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OPERATIONAL RISK MANAGEMENT AND FINANCIAL STABILITY OF DEPOSIT MONEY BANKS IN NIGERIA

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ABSTRACT: *The series of financial crisis that have been experienced in both the developed and developing countries showed the importance of having well-functioning financial systems as financial crises directly affect the health of a country's economy. Many banks had collapsed or experienced serious financial constraints both in Nigeria and the rest of the world due to their continuous exposure to severe operational risk events and fraudulent actions and these have continued to be major threat to the banks. This study investigated the effect of operational risk management on financial stability of deposit money banks in NigeriaThe study employed ex-post facto research design. The population comprised twenty-two licensed deposit money banks in Nigeria as at September 30th, 2018. A total sample of eleven deposit money banks were selected using convenient sampling method and data covering 2009 to 2018 were sourced from the audited and published financial statements of these sampled deposit money banks. Certification of the financial statements by external auditors and regulators and the approval by the board of directors confirm the reliability of the data. Data were analysed using descriptive and inferential statistics.The results showed that operational risk management had negative significant relationship with financial stability of the selected banks in Nigeria ($F(3,106)= 24.46$, Adj. $R2= 0.4091$, $p < 0.05$). Specifically, Non-performing loan to total loan ratio, cost to income ratio and total loan and advances to total deposit ratio have significant relationship on the variables of financial stability of deposit money banks in Nigeria proxied by Capital Adequacy Ratio ($F(3,106)= 18.23$, Adj. $R2= 0.316$, $p < 0.05$), Return on Equity ($F(3,106)= 22.52$, Adj. $R2= 0.389$, $p < 0.05$) and Liquidity Ratio ($F(3,106)= 22.45$, Adj. $R2= 0.389$, $p < 0.05$)The study concluded that operational risk management influences the financial stability of selected deposit money banks in Nigeria. The study recommended, among others, that banks should improve their operational risk management practices and policies in order to maintain sound capital adequacy and sustainable financial stability.*

KEYWORDS: capital adequacy ratio, cost to income ratio, deposit money banks, financial stability, liquidity ratio, operational risk management, non-performing loans, return on equity.

INTRODUCTION

It is generally believed that the financial sector of any nation contributes significantly to the growth and development of its economy through the financial intermediation roles. This position was supported by Akpasung and Gidigbi (2014) when they posited that financial institutions perform intermediation role by helping to channel resources from the surplus idle sector to the deficit real sector of the economy thereby facilitating productive activities in the economy and this

intermediation role is a veritable process for investment, growth and development. Again, Duong, Huyen and Huong (2018) opined that the financial system, through banking, plays a vital role in economic development and as such the banking sector must be robust to ensure financial stability.

Financial systems stability is not only essential for the financial institutions but also very important and crucial to the growth and development of any economy because financial crisis could lead to significant reductions in bank credit and drop in investment and growth (Fajembola, Rahman & Md-Rus 2018). Healey, Mosser, Rosen and Tache (2018) defined financial stability as the ability of the financial system to facilitate and enhance economic processes, manage risks, and absorb shocks. It is a condition in which the mechanisms of the economy for pricing, allocating, and managing financial, credit, liquidity, counterparty and market risks are functioning well enough to contribute to the performance of the economy (Muriungi, Waithaka, Were & Muriuki 2017). According to Dugguh and Diggi (2015), the consequences of bank failures are numerous and very unpalatable, not only to the depositors but also the investors, the general banking public and indeed, the entire economy. They concluded that bank failures, in general, impair financial intermediation and efficient allocation of resources, retard individual well-being and economic progress. Zeb (2009) posited that banking crisis affected all sectors of the economy especially production sector and highlighted some of the effects to include rising unemployment, cut down in the working hours, fall in consumer spending, tight credit conditions, lower financial wealth and decline in business and investment. The various financial crisis that have been experienced in both the developed and developing countries showed the importance of having well-functioning financial systems as financial crises directly affect the health of a country's economy (Tursoy, 2018).

The financial intermediation role of financial institutions exposes them to the risk of failure with losses capable of eroding public confidence and trust in the banking system and consequently affecting other sectors of the economy as demonstrated in the global financial crises which originated from United States of America in 2008 and spread to the rest of the world (NDIC 2017). Tursoy (2018) also emphasised the riskiness of banking business and attributed it to the financial intermediation role that financial institutions play between the surplus unit and the deficit unit of the economy and these risks are usually managed by banks as part of their normal operations. Owojori, Akintoye and Adidu (2011) stated that the nature of banking business is high risk; that is, the banking business is entirely exposed to risk when compared with other types of businesses. Arising from the crystallisation of one or a combination of these risks, many banks in Nigeria have become financially constrained and subsequently gone under. For instance, before the 2014 reforms on bank's recapitalisation, about thirty-five banks have been distressed and subsequently liquidated due to issues that bothered on credit risk arising from inability to repay on default loans, market risk due to unfavourable movement in exchange and interest rate, operational risk caused by weak risk management practices, weak corporate governance, inexperienced personnel, ineffective operating policies and procedures, ineffective internal audit and liquidity risks arising from the inability of the banks to meet their deposit obligations to customers as and when due (NDIC 2014).

Events happening in the banking sector over the years and various studies by scholars like Mohammed (2012), Kwaku (2015) and Bassey, Tobi, Bassey and Ekwere (2016), among others, have shown that weak or ineffective risk management could lead to failure of financial institutions. Hempel and Simonson (1998) observed that inadequate risk management, as characterised by poor lending practice, was one of the major causes of these failures and these events have created the need for banks to take the role of risk management very serious and important. Without doubt, all banks are faced with substantial risks of credit risk, liquidity risk, operational risk, market risk, foreign exchange risk, and interest rate risk, along with others risks, which may possibly intimidate the survival and success of the banks' performance (Dugguh & Diggi, 2015). Failure to sufficiently manage these risks exposes deposit money banks not only to losses, but may also threaten their survival as business entities, thereby jeopardizing the stability of the financial system (CBN 2014). In financial institutions, risk management is very important in decision making for management because risk management must meet certain objectives to keep the business running efficiently (Harelimana, 2017). Singh and LaBrosse (2012) agreed on the importance of managing risks in the banking sector when they posited that banks, like other businesses, will collapse and the probability of this happening is higher when risks in a particular banking concern are not managed appropriately. Zakaria (2017) also argued that efficient risk management measures are paramount in building robust and sound financial systems. IMF (2019) also supports this assertion when it stated that the series of financial crisis experienced in 1990s and 2008 highlighted the importance of effective systemic risk monitoring and management and that explained the reason International Monetary Fund has stepped up efforts to help countries implement policies to support sound financial systems.

While credit risk, liquidity risk and market risk seem to be the major risks the financial institutions face, there are other major risks which are so critical to the financial stability of the banks and which if not properly managed could lead to bank failure and one of these risks is operational risk. Prabhu and Shankar (2017) explained that banks, by tradition, had paid attention to credit and market risk management with only limited resources being allocated to operational risk management until when operational losses started increasing significantly over the years which has prompted regulators and banks to take a closer look at operational risk management. De Jongh, De Jongh, De Jongh and Van Vuuren (2013) explored the role of operational risk in the 2007/2008 financial crisis and the factors that gave rise to the crisis. The authors concluded that although the events leading to the financial crisis were largely regarded as a credit crisis but operational risk factors played a significant role in driving its duration and severity of the impact and he suggested that management of operational risk should be improved. This position was also shared by Zaman and Ali (2017) that credit and liquidity crisis and the failure of financial institutions across the world in 2008 was caused by improper management of operational risk. Prior to issuance of the Basel II Accord in 1999, not much importance and prominence were given to operational risk in financial institutions. The general belief then had always been that financial institutions were only exposed to credit risk. However, with the advent of the failure and fraud cases in some banks due to exposure to operational risk events, financial institutions and regulatory bodies started to give attention to operational risk. As opined by Knežević (2013), most of the cases of bank failure were originated by internal frauds or inadequate process and procedures which encouraged employees

to get involved in activities that exposed banks to higher risk in order to achieve personal gains and he gave an example of operational risk events on LIBOR fraud case that was discovered in the summer 2012 which led to loss of about $1.5 trillion to clients and two big banks, Barclay bank and Swiss based UBS were fined with $450 million and $1.5 billion for manipulating with LIBOR.

Operational risk is embedded into the fabric of every organization and effective management of the risk will increase visibility to material and emerging losses across the front line operations while encouraging more informed risk taking, improved product performance, greater brand recognition and sustainable financial results (Deloitte 2017). According to Epetimehin and Fatoki (2015), managing operational risk is becoming an important element of sound risk management in modern day banks in the wake of phenomenal increase in volume of transactions, high degree of structural changes and complex technological support systems and the Central Bank of Nigeria expects all Nigeria banks and other financial institutions to strengthen their operational risk management system thereby bringing more efficiency, transparency, profitability and sustainability into their operations. Integrating operational risk management strategy, processes and tools into organizational goals will lead to improved product performance, greater brand recognition, and assist in delivering sustainable financial results (Deloitte 2017). This explains the reason financial institutions have started establishing special structures and control processes designed mainly for operational risk (Dejan & Jovo, 2013). Many banks have committed a lot of money in trying to establish framework to manage operational risk; modern risk management therefore requires every ones' participation either through strategic plan or within departments to access the risk scope, so as to attain the business goal Kuriah (2016). Institutions now have to manage operational risk on purpose and within the framework of the quantity of risk they are prepared to accept in quest of their strategic objectives and this depend on the size of a firm's operational risk appetite (PWC 2014 as cited in Kuriah 2016).

Therefore, it is imperative for all stakeholders, especially the board and senior management, in financial institutions to focus more on the effective management of operational risk. This study aims to determine the effect of operational risk management on the financial stability of banks and how the banks can effectively manage and mitigate the risk to the bearest minimum.

Statement of the Problem

Globally, there has been increasing concern over the effect of operational risk on banks. Many banks had collapsed or experienced serious financial constraints due to their continuous exposure to severe operational loss events and fraudulent actions. According to Teply (2012) financial institutions have experienced several large operational loss events in the past years including scandals in JPMorgan Chase & Co. in 2012 (USD 6 billion), UBS in 2011 (USD 2.3 billion), Societe Generale in 2008 (USD 7.3 billion), Allied Irish Bank in 2002 (USD 700 million), Sumitomo Corporation in 1996 (USD 2.9 billion), Barings Bank in 1995 (USD 1 billion) and Orange County in 1994 (USD 1.7 billion) and during the US subprime mortgage crisis in 2007, when mortgage frauds became serious issue. Again, operational risk led to the failure and subsequent closure of First NBC bank in 2017 and this failure of the bank cost the Federal Deposit Insurance Corporation (FDIC) about $1 billion and also Enloe state bank, with deposit worth over

$31m, was closed in 2019 due to fraud (Khandelwal 2019).
Neary (2014) showed how human error and programming bugs caused technical problems in Credit Agricole which led to double payments of 350,000 resulting in $4.6Billion loss. Also, Ogunbadewa (2013) showed that HSBC UK, was sanctioned with huge fine of $1.9Billion due to the failure of the bank to manage and govern anti money laundering practices. Suren (2016) also highlighted instances of operational loss incidences in some of financial institutions like Lloyds Banking Group and Barclays in 2006 which created €5.9billion and €4billion losses respectively; Bernard L. Madoff Investment Securities and Societe Generale in 2008 leading to a loss of almost $17 billion and €6.3billion respectively and Rabobank and Fondiaria-SAI in 2013 which generated losses of $1 billion and €252 million respectively. Others include Barings Bank (Drummond, 2008). Haven Trust Bank, Georgia in USA collapsed in 2009 due to ineffective operational risk management which led to rapid loan growth concentrated in high risk construction sectors coupled with poor loan underwriting. Nakaso (2001) explained that in September 1995, Daiwa Bank, an internationally active city bank, announced that it had incurred a loss of approximately $1.1 billion as a result of the fraudulent conduct of an employee at its New York branch and in November, the bank was ordered by the US regulators to close all operations in the US markets. AuditBoard (2019) concluded that as organizations grow and evolve, the complexity, frequency, and impact of risks that are poorly managed also grow in the same proportion and losses from failure to properly manage operational risk have led to the downfall of many financial institutions with over 100 reported losses exceeding $100 million in recent years.

Also, many banks in Nigeria had experienced financial distress and subsequently liquidated or taken over due to poor or ineffective operational risk management practices and policies. For example, Nigeria Merchant Bank Plc, Cooperative & Commerce Bank Plc, Metropolitan Bank Limited, Group Merchant Bank Limited had failed due to losses suffered from operational events such as weak risk management, noncompliance with credit policies, poor operational policies and procedures in the bank, weak human resources and capacity, weak corporate governance, compromise in information technology, ineffective audit, mismanagement, weak supervisory framework and major regulatory change (NDIC 2017). Also, CBN (2014) explained that the crisis in the banking sector was caused by poor risk management practices, absence of basic control measures, near total absence of corporate governance in most of banks, lack of adequate disclosure and transparency about the accurate financial positions of banks, poor operating environment, weak internal control, inside abuse, among others. Again, Olukotun, Olusegun and Kehinde (2013) concluded that insider abuse, contravention of regulatory guidelines and over bearing interest of directors in loans and advances and other credit facilities accounted for some bank failures while Bassey, Tobi, Bassey and Ekwere (2016) highlighted weak corporate governance, poor capital base, illiquidity and insolvency, poor asset quality and low earnings as some of the constraints faced by the banking system. Mohammed (2012) posited that financial distresses in most countries were attributed to a high incidence of non-performing loans, weak management and poor credit policy and that inadequate consideration for ethical values and good governance hinders banks' performance as experienced in the failures of All States Trust Bank Plc, Lead Bank Plc, Assurance Bank Nigeria Limited, Trade Bank Plc, Metropolitan Bank Limited, City Express Bank Limited, Hallmark Bank Plc., Societe Generale Bank of Nigeria Plc., African Express Bank Plc and Gulf

Bank of Nigeria Plc whose licenses were revoked by the Central Bank of Nigeria (CBN) in 2006 and the recent failures of Intercontinental Bank Plc, Oceanic Bank Ltd, Bank PHB in 2011.

Lately, operational risk has received widespread attention in business, government and academic circles. However, despite the series of intervention, regulatory guidelines and others from the Basel committee on banking supervision and the central banks and the various studies conducted by scholars on operational risk, it has continued to be a source of major threat to banks. According to Huber and Funaro (2018), since the global financial crisis, banks and regulators have become more aware of the need to manage risk but while banks have developed sound systems for controlling financial risks like credit, market and liquidity, they have struggled to deal effectively with operational risk which had caused major banks to suffer huge losses amounting to $210 billion between 2011 and 2016. Duong, Hunyen and Huong (2018) explained that scholars and stakeholders in the banking industry have now focused attentions on examining those factors that affect bank operations because it will assist in formulating adequate strategies and policies to avoid financial crisis which could impact on sustainability and stability in the banking system. However, Most of these studies have mainly concentrated on other risks like credit, liquidity and sometimes market with little or limited emphasis on operational risk, which as posited by Vysya and Gill (2018), is the most dynamic and complicated in nature and impacted by numerous factors such as the internal business process, regulatory landscape, business growth, customer preferences and even factors external to the organisation.

Some authors, though carried out previous studies on operational risk management, but the studies were limited to only one bank or some branches of banks within certain geographical locations, Okeke, Anogoke and Onuorah (2018), Kuriah (2016) and Harelimana (2017) while some previous studies only used one variable to measure operational risk and financial stability, Zaman and Ali (2017) and Olalere, Aminul, Yusoff and Shamsuddin (2018). Also, Okeke, Anogoke and Onuorah (2018) conducted a study on operational risk management and organizational performance of banks in Edo State and concluded that operational risk management has a negative significant effect on organizational performance of the banks in Edo State, a finding which was not consistent with the findings in some other related works like Maina, Alala, Wabwile and Douglas (2014) and Epetimehin and Obafemi (2015) which concluded that operational risk management has significant positive effect on profitability and financial growth and development of financial sector respectively. Again, some previous studies on risk management have dealt more with credit, market and liquidity risks in banks with little or no emphasis on operational risk, Okere, Isiaka & Ogunlowore (2018) and Adeusi, Akeke, Adebis & Oladunjoye (2014).

This study will seek to test these conflicting findings and fill any possible gaps using operational risk management and financial stability while also introducing additional variables like ratio of non-performing loan to total loans, cost to income ratio and ratio of total loans and advances to total deposit as measure of operational risk and capital adequacy and liquidity in addition to the profitability examined by the previous authors to measure financial stability.

Objectives of the Study

The specific objectives of this study were set as follows:

1. investigate the effect of operational risk management on capital adequacy ratio of the deposit money banks in Nigeria

2. assess the effect of operational risk management on return on equity of the deposit money banks in Nigeria

3. determine the effect of operational risk management on the liquidity ratio of the deposit money banks in Nigeria

Research Hypotheses

The following hypotheses were tested in other to achieve the research objective:

$H_0$1: There is no significant effect of operational risk management on the capital adequacy ratio of deposit money banks in Nigeria.

$H_0$2: Operational risk management does not significantly affect the return on equity of deposit money banks in Nigeria.

$H_0$3: Operational risk management has no significant effect on the liquidity ratio of deposit money banks in Nigeria

LITERATURE REVIEW

Conceptual Review

Risk Management in Banks

As posited by Zakaria (2017), risk in banking organisation refers to uncertainties resulting in adverse impacts on profitability that can give rise to outright losses. Banks are exposed to a whole lot of risks in the course of carrying out their financial intermediation role and according to OECD (2014), the risks that companies face are both financial and non-financial and in the case of financial institutions, the focus naturally tends to be on financial risks, such as credit, liquidity or market risks, although there is also an increasing emphasis on operational risk. Crouchy, Galai and Mark (2006), categorised the risks faced by financial institutions into credit risk, market risk, operational risk, liquidity risk, legal risk, strategic risk, business risk and reputational risk. Ferrarini (2017) defined credit risk as the risk that the obligor of a financial instrument will fail to fulfil its obligation on the due date or at any time thereafter; liquidity risk as the risk that a financial institution is unable to get the funding needed to satisfy its obligations; market risk as the risk that results from an adverse movement in the market price of assets owned by a financial institution and operational risk as the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events. This definition includes legal risk which is the risk of loss resulting from failure to comply with laws, prudent ethical standards and contractual obligations.

CBN (2014) explained that the nature of financial services is strongly related to the management and control of risks and therefore, banks in the process of providing financial services undertake several kinds of financial risks which constitute a threat to such bank's steady flow of income and the achievement of financial stability. The regulatory body gave example of such risks as strategic risk, market/volatility risk, credit/default risk, liquidity risk, operational risk, reputational risk, counterparty risk, legal/regulatory risk, solvency risk, among others. In addition to the risks mentioned above, other risks like model risk, contagion risk and cyber-attack risk have emanated in the banking industry (Härle, Havas, Kremer, Rona & Samandari,2015). Agwu, Iyoha, Ikpefan and Atuma (2015) explained that risks abound in all aspects of life and mitigating these risks and their effects has become a huge task especially for profit making organisations and financial institutions all over the world. Hamdu and Knapkova (2016) states that the ability of a firm to identify risk, manage risk and make calculated and concrete decisions would not only boost the strength of the organisation but also the entire economic system of the country. According to Fatemi and Glaum (2000) risk management helps to minimise foreign exchange losses, reduce volatile cash flow, protect earnings fluctuation and increase profitability. Adamgbo, Toby, Momodu and Imegi (2019) opined that the nature of products and services that banking industry trade could expose it to losses that can endanger its stability and continued existence and one of the major activities that can guarantee long-term profitability and stability is risk management in banks. Therefore, it is imperative for banks to have a sound and proactive risk management process in place to be able to identify, assess, measure, mitigate, monitor and report these risks in order to avert any possible threat to the banks' objectives. Also, the risk management should be part of the corporate strategic objectives of an organisation and must be the responsibility of business managers to balance between risk and the benefits associated with it in order for it to be effective (Anderson, 2008).

Many researchers have attempted to define risk management in their studies. Among this definition was the one given by Ennouri (2013) that risk management refers to strategies, methods and supporting tools to identify and control risk to an acceptable level and thereafter concluded that risk management is a systematic application of management policies, procedures, and practices to assess and manage risk. Tursoy (2018) gave a theoretical definition of risk management in banking as logically developed and implemented plans to deal with potential losses; and the focus of the risk management practices in the banking industry is usually to manage an institution's exposure to losses or risk and to protect the value of its assets. Zakaria (2017) explained that since taking risk is essential in banking, it is imperative for banks to practice efficient risk management to ensure survival in uncertain climates, such as the Asian Financial Crisis of 1997. BCBS