



# 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 and Internet Banking

## 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?

### **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 Framework**

#### **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).

### **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.

### **Automated Teller Machine and Economic Growth in Nigeria**

The Innovation Diffusion Theory (IDT) that explains individuals' intention to adopt a technology as a modality to perform a traditional activity. The theory is developed by Roger's (1983). The critical factors that determine the adoption of an innovation at the general level are the following: relative advantage, compatibility, complexity, trial ability and observability. (Rogers, 1995). Researchers such as Tan and Teo (2000), Gerrard and Cunningham (2003) and MdNor and Pearson (2008) had tested the theory on the e-banking adoption. The nominalized factors are complexity, triability and observability.

The underpinning theory employed in this work is a theory arising from the decomposed theory of planned behaviour. This theory considers that the use of technology is influenced by attitude, subjective norm and perceived behavioural control. The theory argues that the lesser the ratio of currency outside banks to broad money supply the higher the intermediation efficiency and vice-versa. This suffices that when the currency outside banks diminishes as a result of the increase in the use of electronic forms of payment, particularly ATM and other e-card products, as well as banking habits, the intermediation efficiency will be positive, otherwise it will be negative.

### **Point of Sale and Economic Growth in Nigeria**

The transaction cost innovation theory's main pioneers are Hicks & Niehans (1983). They thought that the dominant factor of financial innovation is the reduction of transaction cost, and in fact, financial innovation is the response of the advance in technology which caused the transaction cost to reduce. The reduction of transaction cost can stimulate financial innovation and improvement in financial services. This theory studied the financial innovation from the perspective of microscopic economic structure change. It thought that the motive of financial innovation is to reduce the transaction cost. And the theory explained from another perspective that the radical motive of financial innovation is the financial institutes' purpose of earning benefits. This theory discussed the motive and the process of financial innovation from different sides. Desai & Low (1987) with the location theory thought that financial innovation is the method which can make the integrity of financial market come true. According to the Location Theory, they advanced the financial innovation microscopic economic model. Desai & Low (1987) utilized this theory to confirm and measure the gap in the scope of acquirable product in financial market, which indicates the potential opportunity of the new products' innovation and promotion. Chen (1995) built the financial intermediary model in which new security secured by old security is created. In the period of decomposing the old securities and opening new market, innovators play an influential economical role. For example, investors can obtain the consumption at lower cost; investors can realize a better share of risks. His model indicated that even when introducing the surplus securities which are not distributed yet, the innovators can also play these roles. In other words, although these innovations have not changed the scope of acquirable financial tools, it makes investor's trade at lower expected cost. The main focus is on security designing in incomplete financial markets.

### **Mobile Banking on Economic Growth in Nigeria**

The Decomposed Theory of Planned Behaviour (DTPB). The theory was developed by Taylor and Todd (1995). The theory postulates that the intention to use a certain technology is influenced by attitude, subjective norm and perceived behavioural control. Starting from the research conducted by MdNor and Pearson (2008), Karahanna, Straub, and Chervany (1999), certain influencing factors were selected: the attitude toward behaviour and the perceived behavioural control.

### **Internet Banking on Economic Growth in Nigeria**

The Schumpeterian Approach Theory which was advanced by Schumpeter (1940). In the 1940s the economist Joseph Schumpeter assigned the key role in economic growth firstly to the disruptive activity of entrepreneurs, and secondly to large corporations, each of which fed a process of creative destruction by causing continuous disturbances in the economic system. The source of these disturbances was innovation, which created as Schumpeter put it: competition from the new commodity, the new technology, the new source of supply, the new type of organization, competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives. Hence it's important to investigate whether

it's the disruptive nature of financial innovation that drive economic growth or limit hence this theory will be key to this analysis.

### **Empirical Review**

Various empirical studies have been carried out on financial innovation and economic growth in Nigeria with different conclusions and results. 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.

Odušina, (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.

