Comparative Study of Cost and Social Effect of Information and Communication Technology in the Operations of Banking Sector. A Case Study of Nigeria and Ghana

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Abstract
The study empirically examines and compares the cost and social effect of ICT on deposit money banks’ operational activities in Nigeria and Ghana. The scope of the study covers 2000-2016 adopting a secondary data as collected from ten deposit money banks from each country. The key objective of the study is to determine the impact of ICT and its cost and social effect on deposit money banks’ operational activities, level of unemployment and rate of cybercrime in the society. The results obtained indicate that the application of ICT in the Nigerian banking sector enhances maximum profitability, with negative effect on the society through increase in cybercrime and unemployment rate. Similarly, in Ghana ICT equally enhances profitability and cybercrime, boost job creation without a negative effect on the level of unemployment. The study concludes that the adoption of ICT in the Nigerian and Ghanaian banking sector are in line with the global best banking and financial practices as it enhances profitability, similarly its application in Nigeria has increase the rate of unemployment squarely on the grounds of lack of adequate training. The study therefore recommends training of personnel on ICT skill sets. Law curtailing cybercrime should be enacted to restor public trust.

Keywords: Cost, cybercrime, technology, banking sector, financial inclusion

1.0 Introduction
Empirically and theoretically the banking sector serves as growth stimulant in both industrialized and emerging economies, as result of its fundamental objective of financial intermediation. The viability and stability of the banking sector engineers economic growth and development through savings, investment and financial inclusion. The adoption of information and communication technology (ICT) in the banking sector in the contemporary era has not just boosted the efficiency, profitability and quality services delivery but has successfully to a greater extent included the financially excluded in to the financial grid. Kanu . (2016), opine that banks have no asset to offer except confidence. Many
banks have lost control of their customers because of poor service delivery and due to geographical location of rural areas; more than 70% of the populations are still unbanked.

Despite the functionality associated with the adoption of ICT globally and especially in Nigeria and Ghana, its negative effects cast a great deal of doubt as it affects the society through retrenchment of staffs, increase in crime rate, financial fraud, cybercrime. Martins, (2016) noted that over time the prime role of financial inclusion of deposit money banks has been greatly neglected as a result of technological advancement, reduction in the number of bank branches and the exclusion of the elderly from the financial grid.

In Commerce Ghana.com, it was stated that the inefficient system in the country in comparison to what is obtainable in United State of America or United Kingdom may be frustrating to immigrants who expect higher level of efficiency. The clients, both citizens and foreigners experience the same unsatisfactory operations of banks in both countries. The emergence of ICT in the banking sector, although has improved banking operations, but is not without cost. This has resulted increase in cost, acquisition and maintenance of various banking gadgets to improve business and operational activities. In the light of the above the study therefore examines the cost and social implication of ICT on the Nigeria and Ghana banking sectors.

1.1 Statement of Problem

Empirically and conventional the impact of ICT and its cost and social implication in modern times has received considerable attention as it affects the fundamental objective of the banking sector of financial intermediation and inclusion of the financial excluded from the financial grid. The negative effect on the society and poor service delivery hampers the banking sector efficiency and its contribution to economic growth and development especially in emerging economies, where a greater population of the citizens are not ICT compliance and are financial excluded from the financial grid. Resulting to gross under performance, ineffective service delivery, staff retrenchment, increase in cost of maintains. It is against this background that the researchers wish to comparatively evaluate the cost and social effect of ICT on the Banking operations of Ghana and Nigeria.

1.2 Objectives

1. To examine the impact of ICT cost on banks profitability in Nigeria
2. To examine the impact of ICT cost on banks profitability in Ghana.
3. To examine the causal relationship between ICT cost and cybercrime in Nigeria
4. To examine the causal relationship between ICT cost and cybercrime in Ghana
5. To evaluate the long run relationship between cyber crime and use of ICT in the banking sector in Nigeria.

2.0 Review of Related Literature

2.1 Conceptual framework

Information and Communication Technology

Information technology (IT) has become a vital factor in the life of every nation as well as backbone of knowledge-based in the performance of economy. It enhances effective and efficient performance of banks in their various operations, where all the activities are computer based.

For Obasan (2011), it is the process whereby computers, telecommunication, software and other infrastructure are used to obtain, control, and produce information to improve efficient facilitate provision of services and facilitate informed decision making. Igwe (1995) as quoted in Davies (1998) ICT is a way of receiving, processing, giving and transferring information electronically.

Alu and Idowu (2002), opine that IT has made it simple to obtain information, saves time and improved services provided by financial institutions. Investing in IT by financial institution has
improved operations of banks, competitiveness and caused quality service delivery. According to Yasuharu (2005) as quoted in Saeid (2011), the execution of information technology networking has given rise and changes in the activities of the financial institutions. It is a necessary innovation with cost.

Information technology encompasses technology necessary for transmission of information and network-based control and monitoring functions. Woherem (2000) said that banks use ICT in making payments, service delivery and function with it to enhance future survival and growth. The use of computer in the operations of this sector has been the core thing that banks, which operate without it, cannot compete in the national and international market. Unfortunately, people only consider the positive effect of making activities computer based without counting what it takes to acquire and repair of these ICTs gadgets.

Ovia, (2005), confirmed that although ICT caused glamour to the activities of the sector, however, it is not free. Employing ICT has resulted numerous problems for organizations. The purchase and maintenance of computer accessories require a reasonable sum. According to United Nations Development Programme (UNDP) Information Technology consist of various types of internet networks used to control data and improve knowledge. The people with the knowledge and skills to initiate ideas, develop programmes, manage the systems, and specialize on it are called ICT experts.

2.2 Financial Inclusion

According to World Bank, (2014) financial inclusion is that number of people that have access and enjoy services of financial institution. Due to the rural nature of these two countries, especially Nigeria, large number of people is still excluded from financial services. This is caused by remoteness of the country and level of illiteracy. The number of people excluded financially in Ghana is not much because of population and rural density is also too small compare to that of Nigeria. The presence of ICT in the sector has to some extended reduced the rate of financial exclusion in the countries.

GSMA’s state of the Industry on Mobile Money report (2016) argues that

“Mobile money has enabled financial inclusion, giving people access to transparent digital transactions and the tools to better manage their financial lives. It has also been a gateway to other financial services, such as insurance, savings, and credit. People’s lives have been enriched by greater personal security, a sense of empowerment, and more”

2.3 Empirical Framework

Obasan (2011) worked on information and communication technology and banks profitability in Nigeria. Primary data was used and selected banks in south-west Nigeria was the population for the study. Ordinary Least Square Approach in econometric view was employed to analyze the data. The study reveals that positive correlation exists between ICT and profit of banks in Nigeria. It concludes that change in the level of investment and adoption of ICT in the sector will result to profit maximization.

