Achieving Cashless Economy in Nigeria: The Cloud Computing Approach and Imperative of Nigeria's CBN for Effective Coordination

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***Abstract*– This paper assesses the technological modality of using cloud computing in achieving cashless economy in Nigeria; this is with a view to establish a relationship between cashless economy and cloud computing. A desktop research approach was used to evaluate some technical details on the use of cloud computing in achieving cashless economy in Nigeria. Investigation revealed that the present banking transaction in Nigeria is poorly implemented and about 75% of business men are sceptical about doing their businesses online. The study also reveals that cloud computing will be a major job creation opportunities if fully adopted. In conclusion, appropriate policy suggestions were suggested for efficient use of cloud computing in achieving cashless economy in Nigeria.**

***Keywords*– Cloud Computing, Nigeria Banking System, Cashless Economy and Central Bank of Nigeria**

I. INTRODUCTION

Over the past decades business activities have been done over the air. Such activities when carried out uses those properties present within the cloud as platform to reach their required destinations. Cloud computing is a term used by technology companies for information technology (IT) services done over the air. It could also mean network enabled services, providing scalable personalized and inexpensive computing platforms on demand, which could be accessed in an extremely simple and pervasive way. This kind of technology could be likened to the electrical grid system. It could be described as a way by which multiple systems are integrated together to provide specific services in which the users would be allowed access to the hardware, software, and possibly data resources of those integrated computers (Wang and Laszewski, 2008).

In the US SaaS (Software as a service is when users 'rent' or borrow online software instead of actually purchasing and installing it on their own computers) has being adopted by most large organizations. As early as 2000, Microsoft extends its development to web service which makes it possible to reach most of its customers globally (Chowdhury, 2009). This service is now being adopted by most commercial sectors, most notably the banking industry which idea of online banking has been welcome by many business men and has also been seen as a great means to tackle financial crime.

With cloud computing, organizations, institutions and companies no longer need to invest heavily in such resources, which are of necessity limited and require burdensome and costly internal management, having instead the option to migrate to a cloud model enabling them to purchase or lease resources on line. This model frees them from internal management costs, the IT resources being administered by the cloud computing provider (Glenn, 1995). The availability of online services also frees users from the need to acquire hardware by paying instead for the resources used. This model has already been adopted by many companies, particularly small and medium-sized firms and very small firms.

Cloud computing also offers IT resource (hardware and software) modularity, with availability in terms of volume and time according to the customer's requirements and at its request. In an economic context where companies are seeking to make the most from their investments and minimize operating costs, cloud computing is seen as the solution for tomorrow. According to ITU (2012), cloud computing, with its exceptional 25 per cent growth rate, represented over USD 56 billion in 2009 and should account for USD 150 billion in 2013 (some 10 per cent of worldwide investment in the IT sphere).

Within the Africa region, ICT development and uptake are proceeding apace, with cellular mobile penetration at 52 per cent, and 12.8 per cent of the population having Internet access, in early 2012. However, the penetration rates for fixed and mobile broadband − barely surpassing 0.2 and 3.79 per cent, respectively − highlight the need for continued effort.

The Nigeria situation has changed, with the tele-density growing at an alarming rate since liberalization of the telecoms industry in 2001 (Awoleye et al, 2008). For instance, Nigeria soared from a tele-density of 0.73 in 2001 to 64.70 as at May 2011, which is an upward of about 90million active subscribers, compared to less than one million in 2001 (NCC, 2011). In the first quarter of 2013 the tele-density was 83.29% with about 116million active subscribers. Okogun et al, (2012) stated that ICT investment has a significant impact on Nigeria's economy and to sustain the growth more efforts need to be made to increase ICT diffusion in the country.

With the introduction of cashless economy policy in 2012 by the Central Bank of Nigeria (CBN), which is the apex body in the banking sector and responsible in bringing operational orderliness to the system there is the need to for proper analysis of the policy in line with what obtains in the world. There is the need for proper analysis of the ICT software market which include the cloud computing. As in all parts of the world, cloud computing brings unquestionable benefits to the ICT sector and to harness these benefits to the full, there has to be a coherent regulatory framework guaranteeing transparency, data protection and respect for data integrity.

