Bank Attributes and Financial Performance of Listed Deposit Money Banks in Nigeria the Moderating Role of Information Technology

Abubakar Aliyu[1] and Shehu Usman Hassan[2]

[1]*Department of Accountancy, College of Business and Management Studies, Kaduna Polytechnic, Kaduna-Nigeria, E-mail: lamidoaliyu@gmail.com*
[2]*PhD., Professor of Accounting and Finance, Department of Accounting and Business, Federal University of Kashere- Nigeria, E-mail: shehu.hassan@fukashere.edu.ng; shehu.hassanus.usman@gmail.com*

A B S T R A C T

In this paper, weexplore the moderating effects of Information Technology on the relationship between bank attributes and financial performance of listed deposit money banks in Nigerian. We viewbank attributes as specific individual internal factors that affect the profitability and performance of the bank. These characteristics are within the purview of the board of directors and management to influence. The internal attributes are also within the scope of the management of the bank to manipulate and also differ from one bank to another.The study uses correlational and ex-post facto research design in a sample of 15 listed DMBs. Secondary data for a period of 10 years (2009-2018) is used, and multiple panel regression analysis is employed for data analysis. All robustness tests have been conducted. The results obtained from the research indicate that only asset quality and Information Technology has significant effect on the performance of listed DMBs in Nigeria. On the contrary, the results show that capital adequacy, management efficiency, earning ability and liquidity has negative and insignificant effect on the financial performance of Nigerian listed DMBs. The study also discovers that Information Technology has a significant moderating effect only on earnings ability and financial performance of Nigerian listed DMBs. While the interactive variable does not succeed in improving the association between capital adequacy, asset quality, management efficiency, liquidity and performance of Nigerian listed DMBs. The study concludes that there is a strong relationship between capital adequacy, earning ability and Information Technology and performance of listed deposit money banks in Nigeria. It is therefore, suggested that since Information Technology has a strong moderating role on the association between earning ability and performance of listed

deposit money banks in Nigeria, the board of Information Technology Strategy Committee should establish a balance in overall Information Technology investment portfolio in terms of risk, return and strategy for better results ahead

1. INTRODUCTION

Bank attributes are specific individual internal factors that affect the profitability and performance of the bank. These characteristics are within the purview of the board of directors and management to influence. The internal attributes are also within the scope of the management of the bank to manipulate and also differ from one bank to another (Dogarawa& Maude, 2014). They measure the overall profitability of the bank, and its ability to meet with the new capital requirement, changes in its loan quality and risk, its ability to increase earning, generate more revenue and pay expenses, changes in its cash position, and changes in its assets. Specifically, bank specific attributes include quality of assets, capital adequacy and capital management, management efficiency, credit risk, earnings management risk, market power, operating expenses, interest rate spread, and leverage (Dogarawa& Maude, 2014). To proxy bank attributes or factors, scholars often use CAMEL framework. CAMEL stands for capital adequacy, asset quality, management efficiency, earnings ability, and liquidity (Mulualem, 2015).

In Nigeria, banks performance is very vital to investors, stakeholders and the economy at large becauseinvestors are interested in the returns for their investment (Abdullahi, 2016). Well-performing businesses can bring higher returns to their investors. Financial performance of a company will increase the income of its employees, bring quality products to its customers and become more friendly to its operating environment (Alper & Anbar, 2017). A company that has good financial performance can generate more profits which can lead to future investments that can provide employment opportunities and increase the income of people. Kumbirai andWebb (2010) view firms' performance as the outcome of its strategy or an assessment of how well it accomplished its business goals. In the words of Gambacorta (2001), a firm's performance is the ability of the firm to achieve its objectives using its available resources. Company's financial performance can be seen as the measurement of a firm's strategy result, policies and operations in monetary terms. A firm's financial performance provides a deductive measure of how well a company can use assets from business operations to generate more revenue to the organisation (Amahalu, 2017). The most commonly used performance measures are accounting based which include: return on asset, return on equality, return on investment and Tobin's Q. In order to improve the performance of

Nigerian banks, the sector has witnessed a growth-and-bust cycles leading to reforms in the areas of regulations; establishment of number of institutional bodies, ownership structure; and depth and breadth of the entire operations, all this is an attempt to reposition the industry to play its financial intermediation role in an effective, efficient and profitable manner (Dogarawa & Maude, 2014). However, the diverse reforms the sector has gone through, remained largely fragmented with giant gaps within the financing of economic activities to private sectors especially the agricultural sector with the necessary facilities. This is evidenced from the increase in their respective capital adequacy level, asset quality, management efficiency, earning ability and liquidity ratio, amongst others (Atahau, 2015).

Capital represents the level of fund required by a commercial bank to enable them to bear the risk within the system. Such risks are; credit risk, liquidity risk, market risk and operational risks. Capital is one of the specific internal bank attributes that have a direct effect on theperformance of Nigerian bank (Hassan, 2017). Capital is the summation of entire shareholders financing available to support the activities of the bank. Also, capital of the bank serves as a stabilizing factor in cases where adverse situations occur within the banking institution. In addition, capital provides banks liquidity base as deposits are more fragile and prone to the slopes of the bank. Good level of capital reduces to a minimum the possibilities of distress in a banking institution and improves the quality of the assets. However, asset quality is a means of measuring the probability of loan on default, in addition to the measure of its marketing opportunities. Thus, the quality of the bank assets is the measure of the price at which the bank would give a loan to its customer. Loans represent the bulk of the assets of a bank and also takes large percentage of capital risk (Ongore & Kusa, 2013). High asset quality also signifies efficient management of resources in banking operations.

Management efficiency in the Nigerian banking context refers to the ability of the corporate governancemechanism to identify measure and control the risks of any banking operations and to ensure the safety and efficiency of the operation within the relevant legislative provisions. The effectiveness of the management of a bank is measured via various financial ratiossuch as; total growth of assets, loans growth rate and profit growth rate. In addition, the management ability to utilize the resources at its disposal effectively in order maximizes revenues, reduce operating costs, can all be measured by using financial ratios. Reports from operating income are also useful in measuring the quality and efficiency of management. The level of operating expenses also determines the effectiveness of management which in turn affects the ability to earn an income of the Bank and overall profitability (Atahau, 2015).

