is a statistical parametric test called Pair Sample t-test through the use of SPSS statistical package. The study rejects the null hypotheses which means that cashless economy would increase the rate of fraud and unemployment in Nigeria. The study recommends immediate job financial empowerment for those that will suffer job loss as a result of cashless policy.

Martin, Nnamani, Mary and Mgbodile (2014) evaluated the impact of Central Bank of Nigeria cashless policy on Nigeria economy. Survey research was adopted with questionnaire as data collection instrument. Responses from the respondents show that cashless policy will increase employment; reduce cash related robbery thereby reducing risk of carrying cash; cashless policy will also reduce cash related corruption and attract more foreign investors to the country. The study, therefore, shows that the introduction of cashless economy in Nigeria can be seen as a step in the right direction. It is expected that its impact will be felt in modernization of Nigeria payment system, reduction in the cost of banking services, reduction in high security and safety risks and also curb banking related corruptions.

Echekoba and Ezu (2012) 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 2015, CBN data shows that 51% of withdrawal done in Nigeria was through ATM, while 33.6% was through over the counter (OTC) cash withdrawals and 13.6% through Cheque. 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 Nigeria economy system.

Isaac and Michael (2015). Examines the effectiveness of mobile banking services in selected commercial banks in Rwanda. Descriptive design involving both qualitative and quantitative approaches was employed. Sample size of 227 was computed from a total population of 524 employees from the selected banks and the selection of respondents was done through systematic random sampling. The instruments of data collection used in this study included both structured questionnaires and interview. In data analysis, quantitative data was analyzed through frequencies and percentages for respondents', mean values were used to determine the effectiveness of mobile banking services in the selected commercial banks. Difference in effectiveness of mobile banking services was determined through One-Way-ANOVA. Research findings reveal that mobile banking services in the selected commercial banks were generally effective. The most effective item under mobile banking services was noted in security measures and privacy, followed by time management and convenience and the least effective was on the financial risk measures. This study also found out that there were significant difference in the effectiveness in mobile banking services among selected commercial banks. The bank with most effective mobile money services was Banque Populaire du Rwanda, followed by the Kenya Commercial Bank, next was Bank of Kigali, Equity Bank, and finally, ECOBANK. The study concluded that the mobile banking services in the selected commercial banks are effective.

Okoro (2014). Examined the impact of selected e-payment instruments on the intermediation efficiency of the Nigerian economy. Using time series data of 2006 – 2011 the study employed multiple regression technique in the analysis of the sourced data. Employing intermediation efficiency indicator (the ratio of currency outside bank to broad money supply) as a dependent variable, while the automated teller machine (ATM), point of sales (POS), Mobile and Internet service values were used as the independent variables, the result of the study indicate that there is significant relationship between ATM, POS, Internet service values and the intermediation efficiency of the of Nigerian economy. The study also reviles that there is no significant relationship between Mobile service value and intermediation efficiency of the Nigerian economy within the period under study.

James (2013) 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.

Karimzadeh (2014) investigated the impact of e-banking on the profitability of a bank in Iran. By using quarterly data over the period of 2004–2012, they found that expansion of e-banking has significant positive association to the profitability, measured in terms of ROA, of the sample bank. Using a sample of 10 banks' data over the period of 2002 to 2012,

Rauf and Qiang (2014) measured the impact of e-banking on the performance of Pakistan commercial banks where the performance was measured in terms of Return on Assets, Return on equity and interest margin. Their empirical investigation revealed that e-banking has significant positive impact on margin, ROA and ROE of the recent adopters whereas for the early adopters significant positive impact on ROE and Margin but slightly on ROA. On the basis of findings, they conclude that banks can consider e-banking as a cost saving effective strategy to compete with the domestic and foreign banks given a well-managed monitoring and control over the risks involved

Kennedy and Jacky (2013). Investigate the impact of mobile and internet-banking on performance of financial institutions in Kenya where the survey was conducted on financial institutions in Nairobi. The study also sought to identify the extent of use of mobile and internet banking in financial institutions. The study investigated 30 financial institutions. The study found that the most prevalent internet banking service is balance inquiry while the least is online bill payment. Cash withdrawal was the most commonly used mobile banking service whereas purchasing commodities was the least commonly used.