Dawodu and Osondu, (2013) examined the adoption of automated teller machine in Nigerian banks: use enhancements and limitations. The researcher used primary data throughout the work by distributing questionnaires. The questionnaires were returned and analyzed. Based on the result of our analysis, the summary of findings is as follows: The attributes of diffusion (relative advantage, complexity, compatibility, triability and observability) as a whole have significant impact on the adoption of ATM. At any given time, the interaction and combination of these five attributes will either lead to the adoption or rejection of the ATM by users. This is however subject to users' different perceptions. Relative advantage as an attribute of diffusion significantly affects the adoption of ATM. Respondents found the ATM to be of more advantage than traditional human tellers. Some of these advantages are evident in the ATM's speed, efficiency, availability and relative safety of personal information (personal identification number, PIN and account balance). Complexity as an attribute of diffusion has no significant impact on the adoption of ATM. Though most people had trouble comprehending the maze of options on the ATM initially, persistence by some users led to successful use of the machine. Besides, the model of the machine has not changed much over the years. Anyone who succeeded in using the machine ab-initio will still be able to do so now. Compatibility as an attribute of diffusion significantly impacts the adoption of the ATM. It shows that the use of the ATM accommodates the lifestyles, activities and past values of the respondents. Also, societal trend which sees the ATM as a modern way of doing things contributed to the significance of this attribute in the adoption of ATM. Triability as an attribute has no significant impact on the adoption of ATM.

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.

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.

Osazevaru, Sakpaide and Ibubune (2014) examined cashless policy and banks' profitability in Nigeria against the backdrop that these banks in a cash based economy are known for their huge profits even in the face of associated high cost of operations. Secondary data were collected and analyzed using content analysis comparing profits under cash based policy with a cashless regime. The results revealed that cashless economic policy positively impact on banks' profit through reduction in cost of operations and banking the unbanked populace.

Echekoba and Ezu (2012) in a research carried out in Nigeria, observed that 68.2% of the Igbara, Emerenini, and Daasi, (2015) examine the impact of cashless policy on small scale businesses. The study carried out in Ogoni of Rivers state, using the purposive sampling technique, 250 owners and operators of small scale businesses were selected and administered questionnaire. The data collected were coded and analyzed using frequency table and percentage, while regression analysis was used to test the formulated hypotheses using SPSS (Statistical Package for Social Sciences). The results indicate that: small scale businesses in Ogoni land are predominately occupied by sole proprietorship with meager income with a significant numbers of them having a very poor banking habit; it was also found out that small scale businesses statistically do not rely on heavy capital outlay; couple with the fact that provision of services is their main business activity makes bank transaction, ATMs usage and online banking of less or no significance since their transaction is grossly hinged on "cash and carry basis"; the findings from the study also suggest that operators of small scale business have zero tolerance to ICT usage in both the operations and transactions of their businesses; and this constitute a major challenge to the adoption of cashless policy in the study area and generally, there was a negative significant influence of the introduction of cashless policy on the operations and growth of small scale businesses in Ogoni land..

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 reveals that there is no significant relationship between Mobile service value and intermediation efficiency of the Nigerian economy within the period under study.

Ajayi (2014) examined the effect of cashless monetary policy on Nigerian banking industry. Out of 5000 Guaranty Trust Bank (GTBank) staff, 370 sample sizes were selected based on Taro Yemane's formula for sample size. The results of the study showed that there are significant reasons and benefits inherent in the implementation of cashless policy. It also showed that the policy has positively affected the development of banks; as it facilitates ease of operations and reduces queue and congestion in the banking hall, among others. However, inadequate technological infrastructures, high rate of cybercrime and high rate of illiteracy, among others are hindering the full implementation and benefits of the policy during the period of the study.

Igbara, Emerenini, Fabian and Daasi (2015), examined the impact of cashless policy on small scale businesses in Ogoni land of rivers state, Nigeria. The objective of the paper was to examine the impact of cashless policy on small scale businesses. The study used the purposive sampling technique, 250 owners and operators of small scale businesses were selected and administered questionnaire. The data collected were coded and analyzed using frequency table and percentage, while regression analysis was used to test the formulated hypotheses using SPSS (Statistical Package for Social Sciences). The results indicate that: small scale businesses in Ogoni land are predominately occupied by sole proprietorship with meager income with a significant numbers of them having a very poor banking habit; it was also found out that small scale businesses statistically do not rely on heavy capital outlay; couple with the fact that provision of services is their main business activity makes bank transaction, ATMs usage and online banking of less or no significance since their transaction is grossly hinged on "cash and carry basis"; the findings from the study also suggest that operators of small scale business have zero tolerance to ICT usage in both the operations and transactions of their businesses.