Earning ability in banking context is the capacity of a bank to make profits that will helps the bank finance its operation, expansion and increase its capital base. From the point of view of the bank regulator, the essential purpose of earning capacity is to increase the capital base of the bank and absorb all the losses of the bank (Carole, 2015). In addition, liquidity in banking however, allows them to meet its depositor's obligations, as well as other obligation within the system domain. A comfortable level of liquidity has a direct impact on the profitability of the Bank. Management often proxy some variables to measure liquidity. Those are cash due from banks, and government securities to total assets. (Lee & Kim, 2013). However, one important instrument that all of the above mentioned variables rely heavily on in terms of effectiveness in today's global business environment in which a quite number of researchers tend to pays less attention to is Information Technology. As the struggle to enhance bank performance intensifies via providing adequate capital, improving quality of an asset, enhancing management performance, increases earnings and liquidity. The focus is moving to the complete automation of all their operation and services (Hassan, 2015). This is evident from growth of investment in Information Technology (IT) equipment over the last ten years. For instance, in its bid to improve asset quality and enhance management efficiency as well as increasing earning ability the entire Nigerian's banking sector have invested three hundred and ninety billion Naira in the acquisition and deployment of automated teller machines (ATM) across the sector (CBN, 2017). This has necessitated the introduction of Information Technology in order to moderate the association between those bank attributes and financial performance of all the deposit money banks operating on the floor of the Nigerian Stock exchange.

The effectiveness of financial institutions can affect economic growth and development (Dogarawa & Maude, 2014). Economies that have effective and efficient Information Technology system have greater advantage to contribute greatly to the stability of the financial sector (Staikouras, Athanasoglou & Delis, 2006) In the past few decades, the banking sector has undergone series of reforms in its environment with a view to repositioning the sector to be able to play its financial intermediation roles in more effective and efficient ways and consequently increase its performance (Dogarawa & Maude, 2014). The reforms which began with the review of capital base were motivated by the fact that a banking system, which channels financial resources efficiently to deserving economic sector, is a powerful mechanism for development that requires strong capital base (Mhanna & Ammar., 2017). As a key component of the financial system, banks provide the corridor for the floor of resources from surplus to deficit

units of the economy. In the process of discharging this role, banks transform the quality of capital with respect to size, maturity and risk, thereby, reducing the cost associated with obtaining information about both savings and borrowing opportunities and in turn help to make the overall economy more effective and efficient by raising the level of investment and savings, and increasing the efficiency in the allocation of financial funds in the economic system.

Findings from previous researches on the link between bank attributes and financial performance have revealed mixed results (Francis, 2012). This is evidenced in the results of many research work undertaken in different parts of the world (Beatrice & Ndubuisi, 2017; Charles et al., 2018; Dogarawa& Maude, 2014; European Central Bank, 2011; Francis, 2012; Gambacorta, 2001; Ghosh, 2016; Gremi, 2013; Hosny, 2017; Kiganane, Bwisa, & Kihoro, 2012). The studies documented mixed results with regard to relationships between bank attributes and financial performance thereby providing a motivation for the introduction of Information Technology as moderator in the association between bank attributes and financial performance of listed deposit money banks in Nigeria.

Moreover, due to the growing interdependence between bank attributes on the one hand and management information systems (MIS), hardware technology, software technology, and telecommunications on the other, the association is increasing to the point that Information Technology has become an important strategic instrument in Nigerian banking sector operation. This is evident from growth of investment in Information Technology (IT) equipment over the last ten years. For instance, in its bid to improve asset quality and enhance management efficiency as well as increasing earning ability of banking sector, the Nigerian's banks have invested N390 billion in the acquisition and deployment of automated teller machines (ATM) across the country for period from 2004-2012 (CBN, 2013). Also, investments in computer hardware, software and telecommunication equipment has significantly grown over the years. (CBN, 2017). Furthermore, while most of the previous studies have focused on the relationship between ICT investment and bank performance, none of the studies have attempted to investigate the relationship between ICT, bank attributes and bank performance – an approach that is completely different from investigating the same relationship from ICT investment perspective. This new dimension to the investigation is to extend the investigation further for robustness, complementary or confirmatory purposes.

Furthermore, none of the following studies was carried out coveringdata of 2018 financial year in the listed Nigerian deposit money banks or

thereafter. For instance, the studies were conducted as follows: Abubakar et al., (2018) was from 2007-2016; Charles et al. (2018)' was between 2011-2016; Alper and Anbar, (2017) was from 2002-2010; Amahalu, (2017) was between 2010-2015; Mutende et al., (2017) was from 2006-2015; Mhanna and Ammar., (2017), was between 2009-2015; Beatrice and Ndubuisi, (2017) was from 2010-2015; Mwai, (2017), was for 2014; Mongid, (2016) was from 2003-2011; Sahyouni and Wang, (2015) was between 2004-2014; Mulualem, (2015) was from 2010-2014; Atahau, (2015) was between 2003-2011; Dogarawa and Maude, 2014 was between 2005 to 2014; Al-Qudah and Jaradat, (2013) was from 2000-2011; Ongore and Kusa, (2013) was between 2001-2010; Gremi, (2013) was between 2005-2012; Agnes, (2013) was from 2008-2012; Francis, (2012) was from 1999-2006; Kiganane et al., (2012) was between 2009-2011; Musali and Ismail, (2012) was from 2008-2010; Mirzaei and Mirzaei, (2011) was from 1999-2008; Liu and Pariyaprasert, (2011) was between 2008-2011; Kumbirai and Webb, (2010) was from 2005-2009; Athanasoglou and Panayiotis, (2010) was between 1985-2001; and Aniæ et al., (2009) was for the year 2007 only. Therefore, the present study covers the period from 2009 to 2018 which differentiates it from the previous empirical studies, which have provided a period gap for this study to cover.