Shirley, Sushanta and Mallick (2006), researched on the impact of information Technology in the US banking industry. They used panel data to conduct a test on 68 US banks for twenty (20) years and the result shows that the adoption and diffusion of IT investment caused decline in the profitability of banks; showing that networking affects the industry negatively. Agboola, (2001) conducted a research on Information and Communication. Technology (ICT) in banking operations in Nigeria, selecting 36 out of 89 banks in Nigeria as population in 2005. The outcome shows that ICT is the major factor that enhanced competition, improved customer services, brain behind accurate records, provide convenient business hour, prompt and fair attention, encourages fast service delivery and improves bank-customer relationship.
Ekata (2011), conducted research on the adoption of electronic Banking in Ghana banking System with the Guaranty Trust Bank (Ghana) Limited and the study reveals that the adoption of e-banking increases revenue generation, improves productivity, promotes quality services and cost savings. The result is that employing ICT is the future of banking industry in Ghana. Generally, it is the future of global banking not only Ghana.

Ekwonwune, Egwuonwu, Elebri, and Uka (2017), studied the role of Information and Communication Technology in an enhanced banking operation a case study of Diamond Bank. The researchers collected data from both the primary and secondary sources. The result indicates that ICT impacted positively on employment generation, employees and customers, saves time, and improves the efficiency.

Many authors have conducted research on the impact of ICT on the operations of banking sector, impact of ICT on the profitability of banks, but authors have not worked on the cost and social effect of ICT on the operations of banking sector. That is the contribution the study resolved to add to the existing knowledge. The researchers believe that filling of this gap will reduce cyber crime in the country, eliminate financial exclusion in the country and in the banking sector and beyond.

2.4 Theoretical Framework

The term theory means a way or method with reference on how events relate to each other. It is defined as a set of concepts and/or statements with specification of how phenomena relate to each other (Dahe, Carre, Jaramillo and Alemka, 2017). Theory describes a system that produces known, explains and predicts event.

Christopher (2003), defined behavior as somebody’s reaction directly or indirectly to either external or internal events. It is a physical event that occurs in the body but controlled by brain. However, George Herbert Mead shows interest in the function of communication in explaining social acts. In his social behaviorism, people are distinguished from other animals by their ability to assuming themselves in the place of the other, and eagerly await his or her reply. Language, gesture, communication, and role-taking are the major symbolic interaction by which the concept of self is and which forms the basis of social life. Social behavioral theory is the theory that supports this study. It portrays the reactions of individuals, even the environment due to the use of ICT in the system. Individuals with the knowledge and skill of Information and Communication Technology react and employ it in their different activities of life. However, good number of people does not know anything about ICT, as such; it does not touch their lives and activities.

2.5 Early Banking Services in Nigeria and Ghana

Before the advent of any form of globalization in Nigeria, banks have been in operation as early as 1892 when the country was under the rule of the colonial master. Later, some Nigerians established banks that performed the following functions: accepted customers’ deposit, paid cheques, granted loans and overdraft, cleared cheques, kept valuables, managed investment and provided advice to customers. Every activity in the bank was done manually. A few financial institutions in Nigeria automated some activities early in the 1980s but not until the late 1990s did such banks introduce intra-branch financial networks. Automation and the intra-network facilitated the incorporation of electronic banking, which used the established networks to further enhance transactions between branches. Banks that offer such services mostly operate in large cities. Customers accepted the services without much complaint.

According to Woldie, Hinson, Iddrisu, and Boateng, (2008), Commercial banking in Ghana predated colonial times. The literature indicates that the Bank of British West Africa (BBWA) now called Standard Chartered Bank of Ghana Limited was the nation’s first commercial bank. It was followed by Barclays Bank Ghana Limited, then subsequently the Bank of Ghana and the Ghana Commercial Bank. Customers who want to open accounts usually filled forms, for literate ones, submitted their passports and the staff of the bank would create ledgers, and issued deposit form,
withdrawal form and savings passbooks if the accounts are savings accounts or checkbooks in case of current accounts. Clients that wished to withdraw or deposit simply went to the banks with the forms as issued by the banks and filled it requesting for withdrawal and the cashier would receive and stamp the withdrawal forms and checked the account balance of the customer in the ledger card; where the balance is sufficient the cashier would pay the customer, debiting the withdrawn amount in the ledger as well as the saving passbook. When customer deposited money, the passbook and ledger would be credited. Customers queued in the banking hall to wait in turns. Any amount of cash to be withdrawn or deposited used to be done manually. Customers that applied for loan or overdraft waited patiently for documentation, verification and approval of the application. There was no shortcut to these procedures.

Customers do provide wrong information and addresses in their loan application forms and this caused high incidence of nonperforming loans because the customers could no longer be traced. In some situations bankers failed in their responsibilities to verify and document the clients’ applications and information therein to help identify and know the customers. This was the result of manual work with much left undone or omitted. This also led to high cases of nonperforming loans. Defaulting customers may be sued to court. However, due to poor legal system, enormous time and money would be wasted without achieving anything. Banks lacked infrastructure, resulting in poor amenities in the banking hall where customers waited for a long time.

The first bank established in Ghana in the year 1953 was Bank of Gold of Coast. This bank was later divided into two namely; Bank of Ghana and the Ghana Commercial Bank. Every activity in the Ghana banking sector was manually done. Customers spent hours in queue waiting for their turn to be attended to. It took many days before a reply to loan application could be received. The only difference between the two countries was that Nigeria had larger population and vast of rural areas where banking services could not reach. Nigeria had a total population of 185,989,640 (one hundred and eight five million, nine hundred and eighty nine thousand, six hundred and forty ); with a rural population of 95,604,255 (ninety five million, six and four thousand, two hundred fifty five) who did not have electricity and other infrastructure (Nigeria Demographics profile, 2018). However, Ghana with a fewer population had a smaller number of rural dwellers. Due to the small nature of the country, interconnectivity was not much hard. Some years ago, however, number of banks started to render Personal computer banking services to companies. Many banks had website- the World Wide Web through which clients access their accounts. This made the banking operations in Ghana more interesting.

