
EFFECTS OF FINANCIAL INNOVATIONS ON THE PROFITABILITY OF DEPOSIT MONEY BANKS IN NIGERIA

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ABSTRACT: *This study examined the effects of financial innovation on the profitability of deposit money banks in Nigeria. the general purpose of the study was to examine the effect of financial innovation on the profitability while the specific objectives was to examine the effect of automated teller machine, electronic fund transfer, internet banking, mobile banking and investment on information communication technology on return on equity of deposit money banks. The study formulated four hypotheses and used panel data regression to analyze the secondary data extracted from the annual reports and accounts of the fourteen firms for the period 2009 to 2017. Return on equity was the dependent variables while automated teller machine, electronic fund transfer, internet banking, mobile banking and investment on information communication technology on return were the independent variables. Findings of the study revealed that automated teller machine and electronic fund transfer have negative relationship with return on equity while internet banking, mobile banking and investment on information communication technology have positive relationship with return on equity. The study recommends that deposit money banks should adopt financial innovations, deposit money banks invest in technological innovations and banks should transform banking service by adapting to mobile banking and agency banking so that not only to providing jobs but also increase market share.*

KEYWORDS: financial innovations, profitability, deposit, money, banks, Nigeria

INTRODUCTION

Banking system has been growing with technological developments and innovative productions. Banks started to go beyond their basic scope, deposit-credit binary and payment functions with genesis of modern banking. This period has made progress above estimations with the help of computer and internet technologies, putting limitations away. Fast growing innovative investments and expense productions created a market in banking sector and the importance that banks attached to innovative activities just as traditional activities have gradually increased. During the last two decades, the global financial system was characterized by a strong innovation in the secondary markets which gave birth to new financial products that the financial intermediaries could use to hedge their specific risk (Kero, 2013). Developing technology and changing macroeconomic guidelines improved the Nigeria financial system and many reforms have been set about in the system. Over the last years, banks have been trying to increase their portions of productions,

positively influencing profitability like credit cards, telephone banking, and online banking as a result of reduction in net interest incomes in Nigeria. Historically, financial innovations have been described as one of the bedrocks of our financial system and the life blood of efficient and responsive capital markets (Davis, 2017).

The origin of economic thought which sees innovation as a determinant of economic performance is credited to Schumpeter (1934), whose study fronts innovation as its landmark initial contribution to economic literature. Schumpeter opines that the successful introduction of products, processes as well as organizational innovations, enables firms to supersede the existing industries as well as markets. Companies finally grow to attain significant market share at the expense of the less innovative firms. Innovation may be carried out by existing or new firms. However, new innovators are likely to penetrate a sector at the same time, a situation that would cause them to either grow or exit over time (Malerba & Orsenigo, 1997). This exit over time is explained in the later work of Schumpeter (1942,) as 'creative destruction,' which the author defines as the process of industrial mutation that continually revolutionizes the economic structure from within, constantly destroying the old one and continuously creating a new one.

Financial Innovations Ignazio (2007) defines financial innovations as the developments of new financial products, new ways of delivering already financial services or new financial services with new processes. Thus, financial innovations can take different ways. Noyer (2007) notes that financial innovation is the processes that bring about new products in the market. In all these definitions it can be concluded that for financial innovation to come to light, a new product or processes must be borne. Therefore financial innovation is a tool of ensuring that the bank works effectively and efficiently in customer satisfaction. From the above it is imperative to examine the effect of financial innovation on the profitability of deposit money banks in Nigeria.

The central role and scope of financial innovation has made financial innovation a subject of significant research interest. For instance, Tufano (2013) asserts that the activity of financial innovation is large, but the literature on the topic is relatively small and spread out broadly among a number of fields. Unlike some other areas represented in this volume, where our profession had made a great deal of progress, the subject of financial innovation remains one in which our intellectual maps show vast uncharted and potentially interesting lands to be explored most especially the developing countries of Africa where technology is adopted. In spite of the numerous studies on financial innovations, Lerner and Tufano (2011) observed that the sources of financial innovations are not well known due to the absence of sufficient empirical evidence in spite of the their widely acknowledged economic importance, therefore this study intends to examine the effect of financial intermediation on the profitability of deposit money

LITERATURE REVIEW

Concept of Financial Innovation

Innovation Financial innovation is an area of financial economics that has attracted significant research interest in academic as well as corporate circles (Lerner, 2006; Lopez & Roberts, 2002).

Tufano (2003) defined financial innovation in broad terms as the act of creating and then popularising new financial instruments as well as new financial technologies, institutions and markets. According to the study, innovations can be categorized into process innovations and product innovations. The author opines that product innovations are signified by new financial instruments while process innovations are epitomized by innovative methods of distributing the financial products, dispensing transactions or pricing them. The last few decades have witnessed an unprecedented increase in the number and types of financial innovations in both developed and developing countries.