Finally, most of these studies were conducted in different geographical and business environment which is significantly different from Nigeria in terms of policy implication and recommendation. For example studies such as: Alper and Anbar, (2017) in Turkey; Amahalu, (2017) Arab countries; Mutende et al., (2017) in Kenya; Mhanna and Ammar., (2017) was in Syria; Mwai, (2017) in Kenya; Mongid, (2016) in Indonesia; Sahyouni and Wang, (2015) in Bahrain, Egypt, Syria and Yemen; Mulualem, (2015) in Ethiopia; Atahau, (2015) in Indonesia; Al-Qudah and Jaradat, 2013 in South Africa; Ongore and Kusa, 2013 in kenya; Gremi, (2013) in Albania; Agnes, (2013) in Kenya; Francis, (2012) in sub-Sahara Africa; Kiganane et al., (2012) in Kenya; Musali and Ismail, (2012), in Arab gulf Countries; Liu and Pariyaprasert, (2011) in China; Mirzaei and Mirzaei, (2011) in Middle East; Kumbirai and Webb, (2010) in South Africa; Athanasoglou and Panayiotis, (2010) in Greece ; Aniæ et al., (2009) in Croatia; Therefore, it has become obvious that the above mentioned studies have provided an environmental gap for this study to fill, by examining the moderating effect of IT on the association between firm attributes and performance of listed deposit money banks in Nigerian.

The main objective of the study is to examine the moderating role of Information Technology on the relationship between bank attributes and performance of all the deposit money banks operating on the floor of the Nigerian Stock exchange. Other specific objectives are:

(i) To find out the effect of capital adequacy on the financial performance of listed deposit money banks in Nigeria.

(ii) To examine the impact of asset quality on the financial performance of all the deposit money banks operating on the floor of the Nigerian Stock exchange.

(iii) To investigate the effect of management efficiency on the financial performance of listed deposit money banks in Nigeria.

(iv) To determine the impact of earning ability on the financial performance of listed deposit money banks in Nigeria.

(v) To identify the effect of liquidity on the financial performance of listed deposit money banks in Nigeria.

(vi) To examine the effect of information technology on financial performance of listed deposit money banks in Nigeria.

(vii) To find out the moderating role of information technology on the relationship between banks attributes and performance of listed deposit money banks in Nigeria.

The study deals with the moderating role of ICT on the relationship between Bank attributes and financial performance. Being the deposit money banks as one, among the biggest contributors to the Nigerian economy, this study is restricted to all deposit money banks listed on the floor of Nigerian Stock Exchange (NSE) for the period of ten (10) years, starting from (2009 to 2018). The dependent variable of the study is financial performance, while the independent variables are liquidity, capital adequacy, earnings ability, management efficiency and asset quality and the moderator variable is Information Technology.

This study gains its relevance from the increasingly strategic business activities and attention paid to financial sector, which allows banks to be more strategic in their business approach, and enables them to play its financial intermediation role in an efficient and profitable manner. Also, this study is the first of a few studies in the Nigerian context to examine the moderating role of Information Technology on the link between bank attributes and performance of listed deposit money banks in Nigeria. This would assist the DMBs in shaping their policy on IT investment as it would reveal to them the extent to which it affects their performance together with other attributes and also to provide a guide in formulating policy framework for regulators to examine and evaluate the activities of banks in Nigeria. The banks that are included in the study represent the entire DMBs operating in the Nigerian economy and the role of these banks in shaping the financial and economic future of the country is very significant.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

In this section, related literature on Bank attributes andfinancial performance are reviewed in relation with the hypothesis of the studyand, theoretical framework for the study is also presented.

2.1. Capital Adequacy and Financial Performance

Capital Adequacy is also seen as a determinant of the profitability of banks and a positive relationship should exist between capital management and Bank profits (Beltratti et al., 2013). The theoretical literature has examined the effect of the capital on the financial performance of banks. Most of the studies highlights the role of capital and its management by reducing the probability of closure of insolvency and consequent to the banks on the one hand, and on the other hand, the probability of the potential profitability of banks during the crisis and time normal (Berger &Bouwman, 2013). Empirically, the good management of the capital has been shown be important to explain the financial performance of financial institutions, even if its effects on the profitability of banks is still unclear (Beltratti et al. 2013; Shepherd &Bouwman, 2013; Margaritis&Psillaki, 2010)' also documented that higher capital led to a trend of survival and profits higher for banks. In addition, Al-Musalli and Ismail, (2012); Al-Qudah and Jaradat, (2013); Adkins & Mary, (2013); Beatrice and Pascal, (2017); Chan, Liu, and Sun, (2013); Dogarawa and Maude, (2014); Mongid, (2016) discovered a positive and significant relationship between capital management and profitability of banks. Despite the overwhelming evidence of significant positive relationship between the adequacy of capital and the financial performance of the Bank, the study (Kumbirai & Webb, 2010)' suggested that capital would not have a significant positive relationship with the profitability of a certain limit, subsequently, the relationship would be negative for bureaucratic and other reasons.

In view of the literature discussed on whether capital adequacy has a significant positive relationship with financial performance or not, the following hypothesis is formulated:

H_{01}: *Capital adequacy has no significant effect on financial performance of listed deposit money banks in Nigeria.*

2.2. Asset Quality and Financial Performance

Mhanna and Ammar (2017) undertook research to investigate the impact of bank attributes on the implementation of the budget for the period (2009-2015) of Islamic banks in Syria. Financial performance was the dependent variable measured by the return on assets (ROA) and return on equity

(ROE). However, independent variables are adequacy of owned funds, liquidity, deposit, efficiency, size of the Bank and Syrian crisis. The study used the methods of Panel Data thanks to estimate a fixed effects model. The empirical analysis shows that the size of the Bank has a positive and significant impact on ROA and ROE. While efficiency has a negative and significant impact on ROA and ROE. Also, liquidity and the adequacy of own funds have a significant impact on the ROA to the 10% threshold, but have no significant impact on ROE. While the variables (deposits and crisis) have no significant impact on the ROA and ROE