2.6 The Cost of ICT on the Banking Operations

Many authors and researchers have emphasized the benefits of the use of ICT in the banking sector; that the use of ICT fastens transactions and makes work effective. Banks on daily basis equip the offices with different types of computers, internet accessories, vista, and Automated teller machine and others. There is constant replacement of obsolete equipment and repair of spoilt machines. Banks can survive in the face of competition only by using the standard technology necessary to enhance the banking operation for customers’ satisfaction. Use of ICT saves time and bridges the gap of distance between customers and bankers. This solves the problem of mobile banking. Customers make withdrawal with ATM, transfer money online with ATM and now with mobile phone. One can be in his house and pay bills, make purchases, recharge phones and other types of transactions. All these are possible due to the use of ICT in the banking sector. The adoption of ICT in banks has improved customers’ services, encouraged accurate records of transactions and improved service delivery. It is obvious that banks spend a lot every day to be ICT compliant and cannot survive without recouping these costs.

Agboola (2001), added that the cost of deploying the technology has impacted negatively to the profitability figures of many banks. Therefore, the only consideration for the services enjoyed by the
customers is to pay the cost. Information technology acquisition and deployment is capital-intensive and requires deliberate commitment for success.

What necessitated the use of ICT in the banking sector was as the result of large volume of transactions and number of customers. It is obligatory on banks to provide satisfaction to the customers. In many occasions, customers spend the whole day in the banking hall without receiving attention. At times customers regret depositing money in the bank because of the stressful experience on the process of withdrawing the money. However, due to the fear of unknown and insecure environment, people keep on demanding and using the services of banks without minding the excessive cost of operations.

In Nigeria, some ATMs do not pay more than N5,000 and customers have to make several withdrawals in order to make up one transaction. Withdrawal of three times made in a month with ATM is charged N65. Online transactions, both transfer and deposits, transfers through phones attract charges. Customers pay excess charges, in fact they pay for services not rendered and banks charge these to enable them offset the cost of ICT and make profit which is the end product. The cost price and maintenance cost of technology is on the high side especially in Nigeria where every part of ICT equipment is imported. It does end there, because acquired machine cannot operate itself. There is need for experts who specialized in the operations of these equipments. Nigeria needs also to obtain the services of these experts and the price to pay for the services is a cost to the system. In the case of Ghana, although the country imports some equipment, the government established some universities that train some young engineers that are experts in handling these machines. In the long run, the cost of employing ICT in Ghana banking sector is cheaper than in Nigeria because qualified graduates are produced in the universities to handle the ICT complexities instead of spending much in employing the experts. Again, banks introduced various charges to their customers such as stamp duty -charge of N50 on every N1000 and above. The charges are supposed to be on current account only but bank also place charges on the savings accounts. Workers who receive their salaries through the banks have been severally charged by banks. People are worried of the situation in the country, where recession is eaten deep into the root of the economy; banks are reel from the government deposit. Many banks have in their statement of financial position carried nonperforming assets caused by nonperforming loans and, now banks have to spend much in purchasing, maintenance of the technology in order to support the system.

However, these are extra cost on the institution. The cost price and maintenance cost of technology is on the high side. In Ghana, banks do not charge uniform fees, cash withdrawals from the ATMs are free in some banks. In Ghana, ECOBANK charges $1,000 per monthly withdrawals and 60,000 Ghanaian cedi flat annually for ATMs withdrawals. The cost of a 50-leaflet checkbook for personal accounts is 40,000 Ghanaian cedi. Barclays Bank, Standard Chartered Bank, Stanbic Bank, United Bank for Africa (UBA), Bank of Baroda, GCB, Universal Merchant bank, UT Bank, Royal Bank and First Capital Plus bank do not charge for ATM transaction. Five banks charge 20 pesewa for every withdrawal made at the ATM machine, 3 banks charge 25 pesewa for ATM withdrawals. Ayankotun (2008) reported that Nigerian commercial banks spend $114 million, annually, on information technology. In 2009, the 24 commercial banks in the country spent more than $107 million US dollars on IT and related services (Ekata, 2011). The customers bear the burden of ICT cost.

With the use of ICT now in Nigeria, people still pay with their time. Banks have many ATM but unfortunately only one will be working, the queue which customers tend to avoid by withdrawing with ATM will still be experienced. During weekend and other festivals, clients find it almost impossible to withdraw through ATM. Some will not be dispensing cash while others will be inoperative. Time is money, instead of gaining, it will be wasted. However, in Ghana, customers queue up in the ATM merely on weekend due to concentration of people on a particular bank. The population of the country (Ghana) plays an important role in this regard; it is not as large as that of Nigeria.
2.7 Level of Unemployment and ICT in the Banking Sector

The use of information and communication technology in the banking system as it concerns unemployment is obvious as all the activities are done by the computers. Earlier, money used to be counted manually but now, there is a counting machine. Cashiers receive deposits and make payments, Bankers travel far and wide in search of customers, penetrate the market in order to gain sizable portion of it, but due to problem of time and distance, much cannot be achieved. All the loan applications are processed manually. As a result; it takes a long time for customers to get approval for loans. The job has been reduced by the introduction of ATM, e-Monies and Electronic Fund Transfer. This reduction in the volume of jobs done in the banking operations has caused loss of jobs in many banks, thereby increasing the level of unemployment in the country.

As the years go by, the use of ICT in the banking sector replaces the activities done by the employees all over the world. In 2010, the Consultative Group to Assist the Poor (CGAP) conducted a research and discovered that large segment of the Ghanaian population (44.0%) was excluded from the financial services. However, with the introduction of mobile money services, the population that was excluded from the financial services in 2015 reduced to 25%.

Although, Kanu and Isu (2014) contend “that the drastic reduction in the number of banks had affected employment in the sector in particular and the economy as a whole, but the use of ICT in the banking sector added to the existing level of unemployment in the economy. This has multiple effects because of the dependants of the retrenched banks staff. Many businessmen that receive income from the employees in the course of transactions have lost that opportunity. Money no longer enters into the hands of those dismissed staff to enhance buying and selling. They find it difficult to pay their children and wards school fees. Some may have joined the men of the underworld to terrorize people, thereby increasing the level of insecurity in the society.

The developed and some developing countries are enjoying the fruit of ICT in terms of employment, Nigeria is paying the price. The reason is not farfetched. Most of these countries have specialists who develop suitable programmes for their environment, handle and maintain the machines without extra cost. In some cases, most of these countries are both the equipment and services providers. Many individuals in these countries who have excellent knowledge of ICT also join in boosting and enlarging the scope of the services. However, in Nigeria’s banking sector, due to the level of ICT illiteracy, many employees have been retrenched in order to employ the people who are ICT literate.