Solans (2003) defined financial innovation as both the technological advances which facilitate access to information, trading and means of payment, and the emergence of new financial instruments and services, new forms of organization and more developed and complete financial markets. Financial innovation can also refer to the creation of new instruments and can be defined as the act of creating and popularizing new financial instruments, technologies, institutions, and markets (Lerner, Tufano, 2011). Financial innovation is not an old term literature, but real sector innovation has been studied for a long time. Financial innovation and real sector innovation exhibits significant differences. First of all, financial innovation is on paper, there is no barrier for creating new financial instruments because there is no real resource used. Second, the innovation of a new financial instrument may not be considered as a change in a production function. On the other hand, financial instruments are extremely easy to imitate and their costs are comparatively low.

Internet Banking

Internet banking involves the conduct of conventional banking activities on the Internet, that is, the global network of computer which does not depend on any "brick and mortar" office building; it offers financial services that are accessed through the Internet's World Wide Web. By reducing the overhead expenses of traditional banks, Internet banks in theory can offer clients better interest rates on deposits than that of traditional banking average rate. Banks often rely on the Internet to convey information about financial products to the general public, replace business conducted at the branch offices, which do away with the need to put up new branches, and to serve clients more efficiently. Internet banking sites present the prospect of more suitable means to manage customer finances, and such activities as paying bills on-line, searching for mortgage or auto loans, applying for credit cards, and finding the nearest ATM or branch office. Several Internet banks also offer 24-hour telephone support, so clients can discuss their needs with bank service representatives directly. Internet Banking has the disadvantage of exposure to internet fraud, frequent network breakdown and virus infection.

Telephone Banking

Telephone banking is a bank innovation that enables the clients of a bank to undertake banking activities through the telephone. It can be considered as a form of remote or virtual banking, which is basically the performance of bank financial activities through 16 telecommunication devices whereby bank clients can undertake retail banking business by calling on the telephone or mobile

communication unit which is connected to a system of the bank by Automated Voice Response (ABR) technology, Balachandher et al, (2001). For the assurance of the system's security, the client must be first authenticated via a numeric or verbal password or by means of security questions being asked by a live representative at a centre or branch. With a clear exception of cash dispensing in the form of deposits and withdrawals, it offers almost all the functions of account balance information, standing orders, ordering of cheque books and change of address. In addition to the self-service activities listed earlier, telephone banking operatives are usually trained to do what was conventionally obtainable exclusively at the branches.

According to Leow (1999) telephone banking, has numerous benefits for both customer and banks. It increases convenience expand access and significant time saving. On the other hand, from the banks perspective, the costs are substantially lower than those of branch based services. Telephone banking has nearly all the effects on performance of ATMs, apart from the ability to produce or dispense cash to the user. As delivery medium that offer retail banking activities to customers even after banking hours (24hours a day), it provides persistent efficiency for the bank. It makes banking at the client convenience possible both in their homes and offices, the customer can perform banking without visiting the ATMs or the branch office of the bank. These results in saving time spent on banking, it also provides convenience, efficient and higher productivity for both the bank and customers.

Automatic Teller Machine

ATMs are the most commonly used bank innovation in recent times. Almost all the universal banks in Ghana have this facility available for their customers. On most contemporary ATM, the clients is identified after inserting a plastic ATM card with a magnetic stripe or a plasticsmart card with a chip, that contains a unique card number and some security data, such as cessation date and personal identification number (PIN), join computer terminals accounting records and the cash vault in one unit, allowing clients to go into the bank's record keeping system with a plastic card containing a personal identification number (PIN) or by punching a special code number into the computer terminal linked to the bank's computerized records 24 hours a day. Once entrance is attained, it grants a lot of retail banking services to clients. ATMs are generally situated outside of the banks halls, and could also be located at filling stations, airports mall, supermarkets and places far from the branches of a bank. They were established initially to work as cash generating or dispensing devices. However, because of advancement in technology ATMs are capable of offering a variety of banking services, for example withdrawing cash, cash transfers from one account to another and bill payments, checking account balances, making deposit and printing account statement. Banks use the ATM as well as other innovative products to achieve competitive advantage, because it has the effect of cost reduction and depicts an image of a strong bank.

Mobile Banking

This is a wireless internet application of banking generally referred to as m-banking. This involves the working together of the internet and mobile phone communication for banking activities. This innovation offers the customer services such as SMS Banking that provides instant notification about transaction which helps to keep a watch on account with a round the clock services and to-

ups of mobile phone credits. The customer is able to perform other services such as account enquiries, request for cheque book.

Electronic Fund Transfer at Point Of Sale

An EFTPOS is an on-line arrangement that enables clients to transfer funds directly from their bank accounts to a merchant's accounts after making purchases (at purchase points). An EFTPOS employ a debit card to start an electronic fund transfer process, (Chorafas, 1988), improved banking efficiency resulting from the use of EFTPOS to service clients shopping payment conditions as an alternative to the bookkeeping duties in handling cheques and cash withdrawals for purchases. Also, the system remained operational even after regular banking hours; therefore, the bank continues to achieve efficiency even after normal banking hours. It also saves clients time and energy in travelling to branches or ATMs for cash withdrawals which can be exploited into other productive services.

Concept of Profitability

Lin (2008) defines profitability as the measure of outcomes in meeting of an organization goals. (Bessler et al., 2008) measures of how an organization uses its resources to generate income. To this end, financial performance is the expression of the revenues with respect to the resources. Total sales revenue, profits and return on assets are some financial measures. Performance may be measured in terms of financial and non-financial terms (Bahar and Ahmad, 2010). To this end, financial performance may involve such measures as profits after tax and market share and customer satisfaction. Kabira(2011) notes that agency banking ensures that banks save on the floor for banking halls and save on salaries since the agency outlets are run by independent agents. Further, agency banking hours may be more and hence more transactions.

