

Innovation and Technology Application in Banking and Financial Services

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ABSTRACT: *Innovation and technology consists of new products and processes as well as significant technological changes of products and different processes that has been a major trend in the world today. This cuts across all sectors and fields, banking and financial services sector not left behind. The banking sector being a major sector in every country's economy, it is important that consistent innovations be developed to ensure the growth of the sector, ensure safety, and effective service delivery. This research work sets out to assess and explore these trending innovations in the Nigerian banking sector, the incidence of these innovations and how to ensure their full utilization.*

KEY WORDS: *Innovation, Technology, Banking, Financial services*

Date of Submission: 20-04-2018

Date of acceptance: 05-05-2018

I. INTRODUCTION

The world banking and financial services systems, has experienced a massive transformation, due to increasing globalization and deregulation. Technological innovations are rapidly springing up and improving operations in the banking industry. The act of banking takes its root as far back as 1694, with the development of England's bank Known as the "The Bank of England". The bank started its operations with a handful of independent individuals who were willing to lend their money but with a certain percentage of interest added on return on the money borrowed. In Nigeria, almost every one above the age of 18 has at least one bank account. Banking industry in Nigeria dates back as far as the period of colonialism, where colonial banks were developed with an intention to meet the insatiable commercial thirst of the colonial government (Ajayi, 2015). The Central Bank of Nigeria, which is the apex governing bank in Nigeria started operations on July 1st, 1959.

The banking industry in Nigeria according to MFW4A (2016) is expanding. Nigeria today stands as the most populated African nation with a second place largest economy ranking, and also one of the largest oil producing country, who is also one of the largest benefactor of foreign direct investments (FDI). The financial sector of Nigeria, over recent times, have managed to go through a series of effective change, which includes major mergers, acquisitions, and consolidations, that drastically diminished the total no of banks from 89 to 20 and to a great considerable extent, increased capitalization (MFW4A, 2016).

Due to these consolidations, major financial interactions and intermediation levels was in a significant rising level. the number of branches increased significantly as well, and this lead to the banks engaging in a range of new activities, one of which is the introduction of technological innovation to banking services.

The banking industry has been a major driving force in every nation's economy; therefore any change through technology tends to have a massive effect on any given economy. The development in information gathering, preserving, modifying and disseminating have had significant influence in all aspects of financial banking activities. Some of these innovative technologies include the development of ATM which is {The Automated Teller Machines}, E-banking which is known as {electronic or internet banking}, phone banking, likewise smart cards applications etc.

According to Alsmadi and Al-wabel (2011), e-banking definition differs from one independent researcher to another, reason being that the topic of discuss makes reference to numerous kinds of services through which the esteemed customers of various financial institution {especially the banks} can conveniently seek answers to questions, request information of products and also execute their financial transactions.

Ovia (2001), posits that, the banking industry in Nigeria has experienced great changes, which have shown in the outstanding volume and complexity of products, services delivered, re-engineered business procedures and financial trade liberalization. In lieu of Simpson (2002), the motivation trigger towards e-

banking investment, is majorly based on the fact that operating cost will be minimized and the operating revenue will be maximized. Nonetheless, the total acceptance of e-banking has introduced its set of challenge into the banking industry, with respect to increase in risk and fraud. The outstanding benefit of technological innovations in banks cannot be overlooked. The undeniable fact still remains that the continuous use of innovative information technology in our banks today is greatly facilitated by the enormous amount of data and information that the bank deals with on a daily basis. Generally speaking, application of innovation technology in the banking and financial services cannot be overstated, as it has helped improved their performances, maximized their profits, improved customers satisfaction, hence the economy.

This study tries to complement previous literature available on innovation technology applications in banking and financial services. This article is a descriptive study that assesses and identifies these trending innovations, the incident rate and the pros and cons of these innovations and how to ensure the full utilization of the innovations in the banking and financial sector of Nigeria in this era of online or electronic banking.