In this regard, Nigerian universities’ curriculum is faulty and requires redesigning to address the problem of the environment and key into global banking standard. There is no programme in the universities where young people are trained and provided with skills to handle the ICT equipment in the banking sector; rather the country indulge in “technology transfer” where the ICT equipment, service provider are being imported to handle our ICT. The consequences are undue advantage by the foreign experts and increase in unemployment level in the country. Hence the level of unemployment in Ghana and Nigeria is shown in this diagram below:
2.8 ICT and Cyber Crime in the Banking Sector

Generally, ICT crime or fraud is called Cybercrime or internet crime. It is defined as any nonstatutory activities carried on globally on the electronic networks (Wikipedia). The story of cybercrime is a daily affair because it involves services. Shinder (2002), sees Cybercrime as offenses which a person perpetuated using computer gadgets. Cybercrime has come to stay in Nigeria (Folashade and Abimbo, 2013) Cyber crime is much in the banking sector because the product of the system is all about services.

For a good number of years ago, when banks and other organizations began computerization all over the world, without knowing that they were setting the stage for the emergence of a computer crimes age. This development is extremely non-profitable to organizations employing computers and the Internet to improve business processes. Again, as a country advances in the use of ICT, the rate of cybercrime increases. For example, Germany is one of the countries that have advanced in the use of
ICT, yet the issue of cybercrime is still rampant. Records have it that the number of reported cybercrime in the year 2016 was over 82,000 which caused losses worth 51 million Euros (fifty one million Euros) and the value of $55.7 million.

The use of ICT results in effectiveness in the bank service delivery. It aids inter-connectivity between states and countries and makes business interaction easy and fast. However, the consequence of employing ICT is a plus to the level of existing crime in the banking sector. People welcome the use of ICT even beyond the banking sector; little did they know that a step to improve on it is an enhancement to crime in the system. Many authors believe that each step forward in advancement of technology provides an exciting new frontier for fraudsters especially in the financial and banking sector of the economy.

In the society today ICT improves interaction between people through smartphones, internet, Skype, get acquainted with one another, share new ideas, experience and information, but the results are deception and destruction. According to Ibrahim, (2018), Nigeria banking sector recorded 16,751 cases in 2016 and in 2017, recorded 26,182 as total cases of fraud and forgeries of which 24,266 (Twenty four thousand, two hundred and sixty-six) emerged from the use of internet/online banking, ATM and other electronic devices (Ibrahim, 2018). The Nigeria Deposit Insurance Corporation (NDIC) has it that the value of loss incurred in 2017 was N2, 37bn. In the first Nigerian Legislative Stakeholders Conference on ICT cybercrime, Saraki (Nigeria’s Senate President), said that Nigeria has lost about N127 billion to cybercrime.

2.9 Challenges of Ict in Banking Sector

Information and communication technologies as the name suggests are equipment used for information and communication, which consist of smartphones, internet, telephones, televisions, radios, computers, automated machine, POS (Point of Sale) and others. Nigeria, to a large extent is not fully digitized because it lacks the expertise, skill and knowledge that are the necessary criteria to achieve and enjoy the benefits of ICT for the good of individuals, companies and society at large. The problem of ICT in the banking sector is as good as the problem of ICT in Nigerian. Nigeria as a country has its inherent challenges that have in one way or the other affected the financial institution like banks. As a developing country, it consists of more or less remote rural areas that cannot boast of good roads, electricity, pipe borne water, market, good hospital, schools and other infrastructural needs for both human comfort and the prospect of any business.

Although the Data Development Group of the World Bank describe ICT infrastructure in Nigeria to be progressing at the average of 1.1% when compared to other low-income countries of the world. The level of this growth is unimpressive as one percent in this digital world is nothing. The government of Nigeria both past and present and other agencies have over the years made several strides to develop the ICT infrastructure so as to bridge the digital divide between Nigeria and the developed world.

Everybody believes that banking business is now ICT based as it increase the profitability of banking sector. Ovia, (2005) opine that it has broadened the scope of banking practices and changed the nature of banking operations as well as the competitive environment in which they operate. A broad opening has been experienced around the world for banks and they are currently taking due advantage of these innovations to provide improved customer services in the face of competition and faster services that enhance productivity. This can only be achieved where there are capable persons to handle ICT equipment, level of ICT literate is high, environment is conducive for the machines and most of the machines are accessible.

It is on record that Ghana has invested heavily in ICT infrastructure and ICT capacity building, and is not yet regarded as one of the digitalized country and therefore still far from the door of the Global Village. They too do not have the knowledge, expertise, or organizational capacity needed. Although Ghana trains in their universities young graduates that will be the future operators of these equipment and service provider. Due to obsolete nature of ICT equipment, new ones emerge every day in market; in many cases banks many not afford to provide the finance to acquire it, and this will deter
the opportunities of bank in terms of competitive advantage, allowing banks to develop a stronger and more durable business relationship with its customers. Any cost incurred by the bank is paid by customers.

3.0 Research Methodology
The study adopted the expo-facto design, to examine the cost and social effect of ICT on banks operational activities in Nigeria and Ghana from 2000 – 2016, with data extracted from Central Bank of Nigeria Statistical Repot, National Bureau of Statistics publications, Annual reports of individual Deposit Money Banks.

3.1 Model Specification
This study adopted the classical Linear Regression Model according to Brooks (2014) stated thus: \( Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n + u \) -------(I)

To capture cost and social effect of ICT on banks operational activities in Nigeria and Ghana, the essential variables are fitted in on the CLRM, it appears thus:

\[
\begin{align*}
\text{PAT}_t &= \beta_0 + \beta_1 \text{CICTE}_t + \beta_2 \text{CSP}_t + \beta_3 \text{CRM}_t + u_t \\
\text{CYBC}_t &= \beta_0 + \beta_1 \text{CICTE}_t + \beta_2 \text{CSP}_t + \beta_3 \text{CRM}_t + u_t
\end{align*}
\]

For the test of the long-run relationship cointegration between cybercrime and ICT in banking sector in Nigeria.

\[
\Delta \log \text{ICTNIG}_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta \log \text{ICTNIG}_{t-1} + \sum_{j=0}^{m} \alpha_{2i} \Delta \log \text{CYIMNIG}_{t-1} + \sum_{k=0}^{n} \alpha_{3i} \Delta \log \text{CYIMNIG}_{t-1} + \beta_1 \log \text{ICTNIG}_{t-1} + \beta_2 \log \text{CYIMNIG}_{t-1} + \beta_3 \log \text{PATNIG}_{t-1} + \beta_4 \log \text{LUNEMP}_{t-1} + u_t
\]

Where; \( \Delta = \) first difference operator

The parameters \( \alpha_1 - \alpha_6 \) are short-run dynamics of the model and The parameters \( \beta_1 - \beta_6 \) are long-run relationship

All other variables are defined as above;

This is denoted as:

\( H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0 \) i.e there is no cointegration among these variables.

\( H_A: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 = 0 \) i.e there is cointegration among these variables.

