

**EFFECT OF INFORMATION COMMUNICATION TECHNOLOGY ON FINANCIAL  
INCLUSION IN NIGERIA**

**BY**

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**OCTOBER, 2020**

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**A PROJECT SUBMITTED TO THE DEPARTMENT OF ACCOUNTING AND  
FINANCE, MOUNTAIN TOP UNIVERSITY, OGUN STATE, NIGERIA, IN PARTIAL  
FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE  
BACHELOR OF SCIENCE (BSc. Hons)**

**OCTOBER, 2020**

## **CERTIFICATION**

I certify that this work was carried out by **OGUNTUGA TAIWO DEBORAH** at the Department of Accounting and Finance, Mountain Top University, Ogun State, Nigeria under my supervision.

**Dr. T.A Taleatu**

**(Supervisor)**

\_\_\_\_\_

**Signature & Date**

**Dr. J.O Omokehinde**

**(Head of Department)**

\_\_\_\_\_

**Signature & Date**

## **DEDICATION**

I dedicate this project to God Almighty for his love, strength, knowledge and understanding and Grace over my life and for seeing me through the course of this study and through all the difficult times, and also to my beloved parents for their immerse assistance, financial support and encouragement.

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## ABSTRACT

This study examined the effect of information communication technology on financial inclusion in Nigeria. Debate on financial inclusion revealed that highest population in some areas in Nigeria is financially excluded. Previous studies on financial inclusion in Nigeria focused on various determinants excluding the impact of ICT while other studies focused on its consequences on the economy. The general objective of this study is to investigate the relationship between information communication technology and financial inclusion in Nigeria. The study adopted *ex post facto* research design. The findings revealed that ATM usage has a significant effect on financial inclusion in Nigeria with a significance hence this study concludes that ATM usage has a significant relationship with financial inclusion in Nigeria. The study recommended that Banks and other financial institutions should reduce the high charges on some electronic banking channels in order to encourage regular use by stakeholders.

**KEYWORDS:** *Financial Inclusion, ATM usage, E-banking services, POS usage.*

<b>Contents</b>	<b>TABLE OF CONTENTS</b>	<b>Page</b>
Title Page.....		i
Table of Content.....		ii
Certification.....		iii
Dedication.....		iv
Acknowledgments.....		v
Table of Content.....		vi
List of tables.....		viii
Abstract.....		x
Key Words.....		ix

## CHAPTER ONE

### Introduction

1.1 Background to the Study .....	1
1.2 Statement of the Problem .....	4
1.3 Objectives of the study .....	4
1.4 Research Question .....	5
1.5 Research Hypothesis .....	5
1.6 Significance of the study .....	5
1.7 Scope of the study .....	6
1.8 Limitation of study.....	6

1.9 Definition of study .....	6
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## CHAPTER TWO

### Literature Review

2.0 Introduction .....	8
------------------------	---

2.1 Conceptual Review .....	8
-----------------------------	---

2.1.1 Financial Inclusion .....	8
---------------------------------	---

2.1.2 Information Communication Technology .....	10
--	----

2.2 Theoretical Review .....	11
------------------------------	----

2.2.1 Financial Growth Theory .....	11
-------------------------------------	----

2.2.2 Theory Of Change .....	12
------------------------------	----

2.3 Empirical Review .....	14
----------------------------	----

2.4 Gap in Literature .....	17
-----------------------------	----

## CHAPTER THREE

### Methodology

3.0 Introduction .....	18
------------------------	----

3.1 Research Design .....	18
---------------------------	----

3.2 population, Sample, and Sampling Techniques .....	18
3.3 Method of Data Collection .....	18
3.4 Research Instrument .....	19
3.5 Validity and Reliability of Research Design .....	21
3.6 Model Specification .....	22
 CHAPTER FOUR	
 Data Analysis, Results, And Discussion Finding	
4.0 Introduction.....	23
4.1 Data Presentation, Analysis and Interpretation .....	23
4.1.1 Descriptive Analysis.....	23
4.2. Regression Coefficients.....	25
4.2.1 Test Of Hypotheses And Discussion.....	25
4.2.1 Test Of Hypotheses One .....	25
4.3. Linear Regression Analysis Between ATM Usage And Financial Inclusion.....	25
4.3.1 Model summary.....	25
4.3.2 ANOVA.....	26
4.3.3Coefficients.....	29

4.2.2 Test Of Hypotheses Two.....	29
4.4. Linear Regression Analysis Between E-banking Services And Financial Inclusion ...	33
4.4.1 Model summary .....	28
4.4.2 ANOVA .....	28
4.2.3 Test Of Hypotheses Three .....	30
4.5. Linear Regression And Analysis Between POS Usage And Financial Inclusion.....	30
4.5.1 Model Summary.....	35
4.5.2 ANOVA.....	31
4.5.3 Coefficients .....	32
4.2.1.1 Discussion Findings.....	32
4.6 Summary Of Model Amd Hypotheses Results .....	34
 CHAPTER FIVE	
Summary Conclusion And Recommendation	
5.0 Introduction .....	36
5.1 Summary Of The Study .....	36
5.2 conclusion .....	38
5.3 Recommendation.....	39

5.4 Suggestion for Further Studies.....	40
References .....	41
Appendix .....	43

**LIST OF TABLES**

<b>Table</b>	<b>Title of Table</b>	<b>Page</b>
4.2.1	Test of Hypothesis One.....	25
4.2.2	Test of Hypotheses Two.....	27
4.2.3	Test of Hypotheses Three.....	30

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the study

In the last years, financial inclusion provides banking services to a larger number of users who don't have access to traditional financial services. That's why we have seen a boom of a new realities based on digital services that aim to go where traditional channels can't. However, Lazzolino, (2018) demonstrates that considering the importance of and, significance to the digital field of financial inclusion mobile money services may potentially be dangerous as they build new exclusions instead of inclusion. The analysis of Lazzolino, (2018) shows the fact that digital financial services should not be limited to mobile money (digital money transfers through mobile services like ICT), namely: Automated Teller machines (ATM), POS and E-banking) but should include the provision of additional services, such as the provision of more services. Financial inclusion refers to the distribution to deprived and low-income groups of the population of financial services, at fair rates often in rural areas.