Oyewole. (2013) examined the impact of e-banking on bank performance in Nigeria. Using panel data of 1999–2010 for eight commercial banks, authors found that e-banking has significant positive impact on the banks performance measured in terms of Return on Assets (ROA) and Net Interest Margin (NIM). However, the study found no impact on ROE.

Sadr (2013) conducted a cross country study on four banks of selected Asian countries. Controlling bank specific and macroeconomic variables, using a fully modified OLS; author empirically found that internet banking has contributed to improve ROE with a time lag of three years while a negative impact is observed for one year lagged.

## **METHODOLOGY**

The study adopted an ex-post facto research design because the data for the study are secondary data that already exist in the publications of well acclaimed financial institutions such as the Central Bank of Nigeria. Secondary data were sourced from Central Bank of Nigeria, Statistical Bulletin and Statement of Accounts, National Bureau of Statistics (NBS) for the period under. The model regressed some selected financial innovation variables on economic growth in Nigerian which is proxied by RGDP

**Dependent Variable:** In this study, economic growth in Nigeria is proxied by RGDP as the dependent variable (Y).

**Independent Variables:** The independent or explanatory variables (X) in this study are automated teller machine (ATM), point of sales (POS), mobile banking (MB) and internet banking (ITB)

### **Model Specification**

The model used for the study was adopted from the work of Alagh and Emeka (2014).

**Their model is stated thus:**

$$RGDP = f(ATM, POS, MB)$$

Where:

RGDP = Annual Growth of Gross Domestic Product

ATM = Automated Teller Machine

POS = Point of sale

MB = Mobile Banking

**The model was modified by introducing internet banking as a new variable**

$$RGDP = f(ATM, POS, MB, ITB)$$

Where:

RGDP = Annual Growth of Gross Domestic Product

ATM = Automated Teller Machine

POS = Point of sale

MB = Mobile Banking

ITB = Internet Banking (ITB)

$$RGDP = \beta_0 + \beta_1ATM + \beta_2POS + \beta_3MB + \beta_4ITB + \mu \dots \dots \dots 1$$

$\beta_0$  and  $\mu$  are the constant and error term respectively while  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ , and  $\beta_4$  are the coefficient of financial innovation on economic growth in Nigeria The data were analyzed with econometric techniques involving descriptive statistics, Augmented Dicker Fuller and Philip Perron tests for unit roots and the ordinary least square (OLS).

## **DATA ANALYSIS AND INTERPRETATION**

The data for the analyses are shown on Appendix 1. The data for the study include annual growth of gross domestic product (RGDP), automated teller machine (ATM), point of sale (POS) mobile banking (MB) and internet banking (ITB). These data form the variables in which the analyses were undertaken.

**Descriptive Statistics**

**Table 1: Descriptive Statistics used for Test of Normality of the Variables**

	<b>RGDP</b>	<b>ATM</b>	<b>POS</b>	<b>MB</b>	<b>ITB</b>
Mean	19.5863	17.0231	21.2077	49.0336	27.5000
Std. Dev.	2.0344	1.1436	1.5913	10.0172	14.4092
Skewness	-0.5049	0.2366	-0.2891	-0.2188	-2.6088
Kurtosis	1.9873	2.6357	1.6853	2.5131	11.7220
Jarque-Bera	1.8748	0.3269	1.8907	0.3929	94.6903
Probability	0.3916	0.8491	0.3885	0.8216	0.0000
Observations	22	22	22	22	22

**Source:** Computed from E-views Result, 2023.

The results of the descriptive statistics showed that the mean of the variables for annual growth of gross domestic product (19.5863), automated teller machine (17.0231), point of sale (21.2077), mobile banking (49.0336) and internet banking (27.5000) are larger than their respective standard deviations, 2.0344, 1.1436, 1.5913, 10.0172 and 14.4092 respectively. This suggests that there is no wide variation between the series of the variables. Also, the values for their respectively skewness and kurtosis are close to 0 and 3 respectively indicating presence of normal distribution in the series.