The ARDL bound test is based on the (F-statistic). The critical values are given by Pesaran, Shin and Smith (2001) for the cointegration test. The lower critical bound assumes all the variables are 1(0) meaning that there is no cointegration. The upper bound assumes that all variables are 1(1) meaning that there is cointegration. If the computed F-statistic is greater than the upper bound critical value, then the \( H_0 \) is rejected (the variables are cointegrated).

Where:

- CICTE = Cost of ICT Equipment
- CSP= Cost of Service Provider
- CRM = Cost of ICT Repairs and maintenance
- PAT= Profit after Tax
- LUNEMP = Level of Unemployment
- CYBC= cybercrime
- \( \varepsilon \) = Stochastic error term
- \( t \) = time subscript
- \( \alpha \) and \( \beta \) = Constants

The above model explains the relationship between some selected proxies of cost and social effect of ICT which consists of profit after tax (PAT), Level of unemployment (LUNEMP), Fraud (CYBC); and costs of ICT which were decomposed to CICTE CSP and CRM.
4.0 Presentation and Analyses of Data
Descriptive Statistical Test

Table 1: Descriptive Statistics.

<table>
<thead>
<tr>
<th></th>
<th>LOGCOST ICT_NIG</th>
<th>LOGCIME_NIG</th>
<th>LOGPAT_NIG</th>
<th>UNEMPL_NIG</th>
<th>UNEMPL_GHA</th>
<th>LOGPAT_GHA</th>
<th>LOGCOST_JCT_GHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>6.520410</td>
<td>2.610553</td>
<td>4.242312</td>
<td>6.634706</td>
<td>3.349412</td>
<td>3.344312</td>
<td>0.586052</td>
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<tr>
<td>Median</td>
<td>7.635304</td>
<td>2.890372</td>
<td>5.010635</td>
<td>4.560000</td>
<td>3.100000</td>
<td>3.553488</td>
<td>0.530628</td>
</tr>
<tr>
<td>Minimum</td>
<td>2.302585</td>
<td>0.000000</td>
<td>0.000000</td>
<td>3.700000</td>
<td>2.150000</td>
<td>1.386294</td>
<td>0.182322</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>2.387288</td>
<td>1.332338</td>
<td>2.041275</td>
<td>3.447396</td>
<td>0.955343</td>
<td>0.832838</td>
<td>0.251667</td>
</tr>
<tr>
<td>Skewness</td>
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<td>-0.487279</td>
<td>-1.402969</td>
<td>1.101804</td>
<td>0.533392</td>
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<tr>
<td>Kurtosis</td>
<td>2.096749</td>
<td>2.640305</td>
<td>3.458587</td>
<td>3.121082</td>
<td>2.457694</td>
<td>2.967521</td>
<td>2.149212</td>
</tr>
</tbody>
</table>

|          |                   |             |             |             |             |             |                 |
| Jarque-Bera | 2.930634        | 0.764393    | 5.725879   | 3.449974   | 1.014421   | 2.380760    | 0.742132       |
| Probability| 0.231005        | 0.682361    | 0.057101   | 0.178175   | 0.602173   | 0.304106    | 0.689998       |
| Sum      | 110.8470        | 44.37940    | 72.11931   | 112.7900   | 56.94000   | 56.85532    | 9.962882       |
| Sum Sq.  | 91.18633        | 28.40201    | 66.66888   | 190.1526   | 14.60289   | 11.09790    | 1.013383       |
| Dev.     |                  |             |             |             |             |             |                 |
| Observations | 17              | 17          | 17          | 17          | 17          | 17          | 17              |

Source: Author’s Computation 2018 from E-view 8.0 Version

Descriptive test was used to examine the characteristics of the dependent and independent variables. The descriptive result is presented in table 1.

The descriptive statistics table 1 shows the elementary aggregative averages of mean, and median, as well as the standard deviation measuring the spread and variation of all the observations. Skewness measures the degree of departure from symmetry and kurtosis of the peakness of all the observations.

Fig. 1: A Scatter Plot of the ICT cost and social effect in Ghana and various variables under Study.

To further estimate the relationship among the variables, a scatter plot with fitted regression lines is presented in Fig. 1. The slope of the regression line shows, a positive linear relationship between bank profitability proxy by profit after tax in Ghana (LOGPATGHA), and cybercrime in Ghana. Similarly, unemployment rate and ICT cost Ghana show a negative linear relationship.
Augmented Dickey-Fuller Unit Root Test

To ensure that the datasets are stationary enough to allow for meaningful analyses, the variables were subjected to Augmented Dickey-Fuller Statistics. Non-stationarity of the dataset will lead to spurious regression result. The results of the unit root are presented in the table below:

Table 2: Augmented Dickey-Fuller Unit Root Test

<table>
<thead>
<tr>
<th>Series</th>
<th>ADF Test Statistic</th>
<th>5% critical values</th>
<th>10% critical values</th>
<th>Order</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT Ghana</td>
<td>-4.651884</td>
<td>-3.759743</td>
<td>-3.24976</td>
<td>1(1)</td>
<td>Stationary</td>
</tr>
<tr>
<td>ICT Nigeria</td>
<td>-3.549291</td>
<td>-3.759743</td>
<td>-3.24976</td>
<td>1(1)</td>
<td>Stationary</td>
</tr>
<tr>
<td>Cybercrime Ghana</td>
<td>-2.00945</td>
<td>-1.970978</td>
<td>-1.603693</td>
<td>1(0)</td>
<td>Stationary</td>
</tr>
<tr>
<td>Cybercrime Nigeria</td>
<td>-3.366582</td>
<td>-3.759743</td>
<td>-3.24976</td>
<td>1(1)</td>
<td>Stationary</td>
</tr>
<tr>
<td>PAT Ghana</td>
<td>-4.045044</td>
<td>-3.310349</td>
<td>-3.733200</td>
<td>1(0)</td>
<td>Stationary</td>
</tr>
<tr>
<td>PAT Nigeria</td>
<td>-3.839077</td>
<td>-3.759743</td>
<td>-3.24976</td>
<td>1(1)</td>
<td>Stationary</td>
</tr>
<tr>
<td>UNEPL Ghana</td>
<td>-3.990478</td>
<td>-3.875302</td>
<td>-3.38830</td>
<td>I(1)</td>
<td>Stationary</td>
</tr>
<tr>
<td>UNEPL Nigeria</td>
<td>-5.478596</td>
<td>-3.759743</td>
<td>-3.24976</td>
<td>I(1)</td>
<td>Stationary</td>
</tr>
</tbody>
</table>

Source: Authors Computation Using E-views 7.0 Version

The results reported above reveals that, all the variables are order I (1) except cybercrime in Ghana and profit after tax in Ghana that are of order I (0). The p-values of (0.000) are all less than 0.05. The dataset shows a combination of 1 (0) and 1 (1), which provides necessary theoretical support for the use of the ARDL model approach.