Financial inclusion refers to efforts to enable all individuals and companies to access financial products and services irrespective of personal income or net value. The aim of financial inclusion is to eliminate barriers that exclude people from financial sector involvement and remove barriers that discourage their use of these services for their livelihoods. Financial inclusion is also referred to as financial inclusiveness. However, the goal of this study is to investigate whether or not ICT variables are important indicators of financial inclusion, the connection between financial inclusion and ICT growth. The technological boom in smart phones including the use of Internet to develop businesses has irreversibly transformed ways of living, working and communicating in large part, but it is also a tool to boost global connectivity. The ability to access banking services and perform a monetary transaction through a mobile device called mobile finance services is one of the key changes created by the smart phone revolution; the number of individuals in the banking sector is expected to grow with this innovative technology. There is an immense opportunity; therefore, for previously excluded groups to gain access to a

structured financial system, the growth of smart phones is combined with the growing of financial services to the current financial structure gap.

Financial inclusion helps the poor to save money beyond home security and leads to the reduction of the economic shocks experienced by the poor, financial markets is also becoming an increasingly significant area of focus to all politicians because it has far-reaching economic and social impacts. Financial inclusion has now become an open policy for rapid economic development, which as a recent reality was the principal motivator for adopting plans and policies to improve global financial inclusion as a way to foster the global monetary capital, is considered crucial to achieve inclusive growth in a region. Financial inclusion makes for inexpensive, especially those with lower incomes, access to financial capital and services for the numerous financial agents (Mbutor & Uba, 2013).

The distribution of financial services to unbanked and low-income groups of society may also be said to be affordable cost; Although the CBN is developing various programs and policies for the purpose of achieving high financial inclusion, both in urban and rural areas by 2016, such services are neither available nor affordable for a certain class of economic agents of three groups, in particular for low-income society members. It is difficult for those who are illiterate to use the mobile while making transactions, such as money transfers, deposits, savings, which can save time and money as well. Financial exclusion means lack of access to sufficient low-cost, equitable and reliable financial goods and services from conventional suppliers by certain segments of society. Financial inclusion is a condition in which everyone has access to financial services; It can also be described as the state of the financial system, in which all members of society have the access to appropriate financial products and services to manage their resources effectively and efficiently, are provided with necessary resources for the funding of their businesses and financial leverage, in order to take the opportunity to increase their revenue. The growth of Automated Teller Machines (ATMs) was also another technological evolution that has transformed the supply channel in the banking industry.

The banking area has experienced substantial growth via ATMs, but mainly the same has been restricted to the banking area, the high unbanked and lack of access to financial services, especially among rural residents, have many reasons in Nigeria. Infrastructure development is

lacking, illiteracy, poverty, and mistrust. Financial inclusion not only works in Nigeria but in several other countries.

Increasing financial inclusion means so many positive developments at the micro economic level, People who are involved with finances tend to be more productive, to consume more and to invest more 40 % of urban residents remain financially excluded and do not have access to bank accounts that remove them as a result from basic facilities, such as saving, loans, and using different financial services, from the formal financial system, Of the total urban residents financially included in the system, most are inadequately accessing their accounts and related services with present communications technologies, Although a number of studies on financial integration in various sectors have been carried out and Country areas but nothing in relation to the ICT 's position in financial inclusion has been achieved. This paper therefore examined Nigeria's role in financial inclusion in ICT (Information Communication Technology).

## **1.2 Statement of the problem**

The Financial Inclusion debate has shown the financial exclusion of the highest population in certain places of Nigeria; Obstacles to financial inclusion by the expansion of bank branches include high operational costs, restricted banking hours and the absence of alternative outlets available in rural centers. The most critical challenge in Samuelson and Nordhaus (2010) is insufficient savings and investment in many developing countries like Nigeria, People are struggling to meet their basic demands for consumption and have little or nothing to invest in productive enterprises, which results in a low economic growth , Earlier research in Nigeria based on multiple determinants excluding the influence of ICT additional research based on its economic effects. Consequently, the impact on financial inclusion in Nigeria of ICT (ATM, E-banking, POS) has been explored in this study.

## **1.3 Objectives of the Study**

The specific objectives of the study are to:

1. Examine the effect of ATM usage on financial inclusion in Nigeria.
2. Investigate the relationship between E-banking services and financial inclusion in Nigeria.

3. Ascertain the influence of POS usage on financial inclusion in Nigeria.

#### **1.4 Research Questions**

The following research questions are formulated for the purpose of this research work:

1. What is the effect of ATM usage on financial inclusion in Nigeria?
2. What relationship exists between E-banking services and financial inclusion in Nigeria?
3. To what extent does POS usage influence financial inclusion in Nigeria?

#### **1.5 Research Hypothesis**

The following hypotheses are formulated for the purpose of this research work:

1.  $H_0$ : ATM usage has no significant effect on financial inclusion in Nigeria.
2.  $H_0$ : E- banking services do not have a significant relationship with financial inclusion in Nigeria.
3.  $H_0$ : POS usage does not have a significant influence on financial inclusion in Nigeria.

#### **1.6 Significance of the Study**

In terms of income and increased investment and interest on loans, the bank managers would benefit from this study. It will also be of benefits to the public because customers can access their bank deposit or credit accounts in order to make a variety of financial transactions, most especially cash withdrawals and balance checking, as well as transferring credit to and from mobile phones. The benefits will also come from the increasing use of POS systems by companies. POS does not require price tags. When adding stock, the sales prices are linked to the product code, so that the cashier simply has to scan this code in order for the item to be sold. If the price changes occur, the inventory window can be easily used as well. Further advantages include the ability to implement different kinds of discounts, customer loyalty schemes and more efficient inventory controls. Almost all early POS systems are typical.

### **1.7 Scope of the Study**

The study reflects on the ICT effect on Nigeria's financial inclusion. The research dealt with the financial inclusion impact of ATM, e-banking and POS use. The analysis only employed secondary data. The data represented a total of seven years between 2012, when the financial inclusion discourse in Nigeria and 2018 became popular.

### **1.8 Limitations of the Study**

Study restricts This analysis, however, has some limitations; the key obstacles for the researcher in this study were time and money restrictions. The investigator was also presented with the shortage of statistical measurement samples, the analysis should have provided more reliable findings based on a bigger survey.

### **1.9 Definition of Terms**

The operational definitions of terms for this study are:

- 1) **Automated Teller Machine Usage:** is an Electronic Telecom that provides deposit money banks (DMBs) customers with the capability to conduct financial transactions, such as cash retirements, deposits, transfers of funds, etc. or requests for accounts information, no direct interaction with bank staff is necessary any day. In this study, the number of people using ATMs across the country is referred to monthly.
- 2) **Electronic Banking Services (E-Banking):** An electronic payment system enables bank or other financial institution customers through the Web sites of the financial institution to conduct a number of financial inclusions Another financial institution is responsible for carrying out a number of financial activities on its website.
- 3) **Financial Inclusion:** Financial inclusion means the distribution to the poor and the low-income groups of society of financial resources at manageable rates. The analysis applies to the monthly loan-to - deposit ratio (LDR).