Thus, agency banking may increase the profits of the banks while keeping the costs at minimum. A commercial bank's performance may be expressed in terms of its Return on Assets (Cyren, Emre&Asl 2008). Performance of a commercial bank is a function of different externalities operating within the bank's environment. The banking industry has a volatile environment and thus banks need to adjust in order to cope. According to Cicea and Hincu (2009) banks need to establish proper measures to achieve the performance objectives. Batiz-Lazo and Woldesenbet, (2006) noted that financial innovations have a tendency of improving the performance of the institutions in the financial sector. Commercial banks may measure its performance in different folds including total income, customer satisfaction and market leadership. The improvement of income is one of the generic goals of profit oriented organization in that they ensure that they survive and grow over a period of time. Financial innovations lead to improvement of products and product delivery in the banking sector (Alam 2011). Wen (2011) argues that a higher ROA is an indication that the company is utilizing its resources more efficiently.

Return on Investments (ROI)

Return on Investments is defined as a ratio of net income to total assets (Jacobson, 1987). ROI is widely considered a simple and effective measure of division's or profit centre's efficiency in utilising the capital entrusted to it (Solomons, 1965). On the other hand some departments dealing with service delivery in companies such as the human resources have expressed their dissatisfaction with ROI. For example Phillips (1997) argue that the human resource departments are in most cases unable to quantify the return on their investment in training and development. However, Reece and Cool (1978) observe that ROI is viewed as the most useful measure of a division's performance. According to the authors ROI has many advantages which would account for its wide usage, namely: 1) as a ratio it enables one to compare companies of differing sizes; 2) as a percentage return measurement, ROI is consistent with company's cost of capital measurement; and 3) the ratio can be used by parties outside the company to make intercompany comparisons of economic performance. Since the gain from investment is expressed in current values or prices while the invested capital is not, ROI can be affected by inflation as a result of increasing gain from investment.

Return on Assets (ROA)

Most of the studies which use ROE have also used ROA as the complimentary performance measure. This is because whereas ROE emphasis is on returns generated by the owner's investment or equity in the firm, ROA emphasizes on returns generated by the firm's assets. ROA measures the success of a firm in generating earnings using assets in the absence of financing of those assets (Selling & Stickney, 1989). Return on Assets (ROA) is the net income in year x dividend by the total assets as at the beginning of year x The preference for ROA over ROE in the measurement of operational efficiency is consistent with White et al. (1994) who propose the use of both ROA and ROE to separate asset management and financing influences on profitability. McGuire, Sundgren, and Schneeweis (1988) study on Corporate Social Responsibility (CSR) and financial performance find ROA measure as better predictor of CSR than market measures. This according to the authors is because perceptions of social responsibility are unsystematic or firm specific and hence accounting measures should be more sensitive to them as opposed stock market measures, which show systematic market trends.

Return on Equity (ROE)

Return on equity is one of the most widely used profitability ratios in the banking industry. According to (Moussu & Petit-Romec, 2014) ROE has been used by the banking industry in the allocation of capital within and across divisions. The study observes that ROE is a central performance measure in the banking and the choice of the ratio is as a result of risk management approach to banking. This approach the authors argue, places emphasis on the regulation of bank capital due to a belief in the banking industry that equity should be minimised to reduce capital costs. This is consistent with the earlier work of Simpson and Kohers (2002) which finds ROE as a performance measure most broadly accepted in the banking industry. ROE is the ratio of net income to firm's total assets book value (Mehran, 1995). ROE is expressed as: earnings before tax divided by equity (EBT/Equity) (Jose, Lancaster, & Stevens, 1996).

Return on Sales

Return on Sales is one of the measures of a firm's profitability. It is calculated as a ratio of net profit after taxes (excluding extra ordinary items) divided by net sales (Palepu, 1985). ROS is easier to calculate compared to other profitability measures since the data required for its calculation is available in any income statement. Carey, Post, and Sharpe (1998) have used ROS to measure firm performance owing to availability of data and unavailability of data necessary to compute ROA. A number of studies find a strong correlation between ROA and ROS and evidence that the two ratios generate similar results (Hitt, Hoskisson, & Kim, 1997). Since there is strong correlation between ROA and ROS, the two ratios should not be used in the regression model to avoid repetition.