However, the penetration and reception of cloud computing in Nigeria still has some challenges. It is in the context of these uncertainties that the authors have put this paper together to identify the scope and benefits of cashless economy and cloud computing and to suggest policy directions that will foster global best practices for the banking industry in Nigeria.

The major focus of this work is how to achieve cashless economy in Nigeria using the cloud computing approach. The objectives of this paper are to:

- enumerate the benefits of cloud computing to the banking sector;
- evaluate the concept of business cycle and cloud computing in Nigeria; and
- recommend useful policy directions for global best practices as it relates to Nigeria's banking sector.

II. METHODOLOGY

This research employed a desktop approach to evaluate some technical details on the use of cloud computing in achieving cashless economy in Nigeria. The scope of cashless economy and cloud computing were put into consideration for the assessment of the technological modality of using cloud computing in achieving cashless economy and assessing the current infrastructure of banking services in Nigeria**.**

III. DISCUSSION

The understanding of the concept of business cycle is necessary for an in-depth knowledge of the economy and how its interacts.

A. Business Cycle

In economics, business cycle is an important term because it has a significant impact on all aspects of an economy. It can be defined as a periodic increase and decrease in an economy's production output and employment. Business cycle is divided into two: the expansion and contraction periods. During the expansion period, production output increases, employment wages and business profits also rise. This period is also referred to as recoveries, booms, upturns, periods of prosperity etc. In contrast, during the contraction period, production, employment, wages and business profits fall. The period is also referred to as recessions, downturns, downswings and liquidations. Business cycle brought about the two economic policies used in controlling aggregate demand and they are fiscal and monetary policy. Monetary policy is usually implemented by a central bank, while fiscal policy decisions are set by the national government.When these policies are used to stimulate or expand the economy during recession; it means the government is pursuing expansionary economic policies. When used to contract the economy during booms or upturns, it means the government is pursuing contractionary economic policies. There are various tools of monetary policy namely: interest rest, money supply etc but there are two major tools of fiscal policy which are tax and government expenditure (Jelenke, 2002).

B. Fiscal policy

This is the deliberate use of government spending and taxes to achieve macro-economic growth. It describes the combinations of measures in government revenue and expenditure to achieve overall economic objectives of a nation. The fiscal policy tools used includes: taxation, public expenditure, relief, concessions etc. The government fiscal policy measures can be categorized into two: automatic stabilizers and discretionary fiscal policy measures. The Automatic stabilizers are government spending or taxation actions that take place without any deliberate government control and which tend to dampen the business cycle. While, the discretionary fiscal policy are government spending and taxation actions that have been deliberately taken to achieve specified macroeconomics goals (Jelenke, 2002).

In a recession or deflationary period, an expansionary fiscal policy involves lowering taxes and increasing government spending. While during inflation or an overheated expansion in the economy, the federal government pursue a contractionary fiscal policy by increasing taxes and reduce spending.

C. Monetary Policy

This is an economic policy that refers to the combination of measures designed to control supply of money and credit condition in an economy for the purposes of achieving macro-economic goals such as full employment, economic growth, stability of prices and wealth, efficient resources allocation, etc. Such tools use are price-interest rates and money supply to expand or contract aggregate demand, consequently, influencing employment, output, and the general level of prices. In a recession or deflationary period, the central bank will lower price-interest rates and increase the money supply to increase money in circulation thereby increasing aggregate demand. While during inflation or booms, the central bank will raise price-interest rates and decrease the money supply to reduce money in circulation thereby contracting aggregate demand.

The Nigerian government had pursued different monetary policy using tools such as Open Market Operation (OMO), cash reserve requirement, interest rate policy, discount window operations, credit ceilings, stabilization securities, special deposit, sector credit allocation etc (Semiu and Arowomole, 2002). The open market operation is the buying and selling of government securities with a view to influencing the cash flow of the banking system. Purchases increase while sales contract the cash base. The government, through the use of cash reserve requirement, has influenced

the level of the liquidity in the economy. Banks are required to maintain from time to time a certain percentage of their capital base with the Central Bank of Nigeria (CBN) this is the effect of the mega banking in order to provide fund mobilization for both local and international market to aid investment in the economy. The current monetary policy by the CBN is the Cashless Policy introduced in 2012, which is to limit cash withdrawals from banks aimed at reducing the money in circulation. In some countries operating the system, the policy is called 'mobile wallet', which is an alternative payment method that allows a consumer to use mobile phone to pay for a wide range of services.