- 4) **Information and Communication Technology (ICT):** ICT: applies to ATM, e-banking facilities and POS use. Information and communication technology (ICT)..
- 5) **Point on Sales (POS):** A POS transaction is a medium by which a buyer tends to pay for goods and services. POS transactions. Every type of payment, such as cash, debit cards, loyalty points, gift cards, mobile transfers, etc. can be used. It was captured by the monthly volume of POS transactions that took place throughout the year.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This chapter explores ICT 's financial inclusion impact on Nigeria 's systemic analysis, analytical review and practical assessment for the study being carried out.

#### **2.1 Conceptual Review**

This paragraph provides a critical analysis of the research parameters extracted from the related principles discussed in this study. In addition, the ICT concept, its reach and the financial inclusion priorities have been checked. The ICT variables such as: ATM, E-banking and POS use were defined in depth.

##### **2.1.1 Financial Inclusion**

Financial inclusion in Nigeria is of paramount significance but remains a distant hope. Aduda and Kalunda(2012) consider financial inclusion as a method of making a range of financial services available to all members of the community from a service provider at a fair price and at the right location without any discernment. Financial inclusion can be defined as the mechanisms that restrict access to a structured financial system for some individuals and social classes. The inefficiency of obtaining the financial resources available in an acceptable manner was a financial inclusion. It means ensuring the access of exposed communities such as poorer segments and low-income groups at an acceptable rate to the main financial resources and appropriate loans where necessary.

According to Nalini, and Mariappan (2012), financial inclusion is intended to connect people with banks for significant benefits. This enables the formal financial systems to play their unique role as a driver of economic growth, a major endeavor of most developing countries; Financial inclusion, including political, economic and social inclusion, aims at economic growth. The exclusion of all individuals or groups from those three inclusive dimensions will lead to financial exclusion, as people's political, economic and social life is interwoven in the three dimensions and financial inclusion is required. Where the majority is excluded from the financial system, not everyone gains in economic development, which leads to inequalities. In order to share the advantages of growth more or less consistently amongst all segments of the people, inclusive growth is therefore required for the economy. Financial inclusion is described by the World Bank (2014) as a means to provide access for financially excluded and under-served citizens of society without any discrimination. As a plan to expand the number of community members with access to structured financial services.

Hariharan and Marktanner (2012) have intellectualized financial inclusion. Chibba (2009) sees financial inclusion as a policy action technique intended to overcome the barriers of consumer access to financial resources that obstruct vulnerable and disregarded people. Financial inclusion has been planned for linking people with banks to benefit from the performance, according to Nalini, and Mariappan (2012). This encourages the structured financial structures to play a special role in fostering economic development, as most developed countries are doing a great deal of work.

### **2.1.2 Information Communication Technology**

Information Communication Technology "ICT" in financial inclusion means digital access for disadvantaged and under-served citizens to the use of structured financial services. These facilities should be suited to the consumers' desires and provided safely, at a rate both acceptable to customers and viable for suppliers. The Technology can play an important role in reducing operational cost of providing banking services, especially in the rural and unbanked areas. There are innovations that could accelerate the increase of financial inclusion; Since calculation is seen as difficult, it is widely established that financial inclusion is absent from the financial system. Financial inclusion, however, does not only concern physical access to financial services due to the changes in topography. As a result, the debate has been extended to include all manner of individuals accessing financial services and financial exclusion mechanisms little or no use. Nonetheless, the impact of the ICT variables (ATM use, e-bank services and POS use) on financial inclusion has been studied in Nigeria in order to place this analysis in an acceptable perspective. ICT refers to learning, designing, introducing, helping or operating an information system based on computers. Many employed in the field have the duties to oversee the network, create and install the software, and to schedule and manage the life cycle of the technology of an enterprise which manages hardware and software. It also comprises a wide selection of computer hardware, applications, telecommunications networks and intelligent chips, including ATM, E-banking and POS, root of information systems (Yekini & Lawaal 2012). It also contains information on computer and systems. Using ICT enhances the functioning of the economy and boosts trade; Investment in ICT is decreasing cost due to better communication systems.

ICT increase information flows, boost arbitration capability, and promote price by lowering information recovery costs. They allow better business performance, supply, and demand control. This is why knowledge on product, work, and business costs rises in addition, good contact networks replace inefficient physical transport and thus broaden customer, vendor and market networks found out that ICT transaction costs reduced are attractive to trade, as they create opportunities for developed countries to access foreign markets and increase option of sales. The growth of ICT-induced e-commerce raises productivity and opens up developing-country markets; development of the ICT economy businesses, such as ecotourism or expertise, enters global markets, digitalize marketplaces and simplify purchases. Trade in services such as back office support or data entry and processing applications also benefit from new possibilities, as ICT allows knowledge outsourcing.

## **2.2 Theoretical Review**

These are philosophical basis on which a research work takes place. It forms a theoretical aspect and practical component of the investigation undertaken. The theories are explained below.

### **2.2.1 Finance Growth Theory**

Walter Bagehot was the father of the Finance Development Theory; he was a classical British economist. The idea was that for economic development the financial system is very important. This philosophy applies to the basics and views for / or against financial inclusive growth, social inclusion and justice endorsed. It is believed that a reduction in inequalities and increasing inclusiveness would lead to a cycle of high and balanced development and productive social security gains to the disadvantaged segments of society through financial inclusion initiatives.

Studies have reported that countries with high levels of financial exclusion (26-48 percent and above) could be facing a higher poverty level (Aduda & Kaunda, 2012).

### **2.2.2 Financial Intermediation and Financial Stability Theories**

The hypothesis is based on growth issues of the financial sector by seeing financial intermediation as a crucial method for inclusive economic progress to the point that financial institutions bring deficit and excess units together. Technical dimensions are theoretical. A broader role of all workers in total output growth would lead not only to social security for the poor, but also to improvement of domestic market conditions, particularly in the field of monetary stability. Failure to access funds has been related to continued disparities in wages, poverty traps and restricted growth (Aduda & Kalunda, 2012).