**Unit Root Test**

**Table 2: Summary of the Unit Root Result**

<b>Variables</b>	<b>T-statistics</b>	<b>Probability</b>	<b>Order of Integration</b>
RGDP	-6.088595	0.0000	1(0)
ATM	-3.867397	0.0053	1(0)
POS	-4.619034	0.0010	1(0)
MB	-5.531824	0.0031	1(0)
ITB	-9.281478	0.0020	1(0)

Source: Computation from E-view Version 8.0

The table above shows that annual growth of gross domestic product, automated teller machine, point of sale, mobile banking and internet banking assume stationarity at levels. This is indicated by the probability value of the test which is below 0.05 levels of significance.

**Analyses of the effect of Financial Innovation on Economic Growth in Nigeria**

Dependent Variable: RGDP

Method: Least Squares

Date: 04/27/19 Time: 15:27

Sample: 2009 2021

Included observations: 14

**Table 3**

<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
RGDP	0.667553	0.824890	10.809263	0.0260
ATM	0.164745	1.010577	2.163021	0.0058
POS	0.518247	0.672745	3.770347	0.0183
MB	0.068816	0.039042	2.762604	0.0302
ITB	0.027885	0.022862	2.219695	0.0040
R-squared	0.712561	Mean dependent var		4.676947
Adjusted R-squared	0.655073	S.D. dependent var		7.153306
S.E. of regression	6.953540	Akaike info criterion		6.888364
Sum squared resid	1208.793	Schwarz criterion		7.165910
Log likelihood	-100.7696	Hannan-Quinn criter.		6.978837
F-statistic	19.349696	Durbin-Watson stat		2.971283
Prob(F-statistic)	0.006525			

The results from coefficient (0.667553) and the probability value ( $p. = 0.0260 < 0.05$ ) showed that annual growth of gross domestic product (RGDP) which is the dependent variable (Y) is positive: This means that if all the independent, explanatory variables (X) are held constant, annual growth of gross domestic product (RGDP) as a dependent variable (Y) will grow by (0.667553) units in annual-wide basis.

The results from coefficient (0.164745) and the probability value ( $p. = 0.0058 < 0.05$ ) showed that automated teller machine (ATM) had positive and significant effect on annual growth of gross domestic product (RGDP). This means that the null hypothesis one: automated teller machine (ATM) has no significant effect on annual growth of gross domestic product (RGDP), is rejected.

The results from coefficient (0.518247) and the probability value ( $p. = 0.0183 < 0.05$ ) showed that point of sale (POS) had positive and significant effect on annual growth of gross domestic product (RGDP). This means that the null hypothesis two: Point of sale has no significant effect on annual growth of gross domestic product (RGDP), is rejected.

The results from coefficient (0.068816) and the probability value ( $P. = 0.0302 < 0.05$ ) showed that mobile banking (MB) had positive and significant effect on annual growth of gross domestic product (RGDP). This means that the null hypothesis three: Mobile banking has no significant effect on annual growth of gross domestic product (RGDP), is rejected.

The results from coefficient (0.027885) and the probability value ( $P. = 0.0040 < 0.05$ ) showed that Internet banking (ITB) had positive and significant effect on annual growth of gross domestic product (RGDP). This means that the null hypothesis four: Internet banking has no significant effect on annual growth of gross domestic product (RGDP), is rejected.

However, the coefficient of determination ( $R^2$ ) = 0.712561 showed that about 71% of changes in annual growth of gross domestic product in Nigeria is accounted for by the level of financial innovation in Nigeria. This implies that financial innovation is one major contributor on economic growth in Nigeria

The F-statistics (19.349696;  $p. < 0.05$ ) indicated that all the variables of the model (financial innovation variables) have significant effect on economic growth in Nigeria

The Durbin Watson statistics (2.971283) showed that there was no autocorrelation in the model employed.

### **Test of Hypotheses**

To test the hypotheses, the statistical significance of the individual parameters is use to test hypotheses.

#### **Hypothesis One**

Ho<sub>1</sub>: Automated teller machine has no significant effect on economic growth in Nigeria in Nigeria

Hi: Automated teller machine has significant effect on economic growth in Nigeria.