D. The Cashless Economy

Most developed countries are moving towards cashless economy. Sweden is leading the pace, only 3 percent of transactions in Sweden are made using cash; the rest is credit cards or mobile phone payments. This compares with 7 percent in the USA and 9 percent in other Eurozone countries. In most Swedish cities, public buses do not accept cash as tickets are prepaid or purchased with a cell phone text message. A small but growing number of businesses only take cards. In addition, data has shown that Bank robberies have gone down from 110 in 2008 to just 16 in 2011. Political corruption has also decreased because of the digital trail generated by electronic transactions. Not everyone supports getting rid of cash. Small business owners see it as another way for banks to make bigger profits. Banks charge from 5 Swedish kronor ($0.80) for every payment made by credit card. The prevalence of electronic transactions also helps explain why Sweden has less of a problem with graft than countries with a stronger cash culture, such as Italy or Greece. However, the other side of online transaction is the risk of cybercrimes. In Sweden the number of computerized fraud cases, including skimming, surged to nearly 20,000 in 2011 from 3,304 in 2000 (CBS News, 2012).

The Central Bank of Nigeria (CBN) new cashless policy effective from June 1, 2012 stipulates a daily cash withdrawals or deposits limits to ₦500,000 for individuals and ₦3 million for corporate bodies. Transactions above the fixed amount would attract special charges. According to CBN, the policy is to reduce the dominance of cash in the economy with the attendant cost implications for cash management in the banking industry; enhance security and stem money laundering, among others. The policy will mean an increase in the use of technology in financial transactions. However, considering the dangers associated with internet-based technologies, there are fears that the security framework needs to be strengthened to protect consumers against fraud, losses and undue charges. This policy was introduced for a number of reasons: to drive development and modernisation of Nigeria's payment system in line with Vision 2020 goal of being amongst the top 20 economies by 2020, to reduce the cost of banking services (including cost of credit) and drive financial inclusion by providing more efficient transaction options and greater reach, to improve the effectiveness of monetary policy in managing inflation and driving economic growth etc. In addition, the policy aims to curb some of the negative consequences of high usage of cash, including high cost of handling (estimated to be about N192 billion in 2011), high risk of usage and high subsidy (CBN, 2011).

However, as full implementation starts in June 2012, the various e-channels and applications like Automated Teller Machines (ATM), Point-of-Sale (PoS) terminals and mobile banking platforms that are supposed to facilitate electronic transactions have remained largely deficient. There are still fears that ATMs and PoSs are yet to attain the desired efficiency to drive a cashless economy, maintain a working network and constant connectivity. There have been complaints that sufficient facilities have not been provided to make the system smooth. The e-payment system is said by many who have tried to use it to be filled with hitches. Sometimes, one is charged for service not successfully rendered. Another issue is how the market women would and other small business owners who are long-accustomed to cash transactions, smoothly transit to the new policy.

Meanwhile, information security experts have said the infrastructure supporting the cash-less system may be 60 per cent vulnerable to fraud. This, according to them, is because the system is only 40 per cent protected as only one per cent of the operators involved have attained the Payment Card Industry Data Security Standard certification (PCI DSS). PCI DSS is an information security standard for organisations that handle card holders' information for major debit, credit, prepaid, e-purse, PoS cards and Automated Teller Machine (ATM). In addition, an economy where almost every financial business transaction is done without cash, there is a high tendency for such economy to rely on information technology. Turning Nigeria into a cashless economy has its advantages and disadvantages for the economy. Many Nigerians are still afraid to use, for instance, the ATM because the security features are not enough, as yet, to prevent theft. Therefore, security is one very important issue to deal with.