The theory of financial intermediary is based on the assumption that intermediary costs and information asymmetries are minimized by intermediate steps (Aduda & Kalunda, 2012). The theory of financial intermediation comes to the conclusion of the growth of information technologies, deregulation, deepening of financial markets, etc., which continues to reduce the costs of transactions and current asymmetries. Financial intermediaries are structured to put together surplus money players who want to lend (invest) to individuals who are without capital and want to borrow. This provides the advantages of maturity and risk transition. Financial stability is described as the absence of tension that could result in observable financial damage outside the narrowly restrictive client and counterpart community with the two key points; the effective distribution of resource, risk evaluation and management; and the absorption of 13 shock Price and financial stability are related to policymakers because severe interruptions to the

financial system can impact monetary policy execution and effectiveness, while macroeconomic stability leads to the decrease of threats to financial stability.

### **2.2.3 Theory of Change**

Emerging in the 1990s as a methodological model and evaluate comprehensive community initiatives, the Theory of Change (ToC) describes the need to establish strategic, long-term priorities by stakeholders as a requirement for change and then mapping backwards to recognize the conditions precedent to attaining the desired change. As detailed by Anderson (2005), the ToC theory is that a series of early and medium-term successes sets the way for producing long-term success.

The ToC is also a management instrument that has to distinguish between the expected and the real effects and to chart the desired outcomes before some kind of action is determined, providing an honest logistical image of the actions taken to achieve the target. Obviously the three views are interlinked; a reform philosophy is needed as a means to establish responses to complicated socio-economic issues, such as financial inclusion, and without financial inclusion and business creation, a nation will have sustainable growth as a means of achieving the goal for a prosperous, the ideal of an equitable, healthy community. ICT is a means by which business growth can be accelerated. If participants can access, use and afford a variety of financial resources within inclusive financial systems, they are able to properly leverage economic assets to deal with shocks and pressures, to respond to changing conditions and to improve their lives. This research therefore follows a Reform Hypothesis to explore ICT-financial inclusion ties in Nigeria.

## 2.4 Empirical Review

Different researchers have, at different times, investigated the effect of ICT on financial inclusion. The patterns of financial inclusion in India and its future visions were analyzed by Nehan and Pawan (2013) The descriptive research used secondary details and found that many residents and rural families in India had little access to banking services or other financial services. The link between financial inclusion and economic growth in Nigeria has been checked by Otiwu, Okere, Uzowuru and Ozuzu (2018) with a microfinance Banks sample (MFBs). The statistics from this analysis were from the CBN Statistical Bulletin, the CBN Annual Report and the sampled MFB account statements for the corresponding years. For the time the data covered 1992 to 2013. The analysis employs an OLS (Ordinary Least Square and Co-integration) test for Johansen.

The findings show that the use of IT facilities has changed the substance and efficiency of banking in Nigeria. The 2011 survey of Oluwagbemi, Abah and Achimugu (2011) have identified an impact on the Nigerian banking industry on information technology, the findings show that the use of IT facilities has changed the substance and efficiency of banking in Nigeria.

Similarly, Onaolapoa and Odetayo (2012), using survey design tool, explored financial inclusion in Nigeria from the point of view of MFBs. They found that access to finances through microfinance institutions facilitates the creation of jobs, poverty reduction and overall economic development by less fortunate individuals. IN the "Financial Inclusion: The Path ahead" report, Sadakkadulla (2009) clarified how inclusive growth is a day-talk and financial inclusion is a way to achieve inclusive growth. The incorporation of credit is the next reasonable 15 phase, but should not stop and apply to micro-insurance and the common man's other financial solution.

The role of financial inclusion in the growth of the Indian economy has been examined by Joseph and Varghese (2014). From June to November 2013, the report analyzed the operations of five private sector and five state banks. Onsite and offsite use of ATMs is used as proxies for financial inclusion for the numbers of bank offices, credit cards and debit cards per customer, with an emphasis on the rural and semi-urban regions of India.

They noticed that quite a number of people are still excluded from financial services even after the launch of universal banking measures in the world. According to Massey (2010), in his study titled, "Position of Financial institution in Financial Inclusion," the role of financial institutions in a developed world is crucial in fostering financial inclusion. The efforts of the government to encourage financial inclusion can be further strengthened by the pro-activeness on the part of capital market participants like financial institutions.

Andrianaivo and Kpodar (2011) investigated whether financial inclusion is one of the mechanisms by which ICT diffusion can affect economic development. Using a panel estimate of 44 African countries from 1988-2007, the General Method of Moment Framework (GMM) findings affirm the positive impact of ICT on growth and indicate that growth in countries on growth is more significant for countries with high degree of financial inclusion. Moreover, they conclude that financially well-developed countries begin to expand faster when mobile penetration is high as seen by the optimistic and important coefficient of the association word between mobile penetration and financial inclusion.

The mind of any participant –bankers, bureaucrats and regulators–had to be significantly modified. At the same time, it cannot undermine the role of technology in the whole scenario. It must be remembered that technology plays an important role now, more than ever before, in achieving the inclusion of all social and economic groups in society. Therefore, this research discussed the regional split and component exclusions found in previous studies. Even the weakest citizen will be motivated through financial integration and a profound turn of destiny.

#### **2.4 Gap in the Literature**

The discrepancy in literature has primarily been discussed in external studies (Amrita & Nitigya, 2017; Mihasonirina & Kangni, 2011; Neha & Pawan 2013). Linked Nigerian (Adekunle & Rafiu 2014) research concentrated on the effect on the economy of financial inclusion, but omitted the financial inclusion impact of ICT variables. Therefore, this research discussed the regional split and component exclusions found in previous studies.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.0 Introduction**

The procedural techniques used in the study are covered in this section. These include; research design, population of the study, sampling technique, sample size determination, method of data collection, model specifications and measurement of variables.

#### **3.1 Research Design**

The study adopted *ex post facto* research design to investigate the effect of information and communication technology (ICT) on financial inclusion in Nigeria. This research design was considered appropriate since the study made use of readily available past secondary data.

#### **3.2 Population, Sample and Sampling Technique**

Population of the study consists of all the 22 deposit money banks in Nigeria using all the aggregate figures obtained from all the banks by the Central Bank of Nigeria (CBN). The study adopted census survey by including all the DMBs.

### 3.3 Method of Data Collection

This study is purely longitudinal for the reason that it employs time series data covering a seven-year period, 2012 to 2018. These include: study architecture, study population, sampling procedure, calculation of sample size, data collection process, model parameters and variable measurement. Automated Teller Machine usage (ATM), Point of Sale (POS) value, value of electronic banking services (E-banking) and financial inclusion reflected by loan deposit ratio (LDR) data were collected on ICT usage.