From table 3 above, since the probability value is less than 5% ( $0.0058 < 0.05$ ), the null hypothesis is rejected while the alternative hypothesis is accepted implying that: Automated teller machine has no significant effect on t on economic growth in Nigeria

#### **Hypothesis Two**

Ho<sub>2</sub>: Point of sale has no significant effect on economic growth in Nigeria

Hi: Point of sale has significant effect on economic growth in Nigeria

From table 3 above, since the probability value is less than 5% ( $0.0183 < 0.05$ ), the null hypothesis is rejected while the alternative hypothesis is accepted implying that point of sale has significant effect on economic growth in Nigeria

#### **Hypothesis Three**

Ho<sub>3</sub>: Mobile banking has no significant effect on economic growth in Nigeria

Hi: Mobile banking has significant effect on economic growth in Nigeria

From table 3 above, since the probability value is less than 5% ( $0.0302 < 0.05$ ), the null hypothesis is rejected while the alternative hypothesis is accepted, implying that Mobile banking has significant effect on economic growth in Nigeria

#### **Hypothesis Four**

Ho<sub>4</sub>: Internet banking has no significant effect on economic growth in Nigeria

Hi: Internet banking has significant effect on economic growth in Nigeria

Table 3 above reveals that the probability value is less than the critical value ( $0.0040 < 0.05$ ), we reject the null hypothesis and accept the alternative hypothesis and conclude that internet banking has significant effect on economic growth in Nigeria

### **DISCUSSION OF FINDINGS**

**Automated Teller Machine:** The result of the study indicates that automated teller machine has positive and significant effect on economic growth in Nigeria. The results of our findings are in consistent with the work of Adu, (2016) in terms of automated teller machine where it was discovered that automated teller machine has positive effect on economic growth in Nigeria

**Point of Sale** .The result indicates that point of sale has significant effect on economic growth in Nigeria. The result of our findings are not in agreement with the work of Cecilia and Tobias (2016), who posited that point of sale has negative and insignificant effect on economic growth in Nigeria

**Mobile Banking:** The result indicates that, mobile banking has significant effect on economic growth in Nigeria. Our findings are similar with the work of Sali (2015) who found that mobile banking has significant effect on economic growth in Nigeria

**Internet Banking:** The result indicates that, internet banking has significant effect on economic growth in Nigeria. This corroborates with the work of Odusina, Ayokunle and Olumide (2014), who result shows that internet banking has no significant effect on economic growth in Nigeria

The coefficient of determination ( $R^2$ ) = 0.712561 showed that about 71% of changes on economic growth in Nigeria is accounted for by the level of financial innovation in Nigeria. This implies that financial innovation is one major contributor to economic growth in Nigeria

The F-statistics (19.349696;  $p < 0.05$ ) indicated that all the variables of the model (financial innovation variables) have significant effect on economic growth in Nigeria

The Durbin Watson statistics (2.971283) showed that there was no autocorrelation in the model employed.

#### **Summary of Findings**

Our findings are summarized as follows:

**Automated Teller Machine (ATM)** has positive and significant effect on annual growth of gross domestic product (RGDP).

**Point of Sale (POS)** has positive and significant effect on annual growth of gross domestic product (RGDP).

**Mobile Banking (MB)** has positive and significant effect on annual growth of gross domestic product (RGDP).

**Internet Banking (ITB)** has positive and significant effect on annual growth of gross domestic product (RGDP).

The coefficient of determination ( $R^2$ ) = 0.712561 showed that about 71% of changes on economic growth in Nigeria is accounted for by the level of financial innovation in Nigeria. This implies that financial innovation is one major contributor to economic growth in Nigeria

The F-statistics (19.349696;  $p < 0.05$ ) indicated that all the variables of the model (financial innovation variables) have significant effect on economic growth in Nigeria

The Durbin Watson statistics (2.971283) showed that there was no autocorrelation in the model employed.

### **CONCLUSION**

The findings of the study show that automated teller machine, point of sale, mobile banking and internet banking have positive and significant effect on annual growth of gross domestic product (RGDP). The study thus concludes that financial innovation has positive effect on economic growth in Nigeria

## RECOMMENDATIONS

In line with the objectives and findings, the study recommends as follows

1. Public education and awareness on the benefits of automated teller machine should be increased to enhance the benefit of financial innovation in Nigeria
2. Banks should improve their service quality and treat customers complaints promptly
3. Ease of use, and customer interactive features in mobile and on-line shopping systems should be improved
4. Management of banks should from time to time train customers with regard to internet banking, its benefits, risk exposure, physical and internet security to avoid financial loss in the hands of hackers. This will enhance their technical competence which will rob off positively on their operations with a positive spill-over effect on the entire economy

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