E. Benefits of Cashless Economy

Society practicing cashless transaction has some benefits attached to its economy when this system is being implemented.

- *Reduces Errors:* No need to enter transaction amounts at both the cash register and processing terminals.
- *Creates Transaction Database:* Stores transaction information in the database for a long time.
- *Increases Accountability:* It is easy to confirm whether you have received the proper amount of credit for each transaction.
- *Minimizes Fraud:* Performs Address Verification (AVS) and eliminates the chance of shipping to someone using a stolen credit card, saving individuals from a charge back.
- *Quicker Transactions:* Allows people to send multiple transactions as a batch, thus reducing authorization time to as low as three seconds per transaction.
- *Eliminates Equipment:* Multiple registers can share a single modem and phone line, thus saving money.
- *Lowers Transaction Costs:* Electronic processing is faster and less expensive than paper processing.

- *Faster Billing:* It is easy to build and process a batch of transactions as often as needed; this is great for recurring billing.
- *Recurring Billing:* Schedule transactions to be processed according to your specific billing requirements.
- *Cashless economy* is a way of making cash more valuable, by making cash scarce its value increases. This is actually backed by an economy law of absence and presence (i.e., law of scarcity in economics) (Odior et. al., 2012; Akhalumeh et. al., 2012).

F. Demerits of a Cashless Economy

- *Failure of Technology:* The concept of e-Money as a whole is powered by technology and every piece of technology that is involved in the cashless economy system is prone to certain failures
- *Tracking of Individuals:* The use of e-Money would make it easier for the cyber-spending profile of individuals to be monitored anonymously. This is so because a trail of an individual's expenditure is left online.
- *Loss of Human Interaction:* The e-Money system would gradually replace the role of humans with fully automated processes when it is fully in place.
- *Double Spending:* This could come as a problem in the use of forms of e-Money that are not online. It would be a problem when the same quantity of offline e-Money is used to make multiple simultaneous purchases.
- *Fraud:* Any system involving the internet would have to overcome the inherent problem of fraud that has plagued e-banking since its inception.
- *Counterfeiting* (Odior et. al., 2012; Akhalumeh et. al., 2012).

H. The Cloud Computing

The term cloud computing became more common in 2007, and since then it has grown steadily in making IT infrastructure readily available to their client in any part of the world (Wang & Laszewski, 2008). It's a concept that relies on sharing of resources to achieve coherence and economies of scale similar to that of electric grid. Cloud computing could then be seen as a way of storing massive amount of data that is only accessible to authorized users and applications on the internet that protects data and provide services. It could also be a medium by which information are stored on the server and made available to clients on demand.

Cloud computing has the following as its services:

- *Application/Software as a service (SaaS):* SaaS is a model in which provider makes licensed application available to clients on demand (Lynn, 2010; Widjaya, 2010; Barnatt, 2011). This model could best be seen in most of the multi-national organization that makes some of their basic applications available on an online server for most of their branches to benefit from.
- *Platform as a service (PaaS):* is the ability to build and manage an online server, database to house and secure their services. If this service is adopted by an organization it is done with the hope of cutting cost on their expenses and also making their products available to their client on time and more secured (Chappell, 2008; Voorsluys et. al., 2011).
- *Infrastructure/Hardware as a service (HaaS):* This is a model for providing sales and repair services available to client on an online form where they could subscribe for service online.

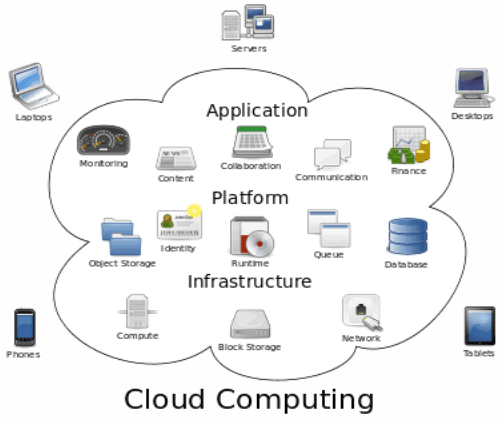

Figure 1: Services Provided By Cloud Computing

The following are various types of clouds that cloud computing can be deployed:

- *Private cloud:* This kind of cloud is for single organization to provide service to their various customers. It may be owned managed and operated by the organization, a third party or some set of combined companies (Mell & Grance, 2011).
- *Public cloud:* The cloud is opened for the use of the general public. It exists on the premises of the cloud provider.
- *Hybrid cloud:* This particular kind of cloud infrastructure is a composition of the above two types of cloud with unique entities, but should be bounded together by standardized or proprietary technology that enables data and application portability (Mell & Grance, 2011; Gital & Zambuket al, 2011).