### 3.4 Model Specifications

The main model of the study can be represented in a functional form as shown below:

$$\text{FINC} = f(\text{ATMU}, \text{EBAN}, \text{POSU}, \text{DRA}, \text{LRA}) \quad (1)$$

Where;

**FINC** = Financial inclusion

**ATMU** = ATM usage

**EBAN** = E-Banking services

**POSU** = Point of Sales

**DRA** = Demand deposit from the rural areas

**LRA** = Loan to rural areas

Moreover, three regression models were derived for the study by adapting the model in the study of Okoye, Adetiloye, Erin and Modebe (2016). The models were presented below:

**Model: 1**

$$\text{FINC} = x_0 + x_1\text{ATMU} + x_2\text{DRA} + x_3\text{LRA} + \varepsilon \quad (2)$$

Where:

FINC = Financial inclusion

ATMU = ATM usage

DRA = Demand deposit from the rural areas

LRA = Loan to rural areas

$x_0$  = Constant

$x_1$ ,  $x_2$  and  $x_3$  = Regression coefficients

$\varepsilon$  = error term

**Model 2:**

$$\text{FINC} = x_0 + x_1 \text{EBAN} + x_2\text{DRA} + x_3\text{LRA} + \varepsilon \quad (3)$$

Where:

FINC = Financial inclusion

EBAN = E-Banking services

DRA = Demand deposit from the rural areas

LRA = Loan to rural areas

$x_0$  = Constant

$x_1$ ,  $x_2$  and  $x_3$  = Regression coefficients

$\varepsilon$  = error term

**Model 3:**

$$\text{FINC} = x_0 + x_1\text{POSU} + x_2\text{DRA} + x_3\text{LRA} + \varepsilon \quad (4)$$

Where:

FINC = Financial inclusion

POSU = Point of Sales

DRA = Demand deposit from the rural areas

LRA = Loan to rural areas

$x_0$  = Constant

$x_1$ ,  $x_2$  and  $x_3$  = Regression coefficients

$\varepsilon$  = error term.

### **3.5 Measurement of Variables**

The dependent variable in this study is financial inclusion. It has been assessed in Okoye *et al.* (2016) as the loan to deposit ratio. The independent variable in this study is ICT usage and it is made up of ATM usage, E- banking services and POS usage (Joseph & Varghese, 2014). ATM usage was represented with the yearly value of transactions made throughout the country on yearly basis. Like NIPS, (NIBSS Instant Payment System) NAPS (NIBSS Automatic Payment Service). NEFT (National Electronic Payment Service) in the nation on an annual basis is measured by the annual value of transactions brought over electronic payment systems. POS was captured by the yearly value of POS transactions that took place throughout the country. The control variables include demand deposit from the rural areas (DRA) and loan to rural areas (LRA). Both DRA and LRA were measured on yearly basis Okoye *et al.*, (2016).

### **3.6 Method of Data Analysis**

The process of data processing can be used for data analysis of descriptive and inferential statistics. Mean and standard deviations are used in descriptive numbers. Correlation and basic linear regressions are inferential statistics. The interaction between the variables is calculated with a correlation and the relationship among the variables is analyzed with regression.

## CHAPTER FOUR

### DATA ANALYSIS, RESULTS, AND DISCUSSION OF FINDINGS

This chapter presents analyses and findings of the study as set out in the research methodology. The research results were presented to study the effects of ICT on Nigeria's financial inclusion. In order to gather secondary data, the CBN statistical report were used during this analysis. Other sections of the data analysis were done in congruence with the research objectives.

#### 4.0 Data Presentation, Analysis and Interpretation

##### 4.1.1 Descriptive Analysis

**Table 4.1: Descriptive Analysis**

	Observations	Minimum	Maximum	Mean	Std. Deviation
Loan deposit ratio (LDR)	7	37.97	79.95	62.3700	16.42
Automated Teller Machine usage (ATM)	7	1984.99	6480.09	4339.28	1722.07
Point of Sale (POS)	7	48.46	2383.11	788.88	837.99
Electronic banking services (E-banking)	7	17643.44	103532.90	49874.99	30513.05

**Source: Researcher's Analysis, 2020**

From Table 4.1 above, the maximum values, minimum values, the mean (average), and standard deviation were shown. The results expressed in Table 4.1 helps to provide some insight into the nature of the deposit money banks in Nigeria used in this study.

First, it can be observed that on the average, in a 7-year period (2012-2018), the deposit money banks used for this study were characterized by positive Loan deposit ratio (LDR)= 62.37. This is an indication that most quoted banks in Nigeria have a positive Loan deposit ratio (LDR) and that most banks relied on its own deposits to make loans to its customers, without any outside borrowing. Similarly, the table also shows that on the average during the period covered by this study, the value of transaction for ATM was ₦4,339.28 Trillion, the maximum value stood at ₦6,480.09 Trillion while the minimum value stood at ₦1,984.99 Trillion, thus showing a large difference between the minimum and maximum values of the ATM transactions, meaning that large number of Nigeria bank customers adopted the use of ATM facilities in most of their cash transactions.

Furthermore, the table also shows that on the average during the period under study that value of transaction for POS Bill was ₦788.88 Billion, the maximum value stood at ₦2,383.11 Trillion while the minimum value stood at ₦48.01 Billion, thus showing a large difference between the minimum and maximum values of the POS Bill Value, meaning that large number of Nigeria bank customers use POS facilities in most of their transactions that involves cash transactions.

Also, the table shows that on the average during the period under study that the value of transaction for Electronic banking services (E-banking) including NIPS,(Nibss Instant Payments System) NAPS(Nibss Automated Payment Service) and NEFT (National Electronic Payment Service) was ₦49,874.99 Trillion, the maximum value stood at ₦103,532.90 Trillion while the minimum value stood at ₦17,643.44 Trillion, thus showing a large difference between the minimum and maximum values of Electronic banking services, meaning that large number of Nigeria bank customers are also using E-banking facilities in most of their transactions that involves cash transactions.

#### 4.1.2 Regression Coefficients of Control Variables

**Table 4.2 Regression Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	59.505	11.565		5.146	.007
	Demand deposit from rural areas (DRA)	5.470E-5	.000	.406	.890	.424
	Loan to rural areas (LRA)	-4.627E-6	.000	-.110	-.242	.821

a. Dependent Variable: Loan deposit ratio (LDR)

**Source: Researcher's Analysis, 2020**

From Table 4.2 above, the regression coefficients for the control variables are;

Demand deposit from rural areas (DRA) = 0.406

Loan to rural areas (LRA) = -0.110

#### 4.2. Test of Hypotheses and Discussion

##### 4.2.1 Test of Hypothesis One

H<sub>0</sub>: ATM usage has no significant effect on financial inclusion in Nigeria.