Table 3: Estimations of the Hypothesis Regression Model

<table>
<thead>
<tr>
<th>R²</th>
<th>F-Stat</th>
<th>DW</th>
<th>BG-F</th>
<th>( \chi^2 ) (HET)</th>
<th>RESET-F</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.58</td>
<td>6.01</td>
<td>2.61</td>
<td>0.277</td>
<td>0.068</td>
<td>0.400</td>
</tr>
</tbody>
</table>

The models below follow the form stated in equation (II &III) in conformity to the classical linear regression model. The models coefficients and its parameters estimates are duly fitted. The standard errors and the t-statistics for the parameter estimates are respectively shown. The results of the estimated models are used in the test of the formulated hypotheses.

**ICT cost has no significant impact on banks profitability in Nigeria.**

\[
\text{LOGPATNIG} = 0.292 + 0.474 \text{LOGCOSTICTNIG} + 0.505 \text{LOGCYIMENIG} - 0.070 \text{UNEMNIG}
\]

SE = 1.211 + 0.180 + 0.340 + 0.112

T = 241 + 0.021 + 1.483 + -0.621

Expectation = (+) (+) (+) (+)

**ICT cost has no significant impact on banks profitability in Ghana.**

\[
\text{LOGPATGHA} = -1.222 + 1.202 \text{LOGCOSTICTGHA} - 0.101 \text{LOG CYIMGHEGA} + 0.041 \text{UNEMGHA}
\]

SE = 0.478 + 0.086 + 0.236 + 0.06

T = -2.554 + 13.927 + -0.428 + -0.664

Expectation = (+) (+) (+) (+)

It is vital, to discuss the diagnostic tests contained in Table 3 and 4, before analyzing the significance of the regression estimates stated above. To confirm that there are no violations of the assumptions of the regression model, such violations will cast doubts on the validity and reliability of the regression model.
Table 4: Diagnostics Tests for the Regression Model

<table>
<thead>
<tr>
<th>R²</th>
<th>F-Stat</th>
<th>DW</th>
<th>BG-F</th>
<th>$x^2$(HET)</th>
<th>RESET-F</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.96</td>
<td>112.918</td>
<td>0.7</td>
<td>0.144</td>
<td>0.938</td>
<td>0.001</td>
</tr>
</tbody>
</table>

The R² of 58% measures the goodness of fit of the regression line model in hypotheses (I). From the reported result, R² of 58% shows the model reliability and the variation in the dependent variable accounted for by the independent variable. The F-statistic of 6.01 and the corresponding probability value of 0.0019 implies that the entire model is positive, statistically significant and reliable for meaningful analysis.

The Durbin Watson Statistics of 2.61 shows the absence of first-order positive autocorrelation for which a higher order serial correlation test was conducted to confirm the Durbin Watson Statistics of 2.61.

The Breusch Godfrey Lagrange Multiplier Serial Correlation Test was used. The result of the F-stat and the p-value of 0.277, rules out the existence of autocorrelation.

The test for heteroskedasticity was conducted on the model to ensure that the assumption of homoskedasticity was not violated. The test revealed that, the $x^2$ and F-stat of 0.068, indicate that the model is homoscedastic. The regression error specification test reveals that the model does not have an inclusion of any irrelevant variable neither does it have an omission of a relevant variable.

The R² of 98% measures the goodness of fit of the regression line model in hypotheses (II). From the reported result, R² of 96% shows the model reliability and the variation in the dependent variable accounted for by the independent variable. The F-statistic of 112.918 and the corresponding probability value of 0.000 implies that the entire model is positive, statistically significant and reliable for meaningful analysis.

The Durbin Watson Statistics of 0.7 creates a doubt of the possible existence a first-order positive autocorrelation for which a higher order serial correlation test was conducted.

The Breusch Godfrey Lagrange Multiplier Serial Correlation Test was used. The result of the F-stat and the p-value of 0.144, rules out the existence of autocorrelation.

The test for heteroskedasticity was conducted on the model to ensure that the assumption of homoskedasticity was not violated. The test revealed that, the $x^2$ and F-stat of 0.938, indicate that the model is homoscedastic. The regression error specification test reveals that the model does not have an inclusion of any irrelevant variable neither does it have an omission of a relevant variable.

Table 5: Pairwise Granger Causality Tests

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Null Hypothesis:</td>
<td>Obs</td>
<td>F-Statistic</td>
<td>Prob.</td>
</tr>
<tr>
<td>UNEMPL_NIG does not Granger Cause LOGCOST_ICT_NIG</td>
<td>14</td>
<td>0.40096</td>
<td>0.7569</td>
</tr>
<tr>
<td>LOGCOST_ICT_NIG does not Granger Cause UNEMPL_NIG</td>
<td>14</td>
<td>1.82267</td>
<td>0.2309</td>
</tr>
<tr>
<td>LOGCYIME_NIG does not Granger Cause LOGCOST_ICT_NIG</td>
<td>14</td>
<td>0.34061</td>
<td>0.7970</td>
</tr>
<tr>
<td>LOGCOST_ICT_NIG does not Granger Cause LOGCYIME_NIG</td>
<td>14</td>
<td>37.7751</td>
<td>0.0001</td>
</tr>
<tr>
<td>LOGPAT_NIG does not Granger Cause LOGCOST_ICT_NIG</td>
<td>14</td>
<td>0.22574</td>
<td>0.8756</td>
</tr>
<tr>
<td>LOGCOST_ICT_NIG does not Granger Cause LOGPAT_NIG</td>
<td>14</td>
<td>101.759</td>
<td>4.06E-06</td>
</tr>
<tr>
<td>LOGCYIME_NIG does not Granger Cause UNEMPL_NIG</td>
<td>14</td>
<td>7.77290</td>
<td>0.0125</td>
</tr>
<tr>
<td>UNEMPL_NIG does not Granger Cause LOGCYIME_NIG</td>
<td>14</td>
<td>3.14106</td>
<td>0.0961</td>
</tr>
<tr>
<td>LOGPAT_NIG does not Granger Cause UNEMPL_NIG</td>
<td>14</td>
<td>3.81971</td>
<td>0.0656</td>
</tr>
<tr>
<td>UNEMPL_NIG does not Granger Cause LOGPAT_NIG</td>
<td>14</td>
<td>1.14467</td>
<td>0.3953</td>
</tr>
<tr>
<td>LOGPAT_NIG does not Granger Cause LOGCYIME_NIG</td>
<td>14</td>
<td>4.95343</td>
<td>0.0375</td>
</tr>
<tr>
<td>LOGCYIME_NIG does not Granger Cause LOGPAT_NIG</td>
<td>14</td>
<td>0.61966</td>
<td>0.6242</td>
</tr>
</tbody>
</table>
Pairwise Granger Causality Tests
Date: 07/31/18  Time: 22:36
Sample: 2000 2016
Lags: 1