Through this study we considered some of the basic activities of CBN, which was why we thought they would be suitable in coordinating the cloud computing activities of the banks.

Figure 1 shows the proposed role banking such as commercial banks and CBN, as the apex body, could play in cloud computing technology.

It could be seen from Figure 2 that CBN activities should go beyond providing policies and guide for commercial banks to operate. The bank should try as much as possible to also aid the banks in securing their data which could be easily achieved if they adopt the use of cloud computing as a tool to fighting money laundering. For CBN to be able to perform this task successfully, the effective usage of the cloud must be applied. However, the use of a private cloud would be ideal for the protection of data received from the banks by CBN. There should also be re-directive server that does filtering of request by client. It also stands as firewall to hackers to give alert on users trying to infiltrate the system.

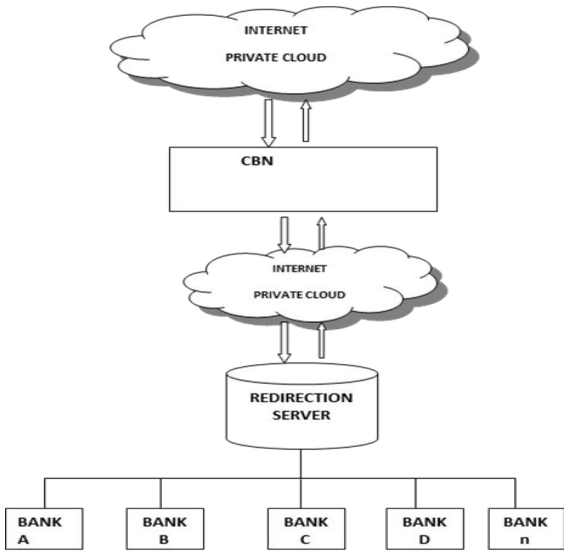

Figure 2: Cloud Operation Model for Banking Transaction
Source: Author, 2012

I. Existing infrastructure of banking services in Nigeria

Cloud computing represents a convergence of two important trends in our everyday life: a) IT efficiency, and b) business alertness (Marston et al, 2011). The present banking transaction in Nigeria is poorly implemented, where many business men are sceptical about doing their businesses online. This was why the government is now looking for way to correct the flaws in the system through the implementation of cashless economy. In Lagos, the cashless system is already been test run and it is been welcome by many large businesses. In March 2013, Business Connexion (BCX) a third party data centre and cloud computing services officially launched its highly efficient and secured cloud computing services in Lagos (Business Day, 2013). Even with these it's still not enough to service the very large IT market which the country has.

J. Essence of collocation

Collocation in banking industry is a measure that would lead to various opportunities in the sector. If the banks could come and put their resources together they would witness a more significant growth than when they operate in isolation, because with this technology small money spend on investment would lead to a massive return. Some notable benefits from such action include:

- *Reduction of expenses:* if the banks are encouraged to invest in cloud computing system it would help them in cutting cost on their expenses.
- *Reduction of CO_2 emission:* implementation of this concept would aid the government and the globe in the issue of climate change.
- *Improve country's economy:* in that money been taken out of the system would be difficult because it is going to be monitored strictly and would be use for development in the country.

K. Cloud computing and its Job creation opportunities

Cloud computing is fast having huge impact on businesses today (Sourya, 2012). According to International Data Corporation (IDC) 2012 report, by 2015 cloud computing would have created about fourteen million jobs globally. As at 2011, cloud computing generated $400 billion in revenue and created 1.5 million new jobs (IDC, 2012). From Figure 3, the proposed number of jobs by cloud computing will surpass 8.8 million.