Theoretical Review

Aguilar (2009) noted that a theoretical framework is fundamental in a study for the purpose of identification of the variables to be evaluated in a particular study. According to Dawson (2006) poses that a theory is the basis of generalization of a phenomenon. Thus it is true to suffice that theories helps in making general observations about things. This study will be based on the following theories: Schumpeter theory of innovations,

Schumpeter Theory of Innovations

According to Schumpeter (1934) chances of profits could be created by entrepreneurs who were independent. Schumpeter argued that this was particularly observed from independent inventors or from people who were in Research and Development engineering. Consequently, due to the abnormal profits, new groups of imitators would join and lower the profits as a result of the innovation. However, Schumpeter idealised that before equilibrium could be reached, there resulted into a new set of innovation that would ultimate another business cycle. Thus, at any 15 point in time, there is something new being innovated in the economy and the financial sector is not exempted. This theory has a central theme that entrepreneurship has a role in searching for new opportunities and creating utility in the economy. Further, the author argues that there is a difference between invention and innovation. To this end, Schumpeter (1934) views invention as the seeking of new dimensions that are potentially adopted by entrepreneurs while innovations basically are seen as the forces leading to growths in a self-propagating system. This theory posits that innovations are sought by the daring individuals who have the zeal to take risks by self-will. Schumpeter (1934) puts it that innovations are always happening in the industry and for this reason, institutions needs to be cognizant of them.

Innovation Diffusion Theory

Innovation Diffusion Theory (IDT) seeks to explain the flow of innovations within an organization. According to Rogers (2003), there are various factors that lead to the diffusion of innovations from one point to another. For instance if there is a relative advantage of the new innovation when compared to the already existing tools, the innovation will be regarded as an improvement and may be adopted in the entire organization. Also, the compatibility of the

innovations is crucial with respect to the already existing tools and practices in that those are that are compatible are easily adopted. Innovations are also weighed on the ease of use, if they can be put on trial before being commenced in full and if their inputs and outputs can be measured with ease. It is important to note that the ease of use is viewed as subjective since expertise is not uniform across all people. Lundblad and Jennifer (2003), notes that diffusions across the departments of organization may not be probable due to the differences of operations. This theory is crucial to this study since it helps explains how innovation diffuse from one segment of the economy to another or from one department to another within the same organization.

Empirical review

De Young et al. (2007) found that internet adoption improved community bank profitability, largely through increased revenues from deposit service charges. Lerner and Tufano (2011) suggest that financial innovations like venture capital, equity funds, mutual and exchange traded funds and securitization lead the way to financial deepening and growth. Cherotich et al. (2015) found out that there is a strong relationship between financial innovations and financial performance in Kenya commercial banks suggesting that the innovation is also effective for undeveloped countries too.

Beck, Chen, Lin and Song (2012) searched the relationship between financial innovation in the banking sector and (i) real sector growth, (ii) real sector volatility, and (iii) bank fragility. They found that a higher level of financial innovation is associated with a stronger relationship between a country's growth opportunities and capital and GDP per capita growth and with higher growth rates in industries that rely more on external financing and depend more on innovation. On the other hand, they found that financial innovation is associated with higher growth volatility among industries more dependent on external financing and on innovation and with higher idiosyncratic bank fragility, higher bank profit volatility and higher bank losses during the recent crisis.

Boot and Thakor (1997) found that the evolution of a financial system is likely to be path-dependent, well developed financial systems provide stronger incentives for financial innovation and develop faster. Berk (2002) researched the link between financial innovation and central banking and concluded that in a world characterized by ongoing financial innovation, reserve requirements will allow the central bank to control overnight rates, provided the former are implemented in a market-oriented fashion.

Roberts and Amit (2003) researched the relationship between innovation and the emergence of differentiated competitive positions in Australian Retail Banking. They found that innovative activity significantly affects its current financial performance. Abir and Chokri (2005) examined the adoption of the financial innovations of products and of process within the Tunisian banking industry during the period from 1987 to 2008. They concluded that the legal framework influences in a large way the innovative behavior of the Tunisian banking system.

Nodern, et al. (2012) argued that this is consistent with banks passing on risk management benefits to corporate borrowers but not with alternative channels through which credit derivative use may affect loan pricing. They found that the magnitude of the risk management effect remained

unchanged during the crisis period of 2007-2009. Domeher et al. (2014) investigated the factors influencing the adoption of financial innovation in Ghana's banking industry. Surveys were conducted involving 405 clients of the six major banks in the country. Using logistical regression, the results amongst other things show that innovation attributes such as lack of complexity, compatibility and perceived usefulness provided by financial innovation, increase the likelihood of e-banking adoption.

Şimşek (2013) analyzed the channels by which financial innovation affects portfolio risks in an environment with both risk sharing needs and belief disagreements. He found that financial innovation that increases portfolio risks also exacerbates the negative externalities, and might lead to inefficiency.

Domeher et al. (2014) emerged that the ease with which customers can use the innovation, the compatibility of the innovation with customers' needs, the perceived usefulness thereof, the amount of information provided on the innovation and the level of customers' education all have a significant positive impact on the adoption of e-banking innovations in the Ghanaian banking industry. Dash et al. (2014) found innovation attributes trialability and compatibility has significant impact on the attitude whereas the relative advantage is not significant in the Indian banking system.

Chava et al. (2013) found that the increase in local market power of banks after intrastate deregulation had a negative effect on the innovative activity of young, private firms. Both the level of innovation and the risk of innovation decreased significantly after intrastate banking deregulation. Mugane (2015) investigated the effect of financial innovations on financial performance of commercial banks in Kenya. The study concluded that the relationship between product innovation and financial performance of commercial banks is negative and significant.