In the same way, Charles et al (2018) consider the effect of the firm attributes on the profitability of listed companies of consumer goods in Nigeria. The study population consists of twenty-two 22 listed consumer goods companies in Nigeria to December 31, 2016 eighteen of the listed consumer goods companies are selected to form the sample of the study for the period of six years (2011-2016). The study employed multiple regressions as tool for analysis. A hypothesis was formulated and tested for the study; which states that: Firm attributes have no significant effect on profitability of listed consumer goods companies in Nigeria. Secondary data obtained from the financial statements of the companies were analyzed. Panel data techniques (fixed and random effects models) were utilized to examine the effect of firm attributes on profitability and Housman specification test confirmed that random effects model was more appropriate for the study. The results show that firm size, sales growth and leverage have significant effects on profitability. In contrast, firm age and liquidity are not significantly affecting profitability of listed consumer goods companies in Nigeria.

The literature discussed provides some evidence on the nature of association between asset quality and bank profitability. In the light of the above arguments, the following hypothesis is derived:

H_{02}: *Asset quality has no significant impact on financial performance of listed deposit money banks in Nigeria.*

2.3. Management Efficiency and Financial Performance

Mwai (2017) measured the influence of firm attributes on the relationship between customer relationship management practices and performance of large-scale manufacturing firms in Kenya. The population of the study comprised large-scale manufacturing firms that were members of the Kenya Association of Manufacturers (KAM). A descriptive cross-sectional survey was used. The data analyzed was obtained through a structured questionnaire. To test the influence of firm attributes on the relationship

between customer relationship management practices and firm performance regression analysis was used. The findings indicated that the moderating influence of firm attributes on CRM practices and firm performance was only discover to be statistically significant on non-financial performance and not statistically significant on the association between CRM practices and financial performance. Further, the interaction of CRM practices and firm attributes on non-financial performance was statistically significant.

Hosny (2017) used the dataof European Investment bank, EuropeanBank for Reconstruction and Development and, World Bank (EIB/EBRD/WB) joint investigation level, covering more than 6,000 private companies in eight countries of the Middle East and North Africa. The objectives of the study is to; (i) identify the relationship between firm attributes and their perception of the effect of policy instability on their operations and (ii) find out whether political instability has a negative impact on the performance of the company. Using binary and ordered probit/logit models, the researcher believes that exporters and larger companies are more likely to face political instability as an obstacle to their operations. Also, with the help of OLS and linear regression models, the study concludes that the perception of political instability is negatively correlated with the performance of company and after correction for endogeneity, sure it can even have a negative causal effect on sales of the companies and the growth of employment, everything else held constant.

Sincethe prior evidence is inconclusive on weather management efficiency leads to firm's performance, the following hypothesis is formulated to investigate this issue further in a Nigerian context:

H_{03}: *Management efficiency has no significant effect on financial performance of listed deposit money banks in Nigeria.*

2.4. Earning Ability and Financial Performance

Leverage is another crucial internal element of financial performance of the Bank. This is because of its business leverage. Banks are financial institutions leverage that is in the business to facilitate leverage for others through their role of financial intermediation. Leverage refers to the extent to which an organization, Bank or non-bank finance assets with debt rather than equity. Leverage in the banking sector is much higher than in any other sector or sectors of the economy. According to Beltratti et al., (2013)' while the leverage ratio average overall of 10 of the largest in the world registered non - financial companies is the order of 50-50 for stocks and bonds, a joint report in the banking sector is 95: 5 before h ORS-balance

sheet exposures are added. While leverage has been theoretically demonstrated to be instrumental to explain the financial performance of banks, its empirical effect is inconclusive. Jenevive and Anyanwaokoro (2017) documented a negative association between the lever and the financial performance. On the contrary, Al-Qudah and Jaradat (2013); Dogarawa and Maude (2014); Fooladi (2012) point out the positive effect of leverage on profitability.

Similarly, Abdullahi (2016) investigate the impact of firm attributes governance mechanisms on financial performance of listed building material companies in Nigeria. study has five hypotheses were formulated and generalized use of squares multiple regression for secondary data analysis of companies Sample annual reports and accounts for the period from 2005 to 2014. The study reveals that the company's size and considerable impact on the financial performance of companies in Nigeria for building materials. The study also discover that stock liquidity and operational and management have no any significant impact on the financial performance of companies. The study also discovers that liquidity, operating expenses and managerial shareholdings have no significant effect on the financial performance of the firms. In view of the findings, it is recommended among others that the management of listed building materials firms should reduce the level of leverage in their capital structure and focus more attention on equity financing, and decrease their assets and reduce the scope of their activities in order to decrease their size. The regulatory authority should determine the minimum and maximum percentage of firms' equity to be owned by management of listed firms in Nigeria.

Okoth and Gemechu (2013) study the factor that determines the financial performance of commercial banks in Kenya for the period between2001-2010. The independent variables of the study were adequacy of capital, asset quality, effectiveness of management, earning ability, liquidity management, growth rate of GDP and inflation. While, the dependent variables are performance proxy by return on Asset (ROA), return on equity (ROE) and Net interest margin (NIM). The panel data of the study were analyses using multiple linear regression models and generalized least square on. The results indicate that the Bank internal factors have a positive and significant effect on the performance of commercial banks in Kenya. In addition, the study showed a significant impact of earning ability on the performance of commercial Banks in the country.

In view of the above controversy on the relationship between earning ability and performance, the following hypothesis is formulated to

determine the impact of earning ability on the financial performance of listed deposit money banks in Nigeria.

H_{04}: Earnings ability has no significant influence on financial performance of listed deposit money banks in Nigeria.