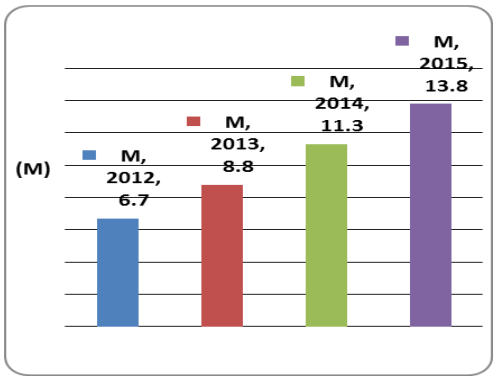

Figure 3: Projected Data for the Number of Jobs Created By Cloud Computing From 2012-2015: Source: IDC, 2012

In this aspect of the study we review the sectors where cloud computing could perfectly be best utilized to have positive impact on the government quest in fighting unemployment. The following areas are some sectors where the cloud impact could be seen immediately when it is applied:

- Telecommunication
- Banking
- Security etc.

IV. POLICY RECOMMENDATIONS

There is need for increasing availability and reliability of alternative payment channels; ensuring effective settlement cycles; ensuring appropriate options to enable addition of "new entrant's "into the banking system (e.g., KYC requirements); educating and creating awareness amongst consumers, merchants, other stakeholders; instituting a framework to ensure monitoring and compliance of policy; mitigate risks; as well as assess the impact on economy and industry cost-to-serve.

As the CBN moves to fully implements the Nigeria cashless system, the following factors will play a major role in effective operation and timely achievement of the cashless policy goals:

A. The state of Infrastructure

The financial infrastructure in Nigeria is not adequate to carry the load of a cashless society, ATM's, Point of Sales system, mobile banking and other mediums have to dramatically expand to touch at least 65% of the whole economy before any meaningful effect can be achieved.

B. Availability of real data

Proper and accurate identification of account holders must be maintain and shared when necessary by all financial institutions. CBN must also collaborate with all other government and private agency responsible for collection of Identification of individuals in Nigeria for reconciliation of any identification.

C. Investments

CBN must be ready to invest heavily in ICT to make these possible. Technology is not cheap and ever changing at a very fast pace. Investments in billions of dollars made in infrastructure, training, marketing, security, maintaining the networks etc will be on a yearly basis for the years to come and should be a collaboration of efforts by all invested parties.

D. Security

There are need to enforce new methods of transactions and a changing culture, the CBN must partner and work with the National Assembly to ensure proper legislation is been formulated. Enforcements of new legislation would be carried by the CBN and all other executive arms that are empowered such as the EFCC. They must commit to training of personnel and the judiciary must be prudent and up to the task. Another major concern would be the risk involved, because if the process is rush and the economy losses confidence in the system due to high level of fraudulent activities, it will be devastating to the Nigeria economy.

E. Compliance

Electronic banking is a new delivery means in Nigeria and where the laws and rules governing the electronic delivery of certain financial institution products or services may be unclear, the CBN could step in proper implementation and proffer solutions. There should be very strict rules that will govern the way banks use or operate their online banking. Banks need to carefully understand and interpret existing laws as they apply to Internet banking.

V. SUMMARY AND CONCLUSION

The rate of adoption of ICT in Nigeria is becoming increasingly alarming and with the enabling environment it is possible, practical and affordable to use ICTs to the benefit the economy. However, Nigerian economy is in exciting but challenging times and the proper foundations have to be established as the CBN transform the modes of operation of the banking sector and the Nigeria economy at large. Banks should remain competitive by employing resource-based strategy rather than positioning strategy. Cloud computing will enable banks concentrate on banking practices and support the economy. The era of sharp practices are fading out: round-tripping and other unethical acts are becoming almost impossible. Cloud computing can encourage more participation in the banking sector and as well retain jobs at lower costs to banks. Therefore, CBN should encourage home grown "Cloud Computing" infrastructure that will limit security issues, retain all the jobs that are associated and tap on the volume impact of such huge database.

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