H<sub>1</sub>: ATM usage has a significant effect on financial inclusion in Nigeria.

**Table 4.3: Linear Regression Analysis between ATM usage and financial inclusion**

**Table 4.3.1: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.761 <sup>a</sup>	.578	.494	11.67482

a. Predictors: (Constant), Automated Teller Machine usage (ATM)

**Source: Researcher's Analysis, 2020**

Table 4.3.1 above shows that automated teller machine usage (ATM) and financial inclusion has a moderate correlation (coefficient R) of 0.761 indicating that there is a positive relationship between the two variables while the increasing degree in automated teller machine usage (ATM) will increase financial inclusion by 76.1%. Analysis in table 4.3.1 also shows that the coefficient of determination (the percentage variation in the dependent variable being explained by the changes in the independent variables) R square equals 0.578, that is, Automated Teller Machine usage (ATM) explains 57.8% of observed change in financial inclusion.

**Table 4.3.2: ANOVA<sup>a</sup>**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	935.264	1	935.264	6.862	.047 <sup>b</sup>
	Residual	681.507	5	136.301		
	Total	1616.771	6			

a. Dependent Variable: Loan deposit ratio (LDR)

b. Predictors: (Constant), Automated Teller Machine usage (ATM)

**Source: Researcher's Analysis, 2020**

The Analysis of Variance (ANOVA) was used to check how well the model fits the data. Moreover, the change statistics shows that the research model and variables are fit ( $p < 0.05$ ). The ANOVA results showed that at 0.047 level of significance, there existed enough evidence to conclude that automated teller machine usage (ATM) was useful for predicting financial inclusion of deposit money banks in Nigeria. From the results, it can be concluded that there is a linear relationship between the dependent variable and the independent variable. It also shows that the F-value which is the mean square model divided by the mean square residual yielded 6.862.

**Table 4.3.3: Coefficients**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	30.910	12.795		2.416	.060
Automated Teller Machine usage (ATM)	.007	.003	.761	2.619	.047

a. Dependent Variable: Loan deposit ratio (LDR)

**Source: Researcher's Analysis, 2020**

**Model 1 for ( $H_01$ ) is stated as  $FINC = x_0 + x_1ATMU + x_2DRA + x_3LRA + \epsilon$**

$$FINC = 30.910 + 0.761 ATMU + 0.406 DRA - 0.110 LRA + 12.795$$

From the regression result, model 1 shows that automated teller machine usage (ATM) has a significance level of 0.047 ( $p < 0.05$ ). This finding hence accepts the alternate hypothesis  $H_1$  that ATM usage has a significant effect on financial inclusion in Nigeria and rejects the null hypothesis  $H_0$  that ATM usage has no significant effect on financial inclusion in Nigeria.

#### 4.2.2 Test of Hypothesis Two

H<sub>0</sub>: E- banking services do not have a significant relationship with financial inclusion in Nigeria.

H<sub>1</sub>: E- banking services have a significant relationship with financial inclusion in Nigeria.

**Table 4.4. Linear Regression Analysis between POS usage and financial inclusion**

**Table 4.4.1. Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.573 <sup>a</sup>	.328	.194	14.73620

a. Predictors: (Constant), Electronic banking services (E-banking)

**Source: Researcher's Analysis, 2020**

Table 4.4.1 above shows that electronic banking services (E-banking) and financial inclusion has a moderate correlation (coefficient R) of 0.573 indicating that there is a positive relationship between the two variables while the increasing degree in electronic banking services (E-banking) will increase financial inclusion by 57.3%. Analysis in table 4.4.1 also shows that the coefficient of determination (the percentage variation in the dependent variable being explained by the changes in the independent variables) R square equals 0.573, that is, electronic banking services (E-banking) explains 57.3% of observed change in financial inclusion.

**Table 4.4.2. ANOVA<sup>a</sup>**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	530.993	1	530.993	2.445	.179 <sup>b</sup>
	Residual	1085.778	5	217.156		
	Total	1616.771	6			

- a. Dependent Variable: Loan deposit ratio (LDR)
- b. Predictors: (Constant), Electronic banking services (E-banking)

**Source: Researcher’s Analysis, 2020**

The Analysis of Variance (ANOVA) was used to check how well the model fits the data. Moreover, the change statistics shows that the research model and variables are not fit ( $p > 0.05$ ). The ANOVA results showed that at 0.179 level of significance, there existed enough evidence to conclude that electronic banking services (E-banking) was not useful for predicting financial inclusion of deposit money banks in Nigeria. From the results, it can be concluded that there is no linear relationship between the dependent variable and the independent variable. It also shows that the F-value which is the mean square model divided by the mean square residual yielded 2.445.

**Table 4.4.3. Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	46.993	11.301		4.158	.009
	Electronic banking services (E-banking)	.000	.000	.573	1.564	.179

- a. Dependent Variable: Loan deposit ratio (LDR)

**Source: Researcher’s Analysis, 2020**

**Model 2 for (H<sub>02</sub>) is stated as  $FINC = x_0 + x_1 EBAN + x_2 DRA + x_3 LRA + \epsilon$**

$$FINC = 46.993 + 0.573 EBAN + 0.406 DRA - 0.110 LRA + 11.301$$

From the regression result, model 2 shows that electronic banking services (E-banking) has a significance level of 0.179 ( $p > 0.05$ ). This finding hence accepts the null hypothesis  $H_0$  that E-banking services do not have a significant relationship with financial inclusion in Nigeria and rejects the alternate hypothesis  $H_1$  that E-banking services have a significant relationship with financial inclusion in Nigeria.

### 4.2.3 Test of Hypothesis Three

$H_0$ : POS usage does not have a significant relationship with financial inclusion in Nigeria.

$H_1$ : POS usage has a significant relationship with financial inclusion in Nigeria.

**Table 4.5. Linear Regression Analysis between POS usage and financial inclusion**

**Table 4.5.1. Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.476 <sup>a</sup>	.226	.072	15.81661

a. Predictors: (Constant), Point of Sale (POS)

**Source: Researcher's Analysis, 2020**

Table 4.5.1 above shows that point of sale (POS) and financial inclusion has a moderate correlation (coefficient R) of 0.476 indicating that there is a positive relationship between the two variables while the increasing degree in point of sale (POS) will increase financial inclusion by 47.6%. Analysis in table 4.5.1 also shows that the coefficient of determination (the percentage variation in the dependent variable being explained by the changes in the independent variables) R square equals 0.226, that is, point of sale (POS) explains 47.6% of observed change in financial inclusion.