2.6. Liquidity and Financial Performance

Abubakar *et al.,* (2018) investigated the impact of firms Attributes and Performance of Insurance firms that are listed on the floor of Nigerian Stock Exchange. The study used secondary data which were collected from the annual reports of Insurance companies in Nigeria for the period of 2007 and 2016. Regression analysis was conducted to test the hypothesis in addition to some post estimation and diagnostic tests conducted so as to enhance the validity and reliability of the findings. The results of the study revealed that the liquidity and age are statistically having negative impact on the financial results of the insurance companies in Nigeria. The researcher recommends that firms are to convert part of their cash and its equivalents to the means of production so as to improve their overall financial performance.

Kumbirai and Webb (2010) conducted a study to investigate the financial performance of banking sector in South Africa for the period between 2005-2009. The dependent variables of the study are profitability, liquidity and credit quality, while financial ratios are used as predictor variables. The result indicates that the general performance of South African banking sector has increased significantly in the first two years of the analysis. However, a significant change in the trend is noticed from the beginning of the global financial crisis in 2007, reaching its peak during the 2008-2009 year. This has resulted in the decline in profitability, low liquidity and credit quality in the banking sector of South African.

A discussion of the literature provides some evidence on the nature of association between asset liquidity and banks performance. In the light of the above arguments, the following hypothesis is derived to identify the effect of liquidity on the financial performance of listed deposit money banks in Nigeria:

H_{05}: Liquidity has no significant influence on financial performance of listed deposit money banks in Nigeria.

2.7. Information Technology and Financial Performance

The benefits of application of ICT in the enhancement of banking services is not only limited to cost reduction benefits alone, the innovation is discover

also to have significant contribution to giving access to customers residing outside the branch network and create opportunities for effective cross – selling, amongst others (Hassan, 2013).

The relationship between investment in ICT and financial performance has received massive attention from researchers in various countries over the years. The results from these studies have been markedly conflicting. Thus, whether the level of investment in ICT actually brings real benefits to the banks or not is still a matter of concern in academic community. This is because while some posit a positive relationship between ICT investment and performance (Jenevive&Anyanwaokoro, 2017; Hassan, 2013; Jalagat, 2017; Rahman et al., 2017)' some argue to the contrary (Ashrafi & Murtaza, 2008). With the use of ICT, the time constraint, and distance barrier to accessing relevant information is eliminated or drastically reduced hence it improves coordination of activities within organisations (Tarafdar et al., 2010).

Considering the nature of its operations and services, the banking sector is relatively amenable to innovative technologies (Alex, 2015). Rahman et al. (2017) argue that the development of electronic communication channels has had a profound impact on the banking industry. Evidence from previous empirical studies indicates that ICT has a positive impact on banks' financial performance; owing to the multitude of benefits it offers its users and providers alike. Such studies include (Binuyo et al., 2014; Jalagat, 2017; Mohamad et al., 2010; Sathye, 2005; Turban, 2005). The most important improvement arising from the use of ICT in the enhancement of operations and activities of commercial banks hinged on the reduction in overhead expenses. Specifically, the costs related to the maintenance of physical branches, marketing and labor can be cut appreciably (Mohamad et al., 2010).

Finally, since the prior evidence is inconclusive on the impact of information technology on bank's performance, and onwhether the information technology has a moderating role on the relationship between bank attributes and financial performance of listed deposit money banks in Nigeria, following hypothesis is formulated to investigate this issue further in a Nigerian context:

H_{06}: *Information technology has no significant effect on financial performance of listed deposit money banks in Nigeria.*

H_{07}: *Information Technology has no significant moderating effect on the relationship between banks attributes and financial performance of listed deposit money banks in Nigeria.*

The two theoretical explanations that anchored the variables of this study are agency theory and technology acceptance model theory. The theories provided a framework and a linkage between the banks attributes as a mechanism for monitoring bank performance and the Information Technology infrastructure within the concept of financial performance. The Agency Theory was based on information asymmetric originated by Jensen and Meckling (1976). This theory assumes that manager and shareholders are in principal - agent relationship in which case, the shareholders are the main business owners and managers are the agent (Ibrahim & Hassan, 2015). Managers as agents are supposed to monitor business in a more profitable way to maximize the value of shareholders such as principals and to protect the interests of other stakeholders regardless of the circumstances surrounding. While The Technology Acceptance model (TAM) is the theory that models how users accept and use technology. The model indicates that when users are presented with new technology, a number of factors affect their decision on how and when to use them. New information technologies cannot improve organizational efficiency if they are not accepted and used by potential users. The Technology Acceptance Model (TAM) is one of the most successful measures to effectively use the computer among practitioners and academics (Davis, 1989). The TAM is consistent with the theory of Rogers, (1983) on the propagation of innovation where the dependence of technology is important to the variety of factors, including; Comparative advantage and ease of use. Two special beliefs are addressed through the theory; perceived usefulness and perceived ease of use. Fred Davis knows the perceived utility as a "The extent to which a person believes that the use of a particular system would improve his or her professional performance ". Perceived ease of use (peou) – Davis knew this as "the extent to which a person believes that using a particular system would be a free effort" (Davis 1989). TAM tries not only to predict, but also to explain how to help researchers and practitioners determine why a particular system can be unacceptable and follow the necessary steps.

3.   METHODOLOGY AND MODEL SPECIFICATION

Predicated on the objectives of this study, it is believed that this study is quantitative in nature. Therefore, the worldview was post-positivism paradigm and research design is quasi experimental and the study approach is quantitative approach. The study consists of fifteen (15) DMBs quoted in the Nigerian Stock Exchange as at 31st December, 2018. The sample size is all the banks in the population constituting 100% sample using Census sampling technique. Secondary source of data was used to