Arnaboldi and Rossignoli (2015) studied the determinants of financial innovation in listed commercial banks in Europe and in the United States from 2005 to 2008 that product innovation prevails both in Europe and in the US, but innovation falls from 2005. Not only banks innovate in less categories, but also less banks engage in innovation. When banks have a higher market share in less concentrated and more efficient banking systems, they enjoy a preeminent position which leads to innovation.

Abaenewe, ZephChibueze, et al (2013) argued that financial innovations have positively influenced the return on Equity of commercial banks in Nigeria. They narrowed down to electronic banking citing that more customer transactions are observed and hence more transaction fees leading more revenues. Rotchanakitumnuai and Speece (2003) notes that electronic banking offers numerous benefits to both banks, investors and individual bank clients can check account balances, transfer money, pay bills, collect receivables and ultimately reduce transaction costs and establish greater control over bank accounts.

Ovia, (2001) found that electronic banking has made it flexible for customers to use their monies and information on their accounts. It is possible for customers to access their account at the comforts of their homes or office as long there is internet connectivity. This has reduced

movements for them bearing in consideration that time is a scarce resource. To the bank this makes it easier to process large transactions in real time. Such facilities like money transfer work best for the bank since the commission is higher and the risk is low. The study on the innovations and financial performance in the financial industry was conducted by Mwangi (2013). The study had a general objective of establishing the impact of innovations in the banking sector. The study used descriptive research design. The target population was commercial banks in Nairobi. The study established that innovations had a significance influence on performance of financial institutions in Kenya. Further, the study found out that the use of mobile banking has more effects on performance when compared to internet banking. This study is important since it highlights on the role of innovations in the performance of financial institutions. However, the study did not consider EFTs which forms the scope of this current study.

Mabrouk and Mamoghli (2010) carried out a study aiming at establishing the impact of emerging trends on performance of banks. The study considered the use of ATMs, Mobile banking and other technological mechanisms that facilitate the banking process. The study established that those banks that adopted innovations earlier had superior performance when compared to those that adopted much later. Perhaps, this is because of the first mover advantage. It is important to note that technology changes so fast and if firms take long to adopt, it may be of value because other better forms of technology will have emerged.

Kimingi (2010) conducted a study to establish the role of technological innovations on performance of commercial banks. The target population for the study was all commercial banks. The study adopted descriptive research design where both primary and secondary data were analyzed. The study found out that there were various innovations that banks had adopted including: mobile banking and internet banking. Further, it was established that innovations improved the performance of banks by enhancing their profitability and competitiveness in the industry. Korir (2014) used a descriptive research design and had sought to establish if the value of Electronic Funds Transfers, value of RTGS transactions had effect on financial performance of banks. The study revealed that these financial innovations explained a large extent of changes in financial performance of commercial in Kenya.

Nader (2011) established that the fact that commercial banks adopted mobile and internet banking, was not a reason enough to expect more profits. This study had sought to establish the profitability of banks in the Saudi for a period of 10 years. The study tested contradicting results for the various aspects of financial innovations. On one hand, use of mobile banking and Automated teller Machines (ATM) had a positive effect on profitability of commercial banks in Saudi Arabia. On the contrary, availability of these services did not necessarily indicate a chance of more profits. Thus, the study implies that financial innovations may or may not lead to improved financial standings. This instant study seeks to establish the effects of financial innovations on total income and return on assets of commercial banks in Kenya.

Nyangosi and Aora (2011) conducted a study with the aim of examining the impact of information technology and banking performance in Kenya. The study adopted a descriptive research design and had a population of all commercial banks in Kenya. The study established that the use of internet banking and mobile banking had been adopted by most banks. The study found out that

use of ATM and mobile banking led to service excellence and thus improved the performance of financial institutions. Further, the study revealed that information technology is an important development in the banking sectors. In as much as this study reveals that use of financial innovations increases the rate of customer satisfaction, it does not indicate whether they lead to better performance. Scholnick (2006) noted that the use of ATMs increases transactions of the large commercial banks hence more business is realized but this is not so for the small banks. It is crucial to note that when the transactions with the bank increases, the income of the bank may increase due to charging of transaction costs. However, some of online banking services are free of charge.

Simiyuet al (2014) did a study on the Effect of Financial Innovations and Operationalization on Market Size in Commercial Banks: A Case Study of Equity Bank, Eldoret Branch. The study had a main purpose of establishing the effect of financial innovations on market size of banks in Kenya. The study adopted a descriptive research design and data was collected through questionnaires and interviews. The study had a target population of 1600 staffs and customers of the bank. The study established that innovations increased the market size and assets of the commercial banks. The study recommended more financial innovations including internet banking that are aimed at meeting customer needs and satisfaction should be enhanced. However, this study has not analyzed the effects of financial innovations on return on assets. This study will seek to establish the effects of financial innovations on financial performance of commercial banks in Kenya.

Yin and Zhengzheng (2010) carried a research in China with an aim of analyzing the operational changes due to technology innovations. Their study indicated banks that adopted innovations of processes were more profitable. When a bank adopts streamlined operations for instance using internet banking, it may result to low operational costs. Thus, the commercial bank may save on costs hence improving on its performance. Thus, it is a process whose effect on performance of commercial banks needs to be studied.