**Table 4.5.2. ANOVA<sup>a</sup>**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	365.946	1	365.946	1.463	.281 <sup>b</sup>
	Residual	1250.825	5	250.165		
	Total	1616.771	6			

a. Dependent Variable: Loan deposit ratio (LDR)

b. Predictors: (Constant), Point of Sale (POS)

**Source: Researcher's Analysis, 2020**

The Analysis of Variance (ANOVA) was used to check how well the model fits the data. Moreover, the change statistics shows that the research model and variables are not fit ( $p > 0.05$ ). The ANOVA results showed that at 0.281 level of significance, there existed enough evidence to conclude that point of sale (POS) was not useful for predicting financial inclusion of deposit money banks in Nigeria. From the results, it can be concluded that there is no linear relationship between the dependent variable and the independent variable. It also shows that the F-value which is the mean square model divided by the mean square residual yielded 1.463.

**Table 4.5.3. Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	55.018	8.526		6.453	.001
Point of Sale (POS)	.009	.008	.476	1.209	.281

a. Dependent Variable: Loan deposit ratio (LDR)

**Model 3 for (H<sub>0</sub>3) is stated as  $FINC = x_0 + x_1 POSU + x_2 DRA + x_3 LRA + \epsilon$**

$$FINC = 55.018 + 0.476 POSU + 0.406 DRA - 0.110 LRA + 8.526$$

From the regression result, model 3 shows that point of sale (POS) has a significance level of 0.281 ( $p > 0.05$ ). This finding hence accepts the null hypothesis H<sub>1</sub> that POS usage does not have a significant relationship with financial inclusion in Nigeria and rejects the alternate hypothesis H<sub>1</sub> that POS usage has a significant relationship with financial inclusion in Nigeria.

#### **4.2.1.1. Discussion of Findings**

This study investigated the effect of Information Communication Technology (ICT) on financial inclusion in Nigeria. The data generated were subjected to both descriptive and inferential statistics. The descriptive statistics revealed the individual characteristics of the variables used in this study while the inferential statistics tested the hypotheses using the simple linear regression analysis.

The test of hypothesis one was to examine whether ATM usage has a significant effect on financial inclusion in Nigeria. The findings revealed that ATM usage has a significant effect on financial inclusion in Nigeria with a significance level of 0.047 ( $p < 0.05$ ). Therefore, the null hypothesis  $H_0$  is rejected and the alternate hypothesis  $H_1$  is accepted. This result indicates that there was a favorable increase in ATM usage which may be also associated with the increase of bank's branches over the years. However, this result contradicts that of Serrao, Sequeira and Varambally (2013) who identifies that increase in number of bank branches may not necessarily lead to improvement in financial inclusion, especially if those new branches are located where other banks already exist. So, where there are bank branches where no current banks operate, financial inclusiveness would expand as new accounts for those who are unbanked until now open. Mbutor & Uba (2013) have also observed, as the trend of stationing several branches in a limited geographic area is typical among banks, that the absolute number of bank branches may not actually mean increased financial inclusion and the resulting impact is consumer poaching instead of financial inclusion.

The second test of hypothesis was to analyze the contribution of e-bank services to Nigeria's financial inclusion. The results therefore suggested that e-Banking services in Nigeria have no essential connection to the extent of financial inclusion of 0.179 ( $p > 0.05$ ). Therefore, the null hypothesis  $H_0$  is accepted and the alternate hypothesis  $H_1$  is rejected. From the findings of this study, it was observed that stakeholders in rural areas have little to no access to E-banking facilities. This means that management should pay more attention on the activities that will improve E- banking services of their banks especially in such areas if they wish to improve the financial inclusion of their banks and the economy at large as this will also lead to high customer's satisfaction and patronage.

Muthami (2015) also agrees that Internet banking helps the commercial banks to lower their cost of banking, through technology which has created greater opportunities to the banks to offer great flexibility to the customers. Kagan, Acharya and Rao (2005) also concluded that banks that provide extensive online banking services tend to perform better than those who lag behind and that online banking improves the earnings of the banks. In addition, Dashi (2013) identified that mobile/E-banking may appeal more to the educated but the regular breakdown in mobile telecommunication network poses a challenge that may make people to be reluctant in subscribing to the service. He also cited that E-banking does not make any meaning to the illiterate, especially those without access to government electricity supply.

The test of hypothesis three was to ascertain whether POS usage have a significant relationship with financial inclusion in Nigeria. The findings discovered that POS usage does not have a significant relationship with financial inclusion in Nigeria with a significance level of 0.281 ( $p > 0.05$ ). Therefore, the null hypothesis  $H_0$  is accepted and the alternate hypothesis  $H_1$  is rejected. This result indicates that POS is regularly used especially in the rural areas. However, the major setback to POS usage is poor network connections and inadequate capacity to cope with the volume of transactions. The insignificant relationship of POS usage with financial inclusion in Nigeria also identifies that most times, the account of cardholders initiating the transaction is debited and the reverse credit is usually not executed within 24 hours as expected. Vanguard (2019) also agrees to this that when a customer is debited through POS without pay, the time frame for the reversal of such fund takes longer than expected which frustrates customers.

However, a summary of the models from the three hypotheses and their results are shown in Table 4.6 below.

**Table 4.6: Summary of models and hypotheses results**

<b>S/N</b>	<b>Models</b>	<b>Hypothesis Results (0.05 significance level)</b>
<b>1</b>	$\text{FINC} = 30.910 + 0.761 \text{ ATMU} + 0.406 \text{ DRA} - 0.110 \text{ LRA} + 12.795$	p=0.047: H <sub>0</sub> 1 is rejected
<b>2</b>	$\text{FINC} = 46.993 + 0.573 \text{ EBAN} + 0.406 \text{ DRA} - 0.110 \text{ LRA} + 11.301$	p=0.179: H <sub>0</sub> 1 is accepted
<b>3</b>	$\text{FINC} = 55.018 + 0.476 \text{ POSU} + 0.406 \text{ DRA} - 0.110 \text{ LRA} + 8.526$	p=0.281: H <sub>0</sub> 1 is accepted

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.0 Introduction

In this section of the study, the researcher provides a summary of the findings derived from the study, the conclusion of the study, and recommendation for the study.