Figure 1: Study Framework
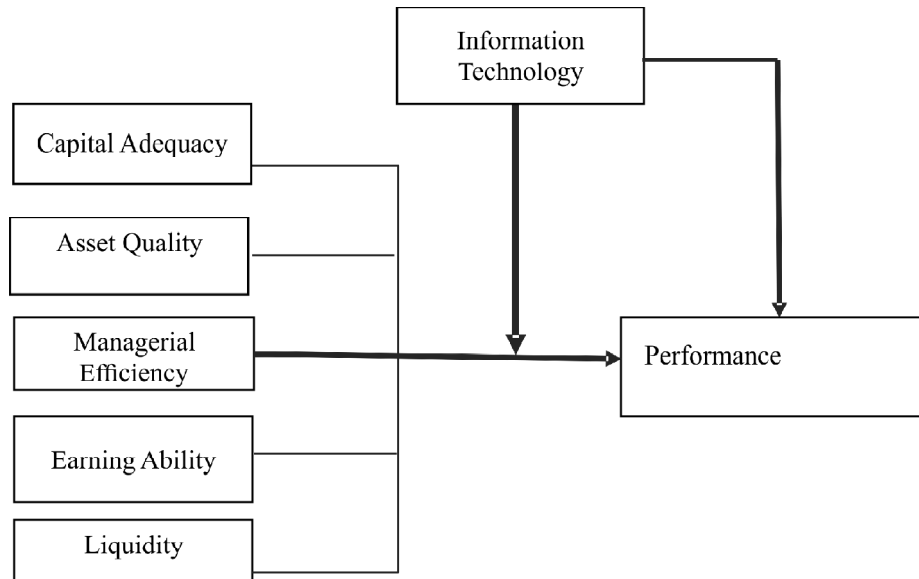
extract information from the annual report and accounts of the banks from 2009 to 2018.Multiple linear regression (two stage least square) were used as a technique of data analysis. The justification for this technique was that it has the ability to test the statistical association between two or more variables and allows for the prediction of the expected outcome. However, effort was made to ensure the validity, reliability and robustness of the statistical results. The panel attributes of cross-sectional and time series posted challenges with regard regression; for instance, Deposit Money Banks exhibit many similarities and dissimilarities, which usually cause cross-sectional dependence and heterogeneity, and hence distort estimation.

In view of this, the study checked the problems of normal distribution of the data, heteroskedasticity and collinearity. Skewness and kurtosis test for normal data was employed to check whether the variables of the study came from a normally distributed population. Moreover, residual diagnostic tests are also conducted using scatter graph test to ensure the residual follow the normal distribution assumption, and the Breuch Pagan/Cook-Weisberg Test for heteroskedasticity to check whether the variance of the residuals is constant (Homoscedastic) or not. Lastly, to check the collinearity problem, Variance Inflation Factor (VIF) and Tolerance Values (TV) are used. When these problems are addressed, the model of the study produces estimators that are Best Linear Unbiased Estimators (BLUE). However, to come out with results consistent with the panel data attributes,

Fixed Effect (FE) and Random Effect (RE) regression models are employed alongside the pooled Ordinary Least Squares (OLS) regression. The FE regression model concentrates on differences within individual companies. Also, Hausman test is conducted to determine which among the two models is more efficient, and a further test of random effect is applied to choose between the RE and OLS, which proved that OLS is the most appropriate for the study.

Table 1
Variable Measurement

S/N	Variables	Measurement	Sources
1	Return on Equity	Net Income / Shareholder Equity	Aebi et al., 2012
2	Capital Adequacy	Shareholders' equity / Total Assets	Liu and Pariyaprasert, 2011
3	Asset Quality	loan / Total Asset	Liu and Pariyaprasert, 2011
4	Managerial Efficiency	Total cost / Total Income	Mirzae, 2012
5	Earnings Ability	Net-interest income/Total Interest income	Liu and Pariyaprasert, 2011
6	Liquidity	Liquid asset/ Total Asset	Athanasoglou et al, 2005
7	Information Technology	Log of Expenditure amounts on IT	Hassan et al, 2013

Sources: Develop by the researcher (2019)

Totest the hypotheses formulated, the following regression models are specified as follows:

$$ROE_{it} = \beta_0 + \beta_1\,CA_{it} + \beta_2 AQ_{it} + \beta_3 ME_{it} + \beta_4 EA_{it} + \beta_5 L_{it} + \beta_6 IT_{it} + \mu \qquad (i)$$

$$ROE_{it} = \beta_0 + \beta_1\,CA_{it} + \beta_2 AQ_{it} + \beta_3 ME_{it} + \beta_4 EA_{it} + \beta_5 L_{it} + \beta_6 IT_{it} +$$
$$\beta_7 CA_{it}{}^*IT_{it} + \beta_8 AQ_{it}{}^*IT_{it} + \beta_9$$

$$ME_{it}{}^*IT_{it} + \beta_{10} EA_{it}{}^*IT_{it} + \beta_{11} L^*IT_{it} + \mu \qquad (ii)$$

Where:

ROE   = Return on equity

β_0 = Intercept

β_1–B_6 = Coefficient of the Parameters

CA   = Capital Adequacy

AQ   = Asset Quality

ME   = Managerial Efficiency

EA   = Earnings Ability

L   = Liquidity

IT   = Expenditure on IT

μ   = Term error

t   = time

I   = firm

4. RESULT AND DISCUSSIONS

This section covers the presentation, analysis and discussion of the results of the study. Results from the descriptive statistics of all the variables are presented, the correlation matrix and regression results are presented and discussed. Finally, the section closes with the implication of finding.

4.1. Descriptive Statistics

Table 2
Descriptive Statistics of the Variables

VARIABLES	Min	Max	Mean	SD	Skewness	Kurtosis
ROE	-3.9432	1.228	.0439674	.4587057	-5.784453	48.13767
CA	-1.528433	.453	.2755097	.1763221	-8.026403	81.12567
AQ	.0572	.642	.432577	.1073504	-.8887764	3.823235
ME	.2819	.85	.608706	.1100456	-.3837448	2.829087
EA	.18581	.751	.6296297	.2410957	1.549841	7.201816
L	.03111	.6121	.6906551	.155813	1.02298	12.70891
IT	-24.3580	10.43045	6.038613	5.258788	-1.93547	9.518640

Source: STATA Output

Table 2 shows the minimum and maximum values of Return on equity (ROE); this signifies that the data deviate from both side of the mean value by 0.46 approximately. This implies that there is a bit dispersion of the data from the mean, because of the value of standard deviation closed to the mean. The kurtosis also suggests that majority of the data are higher than mean.Similarly, the coefficient of skewness also indicated that the data is negatively skewed, and thus, the data did not meet the symmetrical distribution assumption.