Pearson (2011) found that financial innovations lead to the exploitation of new markets in the industry. At this juncture, it is valid to say that financial innovations lead to the betterment of the commercial bank under consideration and the entire sector at large but whose contribution to the financial performance of commercial bank has been least studied. De Young et al (2007) studied the effects of e-banking on profitability of US community banks by analysing banks that online banking with those with physical outlets only. The study revealed that e-banking improved the profitability of banks. A study on the impact of information technology on the banking industry was carried out by Shirley and Sushanta (2006). The study had a general objective of establishing the effects of information technology on the profitability of commercial banks. The study had a target population of 68 US banks and data was collected over a period of 20 years. The study found out that adoption of IT to service delivery may increase the profits due to cost savings. However, the study also found out that the profitability depended on the network effect which if too low would lower the profits of the banks. Thus, the study was not conclusive on the effect of innovations due to technology adoption.

Githikwa (2009) found that financial innovations have an impact on performance of commercial banks in Kenya. The study was conducted with an aim of establishing the effect of financial

innovations on the profitability of commercial banks. The study concluded that 27 innovations require resources for them to be implemented and result in income. The study established that financial innovations involve committing resources in order to develop new products and new ways of delivering the banking products and services. To this end, banks may need to hire skilled personnel to implement and monitor such processes. In as much as the banks need new products, they should consider the utility they are creating for the customers.

Francesca and Claeys (2010) carried out a study with an aim of examining the role of online banking services in contributing to the strategic goals. The study was carried out among 60 large banks operating in the European Union. The study revealed that those banks that had a goal of increasing their market share were likely to adopt financial innovations such as internet banking because they could reach more customers. However, the performance of banks that solely dependent on internet was noted to be low because the banks had spent a lot of money in venturing to internet banking and subsequent labour cost savings could not be sufficient to recoup the initial capital outlay. For this reason, it is important for banks to prudently decide on which financial innovations to adopt.

Malhotra and Singh (2010) carried out a study with the aim of establishing the impact of internet banking on financial performance of commercial in India. The study had a keen interest in establishing whether the period of adoption of internet banking had an impact on performance. Specifically, the study sought to establish whether, banks that had adopted internet banking for longer periods had superior performance over those that had adopted banking for a shortest time period. A multiple regression model was used and 82 banks were selected. The study found out that there was no statistically significant difference among those banks that had adopted internet banking for a longer time than those which had recently adopted internet banking. Further, the regression model established that there internet banking had no effect on financial performance of commercial banks in India.

Literature gap

Several studies were carried out on financial innovations on a global perspective. A number of studies indicated positive relationship between financial innovations and performance of financial institutions in general (Shirley & Sushanta, 2006; Mwangi, 2013 and Githikwa, 2009). Thus, the studies idealized that banks that adopt financial innovations were likely to better their profitability and performance. However, other studies (Nader, 2011 and Scholnick (2006) indicated negative relationships between financial innovation and performance of commercial banks. Interestingly, it is evident that the studies indicated varying findings. Thus there is a need to carry out a study in order to justify which studies are in agreement with the situation in Nigeria in terms of effects of financial innovations and profitability of deposit money banks in Nigeria.

METHODOLOGY

This study uses quasi experimental research design approach for the data analysis. Population of this study covers the 25 deposit money banks in Nigeria. However, sample size consists of the fifteen (14) quoted commercial banks in the Nigerian stock exchange. The reason for the sample

size is for easy source and reliability of required data from the annual reports submitted to the exchange. The data in this study was sourced from the financial statement of banks and Central Bank of Nigeria Statistical Bulletin. The model specified below is based is a modified model adopted from Akani and Lucky (2015)

$$ROE = f(EFT, IB, MB, ATM, INT) \quad (1)$$

Transforming equation 1 to econometrics form, we have:

$$ROE = \alpha_0 + \alpha_1 EFT + \alpha_2 IB + \alpha_3 MB + \alpha_4 ATM + \alpha_5 INT + \mu \quad (2)$$

Where:

ROE = Return on Equity

ETF = electronic fund transfer

IB = internet banking

MB = mobile banking

ATM = Automated teller machine

INT = Investment in technology

$\alpha_0, \beta_0, \chi_0$ = Regression Intercept

μ = Error term

A-priori Expectation of the Result

The elasticity parameter also known as the a-priori expectation of the variables proposes that an increase in the independent variables financial innovation will increase bank profit, and increase in performing loans will increase profit. Therefore it can be mathematical stated as follows:-

$$\alpha_1, \alpha_2 < 0, \alpha_3 > 0$$

Data Analysis Method

The method of data analysis to be used in this study was the panel data multiple linear regressions using Ordinary Least Square (OLS) method. The study adopts the panel data method of data analyses which involve the fixed effect, the random effect and the Hausman Test. This approach, which is a quantitative technique, includes tables and the test of the hypotheses formulated by using ordinary least square regression analysis at 5% level of significance. To arrive at a result that will not lead to spurious regressions, the study will test for stationarity at different levels in the variables making up the model. Other tests that will be carried out on the model include test of Normality, Durbin Watson Test of serial correlation, test of heteroskedasticity and test of model

specification so as to achieve the objectives of our study as well as answer the research question and hypotheses.