II. TRENDING INNOVATION AND TECHNOLOGIES IN THE BANKING AND FINANCIAL SERVICES INDUSTRY

2.1 The Automatic Teller Machines (ATM)

The automated teller machine (ATM) can be described as a computerized telecommunications device that aids the esteemed customers of a financial institution {bank}, perform a fast tracked financial transaction, anywhere, anytime, without any reason to perform those transactions in a banking hall (McGill, 2004).

According to Lockett and Littler, (1999), ATMs could as well be referred to as: Automatic Banking Machine, Money Spitting Machine, Cash Points, etc. Jane Blake (2000) observes that customers' identification is coded on plastic card with a magnetic stripe or a plastic smartcard with a chip, which has a unique card number and some security information. This security information is a set of four numbers called Personal Identification number (PIN) known only to the customer, who has to input this pin in other to carry out any transactions using the machine. Maxwell (1990) opined that the Automated Teller Machines are strategically scattered around various locations such as: inside the premises of banks, shopping plazas, air terminals, food stores, petrol filling stations, and eateries.

2.2 Mobile/ Telephone banking

This is also one of the fastest ways of carrying out a financial transaction. It makes use of mobile phones or fixed wireless phones. The processes includes: Instructions are relayed through voice or short messages (SMS) to the synchronized system, which then analyzes the message and responds accordingly to the customer electronically. This platform also utilizes internet banking as it allows other banking function from the installation of proprietary software or applications (made custom by different banks) on modern mobile phones, and with internet connections, customers are provided with private security PIN to access their bank accounts and carry out other banking transactions. The uprising computer literacy awareness rate has significantly pulled up the rate of use of mobile devices.

2.3 Internet banking

This is an electronic banking system that is done through the internet. It boosts and gives the customer the ability to perform financial transactions from the comfort of their homes instead of through ATMs or the banking hall. This therefore means that buying and selling can be done by customers through the net involving their financial institution. In doing this, a customer can place an order for a good, send the amount to the bank and instruct the bank to pay and the goods will be delivered to the point of choice of the buyer. Aside that, it's technological cost efficiency is a boost to generating higher level of productivity.

2.4 Cards

Transaction Cards are an important and vital tool for enhancing the effectiveness of electronic banking, thereby serving as an efficient authentication tool to access the various banking services available to a customer. In Nigeria, Smart cards are more rampant and it strategically contains one or more integrated circuit chips which give assistance to multiple banking applications, thereby creating an enabling environment for customers to conveniently access the funds in their account through the electronic communication of their information.

MAJOR ADVANTAGES OF THE ELECTRONIC SYSTEM OF BANKING

Rogers (1995), argues that the level {or rate} at which a new banking technological invention is accepted is proportionally to the assumed benefits or upsides.. This simply states that the higher the assumed advantage, the faster the acceptance of the new innovation. Secondly, technological innovation is constantly fired up by the need of various organizations to improve the performances and output of their business. More so, electronic banking benefit covers a wide range of functions which includes:

- ✓ The use of electronic mail (e-mail) to accelerate vital information transmission through financial institutions and their clients, between personnel working in the bank, and between the bank and investors, parties and other banks.
- ✓ E-banking to a great extent provides online information that can be used for research, for both bankers and customers alike.
- ✓ E-banking has made it easier for banks to make available information and improved services that can be exchanged for money.
- ✓ E-banking has also made banking processes more effective and cost efficient by synchronizing all aspects of their operations..

Ovia, (2001) states that internet banking have rapidly gained enormous support from financial institutions customers as they constantly demand flexibility and are comfortable in executing their financial transactions. With the help of internet banking, customers would now be able to carry out financial transactions from the comfort of their homes or offices

DIFFERENT TYPES OF E-BANKING RISKS

According to the Central Bank of Nigeria, The risks affiliated with e-banking activities and operations include: Strategic Risk, Cross Border Risks, Operational Risk, Reputational Risk, Money Laundering Risk, Security Risk, Legal Risk, and Other Risks. These aforementioned risks are precisely expatiated below:

- **Strategic Risk**

This are those risks that are related to top level management decisions, which are most often than not a result of inadequate ability to thoroughly plan, time and execute strategic projects

- **Operational Risk**

This has to do with wrong interpretation of transaction data's, flexible execution of contracts, data falsification, and data exposure. Also, technological weakness, workers or client negligence, inappropriate and suspicious activity of workers can fan the flame of operational risk.