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Obs</th>
<th>F-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOGCYIME_GHA does not Granger Cause LOGCOST_ICT_GHA</td>
<td>16</td>
<td>0.13626</td>
<td>0.7180</td>
</tr>
<tr>
<td>LOGCOST_ICT_GHA does not Granger Cause LOGCYIME_GHA</td>
<td>8.80450</td>
<td>0.0109</td>
<td></td>
</tr>
<tr>
<td>UNEMPL_GHA does not Granger Cause LOGCOST_ICT_GHA</td>
<td>16</td>
<td>0.08726</td>
<td>0.7724</td>
</tr>
<tr>
<td>LOGCOST_ICT_GHA does not Granger Cause UNEMPL_GHA</td>
<td>0.96982</td>
<td>0.3427</td>
<td></td>
</tr>
<tr>
<td>LOGPAT_GHA does not Granger Cause LOGCOST_ICT_GHA</td>
<td>16</td>
<td>0.02942</td>
<td>0.8665</td>
</tr>
<tr>
<td>LOGCOST_ICT_GHA does not Granger Cause LOGPAT_GHA</td>
<td>3.08274</td>
<td>0.1026</td>
<td></td>
</tr>
<tr>
<td>UNEMPL_GHA does not Granger Cause LOGCYIME_GHA</td>
<td>16</td>
<td>0.40872</td>
<td>0.5337</td>
</tr>
<tr>
<td>LOGCYIME_GHA does not Granger Cause UNEMPL_GHA</td>
<td>1.82404</td>
<td>0.1999</td>
<td></td>
</tr>
<tr>
<td>LOGPAT_GHA does not Granger Cause LOGCYIME_GHA</td>
<td>16</td>
<td>7.80999</td>
<td>0.0152</td>
</tr>
<tr>
<td>LOGCYIME_GHA does not Granger Cause LOGPAT_GHA</td>
<td>0.11618</td>
<td>0.7387</td>
<td></td>
</tr>
<tr>
<td>LOGPAT_GHA does not Granger Cause UNEMPL_GHA</td>
<td>16</td>
<td>0.85500</td>
<td>0.3720</td>
</tr>
<tr>
<td>UNEMPL_GHA does not Granger Cause LOGPAT_GHA</td>
<td>4.44221</td>
<td>0.0550</td>
<td></td>
</tr>
</tbody>
</table>

The result of Pair-Wise Granger causality test presented in (Table 5) establishes the direction of causality of ICTCOST, PAT, CYIME, and UNEMP in Nigeria and Ghana. The result shows in Nigeria ICT cost Granger Causes Cybercrime in Nigeria at 0.0001. As such the p-value is less than 0.005%. since we are interested in the two variables. While, in Ghana the result shows that ICT cost Granger Causes Cybercrime in Ghana at 0.010. As such the p-value is less than 0.005%. since we are interested in the two variables. The result shows that as the cost of using ICT rises, it forces the rate of cybercrime increase. The null hypothesis is therefore rejected.

Table 6: ARDL Model Long run Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>T-Statistics</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOGCOSTICTNIG(-1)*</td>
<td>-6.049</td>
<td>1.455</td>
<td>-4.156</td>
<td>0.006</td>
</tr>
<tr>
<td>LOGCYIME_NIG(-1)</td>
<td>19.115</td>
<td>4.815</td>
<td>3.969</td>
<td>0.007</td>
</tr>
<tr>
<td>LOGPAT_NIG(-1)</td>
<td>-5.970</td>
<td>1.816</td>
<td>-3.286</td>
<td>0.016</td>
</tr>
<tr>
<td>UNEMPL_NIG**</td>
<td>-3.411</td>
<td>0.884</td>
<td>-3.966</td>
<td>0.008</td>
</tr>
<tr>
<td>D(LOGCOST_ICT_NIG(-1))</td>
<td>5.581405</td>
<td>1.407046</td>
<td>3.966755</td>
<td>0.0074</td>
</tr>
<tr>
<td>D(LOGCYIME_NIG)</td>
<td>13.50677</td>
<td>3.357061</td>
<td>4.023392</td>
<td>0.0069</td>
</tr>
<tr>
<td>D(LOGPAT_NIG)</td>
<td>-0.385755</td>
<td>0.476062</td>
<td>-0.810303</td>
<td>0.4487</td>
</tr>
<tr>
<td>D(LOGPAT_NIG(-1))</td>
<td>2.642100</td>
<td>0.841863</td>
<td>3.138396</td>
<td>0.0201</td>
</tr>
</tbody>
</table>

Table 7: ARDL Bound Test Model for Conintegration
EC=LOGCOSTICTNIG-(3.1601*LOGCYIMENIG-0.9870*LOGPATNIG -0.5640*UNEMPLNIG)

<table>
<thead>
<tr>
<th>Selected Model ARDL</th>
<th>Dependent Variable</th>
<th>F- Statistics</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARDL (2,1,2,0)</td>
<td>LOGCOSTICTNIG</td>
<td>5.782505</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Critical Value Bounds</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lower Bounds I (0)</td>
</tr>
<tr>
<td>10 percent</td>
<td>2.72</td>
</tr>
<tr>
<td>5 percent</td>
<td>3.23</td>
</tr>
<tr>
<td>1 percent</td>
<td>4.29</td>
</tr>
</tbody>
</table>

***at 5 percent level of significance
Source: Researcher’s Computation (2018)

Extract from the full result in Appendix XV
From the result reported above, the F-statistic value of (5.78) falls outside the critical value, bounds at 5 percent significance level. The Bound test findings verify the existence of a long-run relationship. The F-statistic value clearly rejects the null hypothesis of no long-run relationship among the variables.

To investigate the short-run parameters the ECM Model was applied.