Moreover, in order to undertake a statistical evaluation of our analytical model, so as to determine the reliability of the results obtained and the coefficient of correlation (r) of the regression, the coefficient of determination (r^2), the student T-test and F-test will be employed.

Coefficient of Determination (r^2) Test –This measures the explanatory power of the independent variables on the dependent variables. For example, to determine the proportion of economic growth in our model, we used the coefficient of determination. The coefficient of determination varies between 0.0 and 1.0. A coefficient of determination says 0.20 means that 20% of changes in the dependent variable is explained by the independent variable(s).

F-Test: This measures the overall significance. The extent to which the statistic of the coefficient of determination is statistically significant is measured by the F-test. The F-test can be done using the F-statistic or by the probability estimate. We use the F-statistic estimate for this analysis.

Student T-test: measures the individual statistical significance of the estimated independent variables at 5% level of significance.

Durbin Watson Statistics: This measures the colinearity and autocorrelation between the variables in the time series. It is expected that a ratio close to 2.00 is not auto correlated while ratio above 2.00 assumed the presence of autocorrelation.

Regression coefficient: This measures the extent in which the predictor variables affect the dependent variables in the study.

Probability Ratio: It measures also the extent in which the predictor variables can explain change to the dependent variables given a percentage level of significant.

Fixed Effect, Random Effect and FGLS Ordinary Least Square (OLS) is usually used to estimate the parameters of a single equation model. Besides, the estimator yields estimates that are best, linear, and unbiased estimators (BLUE) with the desirable properties of consistency, efficiency and being unbiased. However, these properties are made possible after all the assumptions of the OLS method have been satisfied, (Ifuero and Chijuka 2014). By following the path of (Jim, Eric, Tom and Choi 2006) in estimating the equation for the study, Feasible Generalized Least-Squares (FGLS) procedure was used in confirming further the output of FE model instead of applying the method of ordinary least squares (OLS) because estimators of the former (FGLS) are more efficient with a large sample.

Heteroskedasticity The problem of heteroscedasticity takes place when the variance of the error terms varies across observations. In order to neutralize the presence of heteroskedasticity in the FE result as it does not affect RE, robustness test was undertaken for validity of statistical inferences. The problem of heteroskedasticity in FE Model Result can be eliminated by applying the likelihood-ratio (LR) test procedure. However, FGLS fundamentally counterbalances the effect of heteroskedasticity. Hence, the use of FGLS results in this study for analysis.

Diagnostic Tests

A regression model has certain basic assumptions without which it may not be accepted. This study tested the measures of normality, multi-collinearity test and test of auto-correlation.

Measures of Normality

Measures of normality assess whether data has features of a normal distribution. This study adopted the Jarque-Berra's statistic of skewness and kurtosis to test normality. According to Gujarati (2007) for a normal statistics the measures of skewness and kurtosis are expected to be 0 and close to 3 respectively. It is crucial to note that the skewness and kurtosis measures assess whether the independent variables affects the dependent variable in a normal distribution way.

Multi Collinearity

Multi collinearity problem exists when the independent variables are significantly collinearity to a single or more of the other independent variables. Multi collinearity thus makes it hard to identify the impact of the independent variables individually on the dependent variables. This study used the Variance Inflation Factor (VIF) to test multi collinearity. The VIF where there is no problem of multi collinearity should be less than 10 with tolerance levels of more than 0.1. Multicollinearity tests among electronic funds transfer, mobile banking and internet banking is important because it explains whether variables are influenced by each other. This test is important because it gauges whether the model holds.

Auto Correlation

Auto correlation means whether the independent variables are related to one another. This study used the Durbin-Watson test in order to test for the problem of auto correlation. The DW test result of between 1 to 3 implies that data has no auto correlation problem. Auto correlation is very important because explains whether electronic funds transfer, mobile banking and internet banking relate to each other. It is important that there is no auto correlation among electronic funds transfer, mobile banking and internet banking because it improves the model.

ANALYSIS AND DISCUSSIONS OF FINDINGS**Presentation of Results****Table I: Presentation of Level Series Result**

Variable	Pooled Effect			Fixed effect			Random effect		
	β coefficient	T. stat	p. value	β coefficient	T. stat	p. value	β coefficient	T. stat	p. value
MB	0.118823	0.908671	0.3652	0.095381	0.700844	0.4847	0.115116	0.873714	0.3838
INVT	4.71E-06	0.008386	0.9933	0.000226	0.383294	0.7022	3.89E-05	0.068640	0.9454
IB	0.104817	0.712160	0.4776	0.090098	0.570001	0.5697	0.102967	0.691060	0.4907
ETF	-0.126539	-1.266471	0.2075	-0.131123	-1.164819	0.0064	-0.127465	-1.250747	0.2132
ATM	-0.053364	-0.566128	0.5723	-0.023270	-0.233589	0.8157	-0.048540	-0.509812	0.6110
C	11.66288	8.077161	0.0000	12.13482	7.535086	0.0000	11.72370	7.945723	0.0000
R-squared	0.039375			0.530313			0.036997		
AdjR ²	0.003531			0.200938			0.001064		
F-statistic	1.098504			5.007251			1.029601		
F- Prob	0.364266			0.000721			0.402877		
D W	1.908644			2.115898			1.938297		
	Correlated Random Effects - Hausman Test								
	Test Summary			Chi-Sq. Statistic			Chi-Sq. d.f.		Prob.
	Cross-section random			2.475306			5		0.0002
	Redundant Fixed Effects Tests								
	Effects Test			Statistic			d.f.		Prob.
	Cross-section F			0.973250			(13,121)		0.4815
	Cross-section Chi-square			13.923106			13		0.3793