#### 5.1 Summary of the Study

Financial inclusion is a state in which all people have access to banking and insurance services as well as financial literacy and capabilities. It can also be described as the state of financial system where every member of society has access to appropriate financial products and services for effective and efficient management of their resources get needed resources to finance their businesses and financial leverage to take up opportunities that will lead to increase in their income. Those who are illiterates are finding it difficult to make use of a smart phone or have access to the internet in doing some transactions like transfer of money, withdrawal of money and investment.

This research was therefore established to investigate the effect of Information Communication Technology (ICT) on financial inclusion in Nigeria. The findings of this study were discussed in detail and the objectives of the study were linked to the current findings of the research. The secondary source of data was obtained from the Central Bank of Nigeria Statistical Bulletin and other related journals.

This study used an *ex-post facto* research design to gather data for the period of 2012-2018 from 22 deposit money banks in Nigeria which was extracted from the CBN statistical bulletin. The study focused on three explanatory variables as proxies for the independent variable (Information Communication Technology); Automated Teller Machine usage (ATM), Point on Sale (POS) value, value of electronic banking services (E-banking) and one dependent variable which is loan deposit ratio (LDR) (Financial inclusion).

In addition, three major theories were identified in this study. They are Finance Growth Theory, Financial Intermediation and Financial Stability Theories, and Theory of Change. Finance growth theory explains that the financial system is of great importance for economic growth. It also refers to the essentials and opinions for/against financial inclusive development, social equality and justice supported. Financial Intermediation and Financial Stability Theory focuses on the concerns for growth in the financial sector by considering financial intermediation as a vital mechanism for inclusive economic development to the degree that financial institutions put deficit and surplus spending units together. Financial intermediaries were meant to bring together those economic agents with surplus funds who want to lend (invest) to those with a shortage of funds who want to borrow. By doing this, they offer the benefits of maturity and risk transformation. They also help to improve the rate of financial inclusion in the economy.

As cited by Anderson (2005), the Theory of Change explains the need to define strategic, long-term goals by stakeholders as a prerequisite for change and then mapping backwards to identify the conditions precedent to attaining the desired change. This theory is needed as a tool for developing solutions to complex socio-economic problem like financial inclusion, and a nation cannot have inclusive growth without using financial inclusion and market development as a means to achieving the vision of an inclusive, stable society. ICT is a means through which market development may be accelerated. Within inclusive financial systems, if participants are able to access, use, and afford a range of financial services then they will better manage economic assets to cope with shocks and stresses, adapt to changing circumstances, and transform their lives.

Furthermore, simple linear regression analysis was used to test the three-research hypothesis. The probability level was set up at 5% significance. The result of the linear regression analysis hence indicates that there is a significant relationship between ATM usage and financial inclusion in Nigeria with a significance level of 0.047 ( $p < 0.05$ ), E- banking services do not have a significant relationship with financial inclusion in Nigeria with a significance level of 0.179 ( $p > 0.05$ ), and POS usage does not have a significant relationship with financial inclusion in Nigeria with a significance level of 0.281 ( $p > 0.05$ ).

## **5.2 Conclusion**

The study concludes that there is no significant relationship between information communication technology and financial inclusion in Nigeria. In particular, the study concludes that ATM usage has a significant relationship with financial inclusion in Nigeria. The study also concludes that E-banking services do not have a significant relationship with financial inclusion in Nigeria. Also, the study concludes that POS usage does not have a significant relationship with financial inclusion in Nigeria.

From the results of this study, it can therefore be concluded that while ICT has not been fully employed in most banks to improve financial inclusion in Nigeria, it has been able to minimize cash related crimes, provides banks with more liquidity for lending to vulnerable sectors, reduces high operational costs incurred in cash based economy and increased convenience, more service choices and affordable access to banking services. Nevertheless, despite the intrinsic benefit derived from the implementation of cashless policy in Nigeria, it appears that the unavailability of certain cashless policy tools, high charges on some electronic banking channels, ATM and POS defects and other technical issues, weak network connectivity and communication, lack of trust the payment system, indiscriminate deductions from accounts and cyber fraud have been identified as the major problems that hinder the progress and efficiency of financial inclusion in Nigeria.

## **5.3 Recommendation**

Sequels to the findings of this research, the following recommendations are made which will be useful to stakeholders;

- i. The Central Bank of Nigeria should embark on a thorough campaign to fully adopt e-payments facilities especially at grassroots level.
- ii. Banks and other financial institutions should step up efforts in installing other e-payment platforms especially in other to enhance Nigeria's economy.
- iii. Concerted efforts should be made by financial institutions to establish an internet security system that can detect online fraud so that stakeholders can be confident and safe from cyber-attacks and fraud.

- iv. Banks and other financial institutions should reduce the high charges on some electronic banking channels in order to encourage regular use by stakeholders.
- v. The government should provide adequate infrastructural facilities such as adequate power supply and installation of telecommunication masts especially to rural areas in order to enhance their access to e-banking platforms.

#### **5.4 Suggestion for Further Studies**

The researcher suggests that for effective conclusive study on the effect of information communication technology on financial inclusion, a replica study should be carried out in another industry other than the banking industry. The researcher also suggests that in future studies, the period covered should be extended.

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## Appendix I

YEAR	Loan deposit ratio (LDR) (Percentage)	Automated Teller Machine usage (ATM) Volume (₦'BILLION)	Point on Sale (POS) volume (₦'BILLION)	Electronic banking services (E-banking) Volume (₦'BILLION)			
				NIPS	NAPS	NEFT	E-banking
2012	42.31	1,984.99	48.46	3,890.26	0.00	13,753.18	17,643.44
2013	37.97	2,830.53	161.21	10,848.73	0.00	14,367.95	25,216.68
2014	64.24	3,681.98	312.07	19,921.49	0.00	14,563.80	34,485.29
2015	69.58	3,971.65	448.51	25,540.84	98.68	13,087.09	38,726.61
2016	79.95	4,988.13	758.99	38,109.06	753.69	14,584.80	53,447.55
2017	78.20	6,437.59	1,409.81	56,165.67	4,960.35	14,946.46	76,072.48
2018	64.34	6,480.09	2,383.11	80,423.03	12,078.91	11,030.96	103,532.90

## APPENDIX II

<b>YEAR</b>	<b>Demand deposit from the rural areas (DRA) (₦'MILLION)</b>	<b>Loan to rural areas (LRA) (₦'MILLION)</b>
2012	19.72	22,579.97
2013	20.50	739,923.34
2014	480.32	988,587.87
2015	90.37	29,169.15
2016	87,930.95	43,776.89
2017	185,336.47	530,992.24
2018	308,851.85	200,066.33

Source: Central Bank of Nigeria Statistical Bulletin, 2019