- **Security Risk**

This has to do with the unsanctioned intrusion of the confidential information and transactions of clients of the bank. The perpetrators of this can be external system hackers, uncultured employees. This type of risk occurring in a networked system, most often than not is always targeted at the weak link of the network to gain access or full control of the system.

- **Reputational Risk**

Reputational risk is the cold chill negative reaction that a financial institution receives as a result of dissolution, merger, lack of funding, or loss of valuable clients. This risk is characterized by a loss of public confidence on the ability of the bank to execute its functions.

- **Legal Risk**

Legal risk emanates from a gross violation and negligence of various rules, regulations, laws, and appropriate practices, governing the banking industry. This also results from situations where the rights, entitlement, obligations and acclaim of a party or parties to a transaction are infringed upon and not clearly established.

- **Money Laundering Risk**

This kind of risk involves dangerous activities. It occurs when the financial institutions are used to claim, clean and process stolen or illegal funds.

- **Cross Border Risks**

This is the risk that accompanies the process of globalization that is being adopted by financial institutions. This risk is encountered when these financial institutions begin to carry out financial transactions across the shores of their domicile region or country. This can be as a result of unstable political occurrence, high exchange rates, legal barriers, unsynchronized rules and regulations, rigid protectionism acts, confidentiality rules, etc.

III. METHODOLOGY

This study utilizes secondary data extracted from The Central Bank of Nigeria, made available by Nigeria Inter-Bank Settlement System PLC, (NIBSS). From the facts provided are the Electronic fact sheets, containing various e-payments operations, like NEFT (NIBSS Electronic Fund Transfer), NIP (NIBSS Instant Pay), E-bills pay (Electronic Bills Payment) as well as other services such as ATM operations, and Mobile Operations between, January 2014, and September 2016.

IV. DATA PRESENTATION AND ANALYSIS

The following Table 1 below shows the electronic Payment fact sheet for the year 2014 (January to December).

Table 1: E-payment fact sheet for the year 2014

E-Payment Operations (NEFT, NIP & E-bills pay)	
NEFT Channels	Bank branches, Internet Banking
NIP Channels	Bank branches, Internet Banking, Mobile, ATM, POS
Total NEFT Volume	29.69 Million
Total NEFT Value (₹)	14.56 Trillion
Mean Value per NEFT (₹)	490,516
Total NIP Volume	40.83 Million
Total NIP Value (₹)	19.92 Trillion
Mean Value Per NIP (₹)	487,915
Total E-Bills pay Volume	607,526
Total E-Bills pay Value (₹)	45.27 Billion
Mean Value E-Bills pay (₹)	74,522
Payment Terminal Service provider (PTSA) / Point of sale (PoS)	
Total No. of PoS Registered	107,705
Total No. of PoS Connected/ Deployed	82,537
Total PoS Transaction volume	20.82 Million
Total PoS Transaction Value (₹)	312.07 Billion
Mean Value per Purchase (₹)	14,990
Payment terminal service providers	6(Fully Licensed) 10(Approval in principle)
PoS Connectivity	LAN, GPRS, CDMA, WIFI
Cashless Initiatives State	Nationwide
Automated Teller Machines (ATMs)	
Total Number of ATM	13,770
Total Number of Active cards	41.89 Million
Total Transaction Volume	214.63 Million
Total Transaction value (₹)	2.00 Trillion
Mobile Operations	
Total No. of Customers	9,139, 417
Total No. of Agents enrolled	40,875
Total Transaction Volume	12.58 Million
Total transaction Value (₹)	139.70 Billion

The Table 2, below shows the electronic Payment fact sheet for the year 2015 (January to December).