Source: Extract From E-View

The fixed effects model is better than pooled effect that the results of the likelihood ratio test were significant ($p\text{-value} < 0.0000$ for the three models. This result means that we reject the Pooled effect model and choose the fixed effects model for this study. To make a choice between the fixed effects model and the random effects model, we utilized the Hausman test as shown in the table above. The hypotheses of the test are as follows:

The fixed effects model is more appropriate than the random effects model. As the result found that the results of this test were significant ($p\text{-value} = 0.0241$). Hence, we reject the null hypothesis and conclude that the fixed effects model is the most appropriate of the three models.

The fixed effect model found that the independent variables can explain 53 percent variation on the dependent variables. The F statistics and the F-probability proved that the model is statistically significant. The Durbin Watson statistics justifies the absence of serial autocorrelation in the time series.

DISCUSSION OF FINDINGS

Based on the findings presented in the table above, a unit change in the number of teller machines will cause the return on equity to decrease by 0.02 units factor. It's a negative relationship and the relationship is insignificant. A decrease in the number of mobile banking customers by 0.09 units on return on will lead to an increase in the return on equity. A decrease in the number of bank ETF by 0.113 units will lead to an increase in the return on equity of deposit money banks. The p value for all the variables analyzed are greater than 0.05 indicating that the variables were insignificant. Therefore, they have no effect on the return on equity of deposit money bank. A study by Otieno (2015) argued that teller machines have indeed revolutionized the banking industry and has led to improved financial performance. However, the teller machines were found to be statistically insignificant. The findings of this study concurs with the findings by Momanyi (2015) who concluded that innovation have a negative influence on the financial performance of commercial banks in Kenya.

Further, these findings agrees with those of Al-Jabri (2012) who identified that adoption of mobile banking by Saudi Arabia banks led to enhanced performance. Kigen (2010) also identified that mobile banking reduced transaction costs hence improving profitability. On the contrary Agboola (2006) found out that mobile banking was beneficial to banks if the customers trusted the interface which changed from bank to bank. This study has also established a positive relationship between internet banking and performance of commercial banks in Kenya. Internet banking ensures that customers can access banking services by themselves hence reducing the operational costs for the banks. Internet banking is advantageous in that most transactions can be done online.

This finding agrees with those of Gakure and Ngumi (2013) who established that internet banking had a positive relationship with performance of commercial banks. Also, these findings match with those of Malhotra and Singh (2010) who identified that those larger banks that adopted internet banking had a potential for more profits due to reduced operational costs. Interestingly, the same study established that those smaller banks that adopted internet banking had negative impact on their performance. Kagan et al (2005) identified that online banking was advantageous to banks since it ensured efficient delivery of services and thus improved performance.

The study has also established a positive relationship between electronic funds transfers and Return on Assets. This result disagrees with those of Shirley and Sushata (2006) who identified that electronic payments can potentially create massive networks that may reduce banks' profits in the United States. Electronic funds transfers involve payments through clearance systems that are initiated by commercial banks. Further, this finding matches with that of Shu and Strassman (2005) who found out that use of electronic payment could not necessarily improve the banks' earnings.

On the contrary, according to Sana et al electronic funds transfers reduces costs and saves time consequently improving profitability of commercial banks in Pakistan.

CONCLUSION

Electronic funds transfer is the transferring money without have the parties to be physically present at a single location. The study had sought to establish the relationship between EFTs transactions and performance of deposit money banks in Nigeria. The study has found out that there is a negative relationship between EFTs and Return on equity. The study has thus further rejected the null hypothesis that had been formulated.

The study had sought to establish the relationship between internet banking transactions and performance of deposit money banks in Nigeria. The study has found out that there is a positive relationship between internet banking transactions and Return on equity. The study has thus further rejected the null hypothesis that had been formulated.

The study had also examined to establish the relationship between automated teller machine and performance of deposit money banks in Nigeria. The study has found out that there is a positive relationship between automated teller machine and Return on equity.

The study had also examined to establish the relationship between ICT investment and performance of deposit money banks in Nigeria. The study has found out that there is a positive relationship between ICT investment and Return on equity.

Recommendations

1. The study recommends that; deposit money banks should adopt financial innovations since they affect their performance. Particularly the study has established a positive relationship between internet banking and performance of commercial banks. For this reason, it is important that deposit money banks adopt internet banking. Internet banking enables deposit money banks to cut down on costs since customers do not have to travel to the banking halls for financial services.
2. This study recommends that deposit money banks should invest in technological innovations. It is also recommended that deposit money banks adopt financial innovations in order to foster performance.
3. The study recommends that banks should transform banking service by adapting to mobile banking and agency banking so that not only to providing jobs but also increase market share. It would be beneficial where banking has not reached and improve security.
4. Bank should create awareness on service that is available in the online through providing alternative technology that can be used in banking transactions.

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