**Table 8:** ARDL Model Short Run Error Correction Model (ECM)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>36.39542</td>
<td>6.181352</td>
<td>0.0011</td>
</tr>
<tr>
<td>D(LOGCOST_ICT_NIG(-1))</td>
<td>5.581405</td>
<td>1.007404</td>
<td>0.0015</td>
</tr>
<tr>
<td>D(LOGCYIME_NIG)</td>
<td>13.50677</td>
<td>2.324991</td>
<td>0.0011</td>
</tr>
<tr>
<td>D(LOGPAT_NIG)</td>
<td>-0.385755</td>
<td>0.257977</td>
<td>0.1855</td>
</tr>
<tr>
<td>D(LOGPAT_NIG(-1))</td>
<td>2.642100</td>
<td>0.530608</td>
<td>0.0025</td>
</tr>
<tr>
<td>CointEq(-1)*</td>
<td>-6.049200</td>
<td>1.026985</td>
<td>0.0011</td>
</tr>
</tbody>
</table>

Results of short-run result reveals that value of ECM (-1) coefficient of (-6.049) is negative statistically significant.

The coefficient of the feedback parameter reveals the speed of reversion from disequilibrium caused by cost of ICT in the banking sector in Nigeria. As such, the departure from equilibrium in the previous period, is therefore reduced by 6.04% in the current period.

More so, Fig. 2 below contains the cumulative sum of squares graph following the recursive estimates. This is a measure of the stability of the model. Evidently the model is BLUE (Best Linear Unbiased Estimator) and lies intact between the lower and the upper bounds. This clearly points to the stability of the model.

**Discussion of the Regression Result**

The result shown in equation II and III which is an extract from table 3 and 4 shows that cost of ICT and Cybercrime show a positive significant relationship with bank profitability in Nigeria, while unemployment shows a negative and non-significant relationship. That is 1% increase in the cost of ICT increases bank profitability by 0.474 percent, 1% increase in cybercrime decreases bank profitability by 0.505 percent. Whereas, 1% decrease in unemployment increases bank profitability in Nigeria by 0.07 percent.

In Ghana 1% ICT increases banks profitability in Ghana, 1% increase in unemployment in Ghana decreases bank profitability by 0.041 percent. While, 1% decrease in cybercrime increases bank profitability in Ghana by 1.202 percent.

The test of hypotheses 3 and 4 shows that ICT cost Granger causes cybercrime in Nigeria and Ghana respectively. Since the p-values are less than 0.005.

In Nigeria the test of hypothesis 5 shows that cybercrime and ICT in the banking sector has a long run conintegration. The bound test F-statistics of 5.782 is above the lower and upper bound values of 3.23 and 4.35 respectively. The null hypothesis is rejected of no co integration. According to the ECM the speed of adjustment back from disequilibrium cause by cybercrime in the previous years is corrected at 6.04 percent in the current adjusting back to equilibrium.

**Conclusion**

Banking operations all over the world are computer-based. Any system that isolates itself from the use of ICT cannot survive the ongoing competition. As a result, it is mandatory that every organization should employ the use of ICT despite all odds so as to meet demand of the service users.

The study focused on the cost and social effect of use of ICT in the operations banking sector. The result of the study permits the researchers to observe that the use of ICT in Nigerian banking sector increases cost of banking operation. Infact there is a positive linear relationship between cost of
ICT, bank profitability proxy by profit after tax, (LOGPATGHA), and cybercrime in Ghana. Similarly, unemployment rate and ICT cost in Ghana show a negative linear relationship.

In Nigeria, the finding shows a positive linear relationship between cost of ICT, bank profitability proxy by profit after tax, cyber crime and level of unemployment. It shows that as the cost of using ICT rises, it forces the rate of cybercrime, profitability to increase in the two countries under study, but does not affect level of unemployment in Ghana but also increases the level of unemployment in Nigeria.

The reason is not far-fetched; in the Ghanaian universities, young graduates are being trained for handling of the complexities in the ICT equipment. Non-governmental sectors also groom specialists in the use of ICT who serve the capacity of consultants.

Another finding that the use of ICT in the banking sector increase profitability, the two countries have different ways of saving cost in order to maximize profit. In Nigerian banking sectors, customers are charged excessively, they even pay for services not rendered. In the Ghana context, some of the ICT equipments are produced by them as well as the experts who take care of the equipment and service providers.

Some researchers believe that the rate of the crime is much higher in Nigeria but the issue of cybercrime is that the more advanced a country is in the use of ICT, the more steps are being added to the cybercrime.

The study concludes that the purpose of every business organization is to make profit and the use of ICT aids profit making. Nigeria and Ghana banking sector should employ the use of ICT but with caution. Consideration has to be made as regards the environment and provision of enabling environment that will be receptive of ICT services.

Nigeria government should train and produce experts just like other countries and charge them with the duty of managing the ICT equipment and other related jobs. The intelligent of Nigerian Youth should be properly channeled to their well being and good of the country.

Every country should enact enabling law that will support the use of ICT, address the cybercrime and other related ICT frauds to protect innocent party.

**Recommendation**

We therefore recommend the following:

The effort of banking sector alone will not be enough to fight cybercrime as it is global, hence government, multi-stakeholder, private sector, non-governmental organization as well as individuals are required to collaborate in combating cybercrime.

The curriculum of the Nigerian universities is faulty and should be restructured to accommodate training of ICT experts. Such gesture will be beneficial in two folds; provision of jobs to the teeming youths and cost reduction of ICT equipment and maintenance in the banking industry.

Suitable environment that will reduce dust and hash whether should be created for smooth operations and long lasting of the ICT equipment.

Policy of the apex bank should provide for succession plan as it regards training of employees who will handle the ICT gadgets. The universities should train the graduates and equip them with the knowledge and skill of ICT, service provider and maintenance. This is will reduce the cost and create employment for the graduates.

There is need for accurate records and report of the cybercrime to the appropriate place. This will enhance the taking of proper action against cyber criminal to eliminate the crime in the system. Recognizing the climatic differences in the two countries, Ghana and Nigeria, the study recommends acquisition of ICT equipment suitable for the environment to reduce frequent damage as Nigeria is notably hot and dusty. Enabling law should be enacted to addresses cyber crime-related issues that protects the innocent party and eliminate the crime in the society.
Nigeria banking sector should devise means of saving cost instead of transferring the bulk of the cost to the customers as such seems unethical and may not encourage the growth of entrepreneurial activities needed to generate more revenue for the economy to grow. This study provides the first empirical data on the cost and social effect of the use of ICT in the operations of banking sector in Ghana and Nigeria. It serves as a benchmark for further research, perhaps in the area of widening the scope of cost savings and customer protection in the banking sector.

The study used case study as a means to collect data from banks on what they have expended so far on the use of ICT. The aim of this research work is to provide a practical guide to the management of banking sector and beyond on the ways of creating employment, eliminate cybercrime, save costs, maximize profit, elimination financial exclusion and not placing the interest of the customers at abeyance.

References


[21] Spectrum, Ibadan