Table 2: E-payment fact sheet for the year 2015

E-Payment Operations (NEFT, NIP & E-bills pay)	
NEFT Channels	Bank branches, Internet Banking
NIP Channels	Bank branches, Internet Banking, Mobile, ATM, POS
Total NEFT Volume	22.08 Million
Total NEFT Value (₹)	10.22 Trillion
Mean Value per NEFT (₹)	80,681
Total NIP Volume	49.06 Million
Total NIP Value (₹)	18.65 Trillion
Mean Value Per NIP (₹)	384,883
Total E-Bills pay Volume	890,817
Total E-Bills pay Value (₹)	0.14 Trillion
Mean Value E-Bills pay (₹)	159,897
Payment Terminal Service provider (PTSA) / Point of sale (PoS)	
Total No. of PoS Registered	129,322
Total No. of PoS Connected/ Deployed	106,921
Total PoS Transaction volume	23.35 Million
Total PoS Transaction Value (₹)	0.31 Trillion
Mean Value per Purchase (₹)	13,431
Payment terminal service providers	17 (Fully Licensed)
PoS Connectivity	LAN, GPRS, CDMA, WIFI
Cashless Initiatives State	Nationwide
Automated Teller Machines (ATMs)	

Total Number of ATM	15,529
Total Number of Active cards	41,89 Million
Total Transaction Volume	172.10 Million
Total Transaction value (₹)	1.57 Trillion
Mobile Operations	
Total No. of Customers	3,306,990
Total No. of Agents enrolled	8,200
Total Transaction Volume	15.15 Million
Total transaction Value (₹)	159.0 Billion

Table 3, below shows the electronic Payment fact sheet for the year 2016 (January to September)

Table 3: E-payment fact sheet for the year 2016

E-Payment Operations (NEFT, NIP & E-billspay)	
NEFT Channels	Bank branches, Internet Banking, USSD
NIP Channels	Bank branches, Internet Banking, Mobile, ATM, POS, USSD
Total NEFT Volume	18.01 Million
Total NEFT Value (₹)	9.13 Trillion
Mean Value per NEFT (₹)	505,085
Total NIP Volume	95.15 Million
Total NIP Value (₹)	25.96 Trillion
Mean Value Per NIP (₹)	272,802
Total E-Bills pay Volume	749,705
Total E-Bills pay Value (₹)	25.96 Million
Mean Value E-Bills pay (₹)	294,996
Payment Terminal Service provider (PTSA) / Point of sale (PoS)	
Total No. of PoS Registered	140,281
Total No. of PoS Connected/ Deployed	120,042
Total PoS Transaction volume	41.37 Million
Total PoS Transaction Value (₹)	498 Billion
Mean Value per Purchase (₹)	12,049
Payment terminal service providers	20 (Fully Licensed)
PoS Connectivity	LAN, GPRS, CDMA, WIFI
Cashless Initiatives State	Nationwide
Automated Teller Machines (ATMs)	
Total Number of ATM	17,253
Total Number of Active cards	59.24Million
Total Transaction Volume	414 Million
Total Transaction value (₹)	3.5 Trillion
Mobile Operations	
Total No. of Customers	4 Million
Total No. of Agents enrolled	10,070
Total Transaction Volume	33.6 Million
Total transaction Value (₹)	527 Billion
Web Payments	
Total Transaction Volume	8.91 Million
Total Transaction Value (₹)	88.73 Billion

Assessing the tables 1, 2 and 3 above, it is evident that innovation technology in the banking services has had impact on various bank operations from making inquires, making withdrawals, to making transfers and making payment online or with Point of sale services.

According to the tables 1, 2 and 3 above, the channels for c transfer of fund are bank branches, and internet banking while the channels for Instant pay are bank branches, internet banking, mobile, Automated Teller Machines (ATMs), and Point of Sale (Pos) terminals till further innovation brought about the use Unstructured Supplementary Service Data (USSD) codes on mobile networks which does not require internet connection for e-payment operations.