The results from the table also indicate that the minimum and maximum values of capital adequacy (CA), Asset quality (AQ), Management efficiency (ME), Earning ability (EA), liquidity (L), and the moderator variable that is Information Technologyrespectively. Their mean values and standard deviationimplies that there is dispersion from the mean value in the banks sample. The coefficient of Skewness implies that the data is negatively skewed, and thus, the data does not meet the symmetrical distribution assumption. The kurtosis values also show that most of the values are higher

than the mean, and thus the data did not meet the Gaussian distribution assumption.

4.2. Correlation Matrix

Table 3
Correlation Matrix of the Dependent and Independent Variables

Variables	ROE	CA	AQ	ME	EA	L	IT
ROE	1.0000						
CA	0.0991	1.0000					
	(0.2474)						
AQ	0.1265	0.5315	1.0000				
	(0.1391)	(0.0000)					
ME	0.1224	0.1534	0.0321	1.0000			
	(0.1527)	(0.0724)	(0.7090)				
EA	0.0795	-0.0628	-0.3259	-0.0724	1.0000		
	(0.3543)	(0.4646)	(0.0001)	(0.3990)			
L	-0.0793	-0.4540	-0.0131	-0.0957	-0.0269	1.0000	
	(0.3552)	(0.0000)	(0.8788)	(0.2641)	(0.7539)		
IT	0.3263	-0.0011	0.0969	-0.0226	-0.2660	-0.0812	1.0000
	(0.0001)	(0.9901)	(0.2581)	(0.7922)	(0.0016)	(0.3438)	

Source: STATA Output P-Values in Parentheses

Table 3 presents the correlation results between predictor variables (Capital Adequacy Asset Quality, Management Efficiency, Earning Ability and Liquidity) and interaction terms Information Technology) and the Return on Equity (ROE) of the listed Deposit money banks in Nigeria. The result shows that there is insignificant positive relationship between Return on equity (ROE) and Capital adequacy (CA) from the correlation coefficient of 0.0991, at any level of significance, (p-value 0.247).

From the table 3 also the result indicates that there is no positive relationship between Return on equity (ROE) and Asset Quality (AQ). This implies that the more assets are added into the banking sector, the less return on equity for the shareholders of listed deposit money banks in Nigeria. The table also shows that there is a positive relationship between management efficiency (ME) and Return on equity (ROE) .This suggests that return on equity of listed deposit money banks in Nigeria increases with increase in management efficiency. The results from the table 3 also indicate that there is a significant positive relationship between return on equity (ROE) and earning ability of DMBs in Nigeria. This result suggests that return on equity of listed DMBs in Nigeria will not increases with antagonistic effect of earning ability which is statistically insignificant at

any level of significance. In addition, Table 3 shows that there is a negative relationship between return on equity (ROE) and liquidity of listed DMBs in Nigeria. This result suggests that return on equity of listed DMBs in Nigeria decreases when the level of liquidity is increased.

In addition, the results also indicate that there is significant positive relationship between Return on equity (ROE) and the moderator variable of Information Technology (IT). This implies that an increase in investment in Information Technology equipment in the DMBs, the more return on equity for the shareholders of listed deposit money banks in Nigeria.

Following the analysis of the relationships between predictor variables (Capital Adequacy, Asset Quality, Management Efficiency, Earning Ability, liquidity) and the moderator Information Technology of the listed DMBs in Nigeria, the study presents and discusses the post-estimation test as well as the regression results of the model of the study from which the hypotheses of the study are tested in the following section and the relevant inferences drawn about the relationship between predictor variables.

4.3. Post-Estimation Test

Table 4
Post-Estimation Test

Test	Result	P-Value
Mean VIF	1.43	
Hettest Chi2	98.98	0.000
Hausman Chi2	53.17	0.000

Source: STATA Output

Multicollinearity test is conducted to check whether there is a correlation between independent variables which will mislead the result of the study. The variance inflation factor and the tolerance values are good measures of evaluating multicollinearity. The multicollinearity test using the variance inflation factor (VIF) pointed out that excessive correlation does not exist as all the factors are above 1.0 and all the tolerance values are below 10. The mean of the VIF stood at 1.43.

Heteroskedasticity is conducted to check whether the variability of error terms is constant or not. The result of the test reveals that there is a presence of heteroscedasticity because the hottest chi2 (1) is 9.98 with a probability of 0.0000 which is significant at 1% indicating that the data are not homoscedastic but heteroscedastic. This therefore suggests that the original OLS regression will not suit the study.

Hausman specification test is also conducted to guide select between fixed effect and random effect model. The result indicated that fixed effect model should be interpreted because the Hausman test is significant at 1% level of significant (0.0000).

4.4. Unmoderated and Moderated Regression Result

Table 5
Unmoderated and Moderated Regression Result

Variables	Coefficient	t- value	p-value
CA	-0.032929	-0.11	0.911
AQ	0.7322444	1.64	0.104
ME	0.5914377	1.76	0.080
EA	0.4636261	2.79	0.006
L	-0.0948297	-0.34	0.732
IT	0.032717	4.53	0.000
CAIT	-0.2270136	-2.28	0.024
AQIT	0.0967583	1.5	0.294
MEIT	-0.0622849	-0.70	0.486
EAIT	0.1162889	3.45	0.001
LIT	-0.0674182	-1.16	0.249
R^2			0.37
F-Statistic			8.06
Prob. of F			0.0000

Source: STATA Output

4.4.1 Capital Adequacy, Information Technology and Financial Performance

Before the introduction of IT as moderator, capital adequacy and performance has a beta coefficient of -0.032 which is not significant given the P-value of 0.911. However, after the introduction of the moderator the relationship dwindled showing a beta coefficient of -0.227 and a P-value of 0.024 which is significant at 5% level of significance. The result indicated that with the introduction of Information Technology as moderator, the relationship between capital adequacy and performance of listed DMBs in Nigeria has significantly improved. This is may be as a result of Standardization in IT risk management practices and compliance with institutional IT risk policy in the Bank's operations at all levels; and implementing cost effective solutions for IT risk mitigation strategy. The result, therefore, provides an evidence of rejecting the null hypothesis 7 of the study which states that Information Technology has no significant moderating effect on the relationship between Capital adequacy and financial performance of listed deposit money banks in Nigeria.