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.

Al-Smadi and Al Wabel (2011) studied the impact of e-banking on the performance of Jordanian banks. In their study, performance of banks was measured by ROE and two sets of control variables were used. Using pooled OLS regression technique they found significant negative impact of e-banking on financial

performance of banks. The major limitation of this study is that authors did not look at ROE after a specific year of adoption of e-banking. Since adoption of e-banking technology involves cost, this might take time to recover cost and experience profits.

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.

Onay and Ozsoz (2013) used panel data over the period of 1990–2008 of eighteen retail banks operating in Turkey and revealed that Internet banking adoption is positively associated with the level of profits, deposits and loans per branch. Their study also revealed that adoption of internet banking has a negative impact on bank profitability after 2 years of adoption. According to the authors, the reasons for such negative impact are internet banking increases competition and results in lower interest income.

Salhieh *et al.* (2013) addressed this dimension as the degree of belief of people that use a particular system would enhance their functional performance, from the customers perspective means the extent of the benefit that can be achieved by the electronic banking system, and their contribution to promoting efficiency and overall performance, so this study found that the proportion of customer perception of the benefit of using electronic banking services were high, which means accepting them to conduct electronic transactions in a way that will enable them to benefit from the advantages of banking service more easily and quickly.

## 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 review. 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). 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)

$$RGDP = \beta_0 + \beta_1 ATM + \beta_2 POS + \beta_3 MB + \beta_4 ITB + \mu \dots \dots \dots 1$$

$\beta_0$  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

**Method of Analyses**

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).

**Descriptive Statistics**

Descriptive statistics was also carried out on the variables. The descriptive statistics are employed to address the issue of normality of the variables. The selected statistics for the analyses are means, standard deviations (SD), and the Jarque-Bera. Mean is the average value of the series while standard deviation measures dispersion in the series. However, the Jarque-Berastatistics was basically used for the test of normality of the variables. Normality of data is one of the standardized assumptions that have to be fulfilled in many statistics tests such as t test and F test. The Jarque-Bera test was used to test for the normality of the variables employed in the study. The Jarque-Bera test uses skewness and kurtosis measurements. Decision rule: Reject the null hypothesis, when p. value is less than 0.05 level of significance, otherwise, do not reject.

**The Augmented Dickey-Fuller (ADF) and the Phillips and Perron (PP) tests**

The Augmented Dickey-Fuller (ADF) and the Phillips and Perron (PP) tests were conducted on the variables, to determine whether they are stationary or non-stationary series. The two tests were employed to reinforce one another, to ensure their robustness and boost confidence in their reliability. The tested null hypotheses for both unit root tests are to determine the presence of a unit root.

**Decision rule:** Reject the null hypothesis when the test statistical value is less than the critical value. Otherwise, accept and test at higher difference (1 or 2). The significance level for the analysis is at 5%.

**Ordinary Least Square (OLS)**

The estimation of the models was done using Ordinary Least Square (OLS). The OLS was employed because it has the criteria of being Best Linear Unbiased Estimator of linear relationship

The Coefficient of Determination ( $R^2$ ) measures the explanatory power of the independent variables on the dependent variable. The  $r^2$  normally makes an overestimation of the true value of the population especially when small sample is used. The Adj  $r^2$  correct this problem (Pallant, 2004). Therefore, since the sample is a small one, we use Adj  $r^2$ . F-Test = measures the overall significance.

Student T-Test measures the individual significance of the estimated independent variables. The decision rule for test of hypotheses is to rejects the null hypotheses for calculated significance value below 5% level of significance.

Durbin Watson (DW) Statistics test for autocorrelation in the regression. The decision rule is to accept any equation with Durbin-Watson less than or greater than values not approximately 2 as not acceptable. Unacceptable Durbin-Watson suggests that the analysis cannot be relied on.

**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, 2018.

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**

Variables	T-statistics	Probability	Order of Integration
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 2017

Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
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 5 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 5 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 5 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 5 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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