Although, the volume of Electronic Fund Transfer (EFT) has been on the decrease considering 2014 till date, but the volume of Instant Pay (IP) has been on the rise, going from 40.83 million in 2014 to 49.06 million in 2015 and drastically 95.15 million in 2016. The increase in the number of Pos registered, connected and

deployed is said to have contributed to the increase in the total volume of Pos transaction throughout the country of which volume increased from 20.81 million in 2014 to 41.37 million in 2016. These records therefore explains the decrease in the volume of fund transfers over the years as customers now pay instantly and with Pos services more.

The cashless policy initiative in the country has taken full effect as the state of cashless initiative has gone nationwide, corroborated by the increase in the number of Payment Terminal Service Providers, which has increased from 6 (six) in 2014 to 20 (twenty) fully licensed in 2016.

Moreover, the use of Automated Teller machines (ATMs) has gone from 216.63 million in 2014 to 414 million in 2016, this could be explained by the increase in the number of card holders as well as the increase in the number of ATMs deployed nationwide which went from 13,770 in 2014 to 17,253 in 2016, enabling easy access to ATMs.

Other e-payment services such as mobile banking and web payment all have experienced improvement in its use over the years. Increased productivity due to these innovations could only have allowed their stay and continuous use.

The advantages of innovation technology in the Banking and financial sector cannot be over emphasized as it benefits the sector and its customers in numerous ways. These pros have led to the continuous usage, modification and improvement in quality as well as the quantity of materials (e.g. cards, software, ATMs) deployed. However, these innovations have its cons posed as risks. The risks accompanying e-banking have been treated above. As the innovative information technology systems rapidly unite and relate in interdependency, there will continually be a rapid increase in the introduction of computers in every organization under the banking industry. As a matter of undeniable facts, this tends to be the only challenge that is currently tackling the e-banking system. Those banking institutions that run a weak system security will unfortunately be grossly exposed to the devastating blade of the risks which would eventually lead to a dissolve or liquidation. It is however, a sound note of warning that the banking overall risk management process should equally deal and manage the risk of e-banking, so as to maintain business and avoid dissolution, merger or liquidation.

It is therefore imperative that e-banking risks be managed as part of a bank's overall risk management process to avoid falling victim.

V. RECOMMENDATIONS

To ensure proper and maximum productivity of delivery channels, and reduce security and privacy risks of e-banking, the following guidelines are recommended for banks and other financial institutions.

5.1 Acceptable Prerequisite on the mode of Delivery

Mobile Phones: Mobile phones are in recent times, a fast tracked medium through which Nigerians perform financial transactions. Banks are encouraging and strategically forcing clients to perform business transactions through their mobile phones, by generating codes that can be dialed on phones to check account balance, recharge numbers, and even do funds transfer. Due to this, there exist few guidelines to improve this innovation, they include:

- Mediums used for communicating financial information must be strategically designed to meet the necessary requirement for preservation of the confidentiality of customers' transactions, and financial safety.
- There must be in place an effective plan to constantly audit individual transactions to minimize fraud.

Automated Teller Machines (ATM)

Irrespective of the overall guidelines on e-banking, the following applies to ATMs:

- The machines should be designed to transmit customer's details in confidentiality.
- In view of the proven shortcomings of the magnetic stripe technology of smart cards, banks should endeavor absorb the innovation of the smart card chip technology as the standard, as quick as possible.
- Financial institutions {Banks} should endeavor to have a synchronized ATM network with every other bank.
- Financial institutions are to boldly display and declare to customers the variety of card that each particular machine can accept.

Internet Banking

Financial institutions {banks} should ensure the regular maintenance of their website to ensure that information displayed is timely, correct and relevant and they should ensure that:

- Only staffs that have a certain level of clearance in the bank's IT department should have access to make changes to vital information displayed on the banks web site.

- Vital changes made on the web site should go through a series of verification process to eliminate fraud and show the customer a seriousness of information validation and protection from the side of the banks.

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Anih Ugochukwu. "Innovation and Technology Application in Banking and Financial Services" International Journal of Business and Management Invention (IJBMI) , vol. 07, no. 05, 2018, pp. 01–07.