4.4.2. Asset Quality, Information Technology and Financial Performance

Asset quality and performance without the moderator has a beta coefficient of 0.732 and a P-value of 0.104 which is statistically not significant at all level of significance. When the moderator was introduced the result shows a beta coefficient of 0.096 which is still not significant at any level of significance, indicated by a P-value of 0.294. The result in table 4.5 reveals that the relationship between asset quality and performance did not improve after the introduction of Information Technology as a moderating variable given the significant level above. This shows that Information Technology has no role to play on the association between Asset quality and performance of listed deposit money banks in Nigeria. This may be as a result of lack of continuous development of IT risk management expertise within the banking asset and liability management system as well as lack of proactive risk management approach within the entire banking system. The result therefore provides an evidence of failing to reject the null hypothesis 8 of the study which states that Information Technology has no significant moderating effect on the relationship between asset quality and financial performance of listed deposit money banks in Nigeria.

4.4.3. Management Efficiency, Information Technology and Financial Performance

Management efficiency and performance has a positive and insignificant relationship before the introduction of the moderator; this can be deduced from the beta coefficient of 0.591 and P-value of 0.080, which was not significant at any level of significant. But with the introduction of interacting variable, the result remains negative and insignificant as indicated by beta coefficient of -0.062 and a P-value of 0.486. This signifies that Information Technology has an undue influence on the relationship between management efficiency and financial Performance of listed DMBs in Nigeria. The possible explanation for the observed relationship here is that the costs associated with the deployment of IT infrastructures, which includes electronic devices, continuing maintenance, depreciation and employees training are higher than the revenues generated from providing the services in the Nigerian DMBs, as can be obviously noticed by the enormous amounts spend on IT infrastructure. The result therefore provides an evidence of failing to reject the null hypothesis 9 of the study which states that Information Technology has no significant moderating effect on the relationship between Management efficiency and financial performance of listed deposit money banks in Nigeria.

4.4.4. Earnings Ability, Information Technology and Financial Performance

Table 4.5 shows that before the moderator was introduced, Earning Ability and Performance has a positive and significant relationship which is observed by the beta coefficient of 0.463 with a P-value of 0.006. When the moderator was introduced, the result maintains the same statistically significant level as can be deducted from a beta coefficient of 0.116 and a P-value of 0.001. This signifies that Information Technology has positive and significant moderating role on the association between earning ability and performance of listed deposit money banks in Nigeria. Thus, the result is not surprising as it is within the researchers prior expectations that the more IT infrastructures deploy to the banks credit risk analysis and risk mitigation, the less they recorded non-performing loan and the more performance of the bank will improve. This has provided an evidence of rejecting the null hypothesis 10 of the study which states that Information Technology has no significant moderating effect on the relationship between Earning ability and financial performance of listed deposit money banks in Nigeria. Thus, validating the technology acceptance model theory.

4.4.5. Liquidity, Information Technology and Financial Performance

Before the introduction of the moderator, Liquidity and performance has a negative and insignificant relationship; this can be deduced from a beta coefficient of -0.094 and a P-value of 0.732 which is not significant at any level of significance. However, even with the introduction of Information Technology as the moderator variable, the relationship remains unchanged. This can be deduced from the beta coefficient of -0.067 and a P-value of 0.249 which shows the presence of a negative and insignificant relationship. The result signifies that Information Technology has an insignificant influence on the relationship between liquidity and Performance. The possible explanation for the observed relationship here is that there exist a lacks of synergy between the bank liquidity, risk management process and Information Technology infrastructure in the listed deposit money banks in Nigeria. The result therefore provides an evidence of failing to reject the null hypothesis eleven of the study which states that Information Technology has no significant moderating effect on the relationship between liquidity and financial performance of listed deposit money banks in Nigeria.

5. CONCLUSION AND RECOMMENDATIONS

Based on the findings of the study, it is concluded that there isa strong negative relationship between capital adequacy, Information Technology

and performance of listed deposit money banks in Nigeria. Therefore, massive investment in Information Technology does not in any way add value to the relationship between capital adequacy and performance of listed deposit money banks in Nigeria. On the other hand, the study concluded that there is no relationship between asset quality, Information Technology and performance of listed deposit money banks in Nigeria. In view of that, combining IT infrastructure with asset quality in banking operation does not improve the performance of listed deposit money banks in Nigeria.However, the study also concludes that Information Technology has an undue influence on the relationship between management efficiency and performance of listed deposit money banks in Nigeria. Additionally, the study concluded that Information Technology has strongly moderated the association between earning ability and performance of listed deposit money banks in Nigeria.Finally, Information Technology has an undue influence on the relationship between liquidity and performance of listed deposit money banks in Nigeria. Therefore, this indicates that there is lack of synergy between the bank liquidity risk management process and Information Technology infrastructural facilities.

In line with the findings and conclusion of the study, it is recommended among others that, the relevant regulatory authorities such as Central Bank of Nigeria should ensure the effectiveness of the IT risk management and security plan as well reviewing key IT risk and security issues relevant to Bank's IT processes and systems.The board information technology strategy committee of the respective banks should provide a strategic direction for information technology issues so as to have more focused policy regarding IT risk management within the banking asset and liability management system. More so, the board and management of listed deposit money banks in Nigeria should ensure that vulnerability assessments of new technology are performed as well as providing effectivemonitoring mechanism for improvements on IT service delivery.Since information technology has a strong moderating role on the association between earning ability and performance of listed deposit money banks in Nigeria, the board should establish a balance in overall IT investment portfolio in terms of risk, return and strategy for better result ahead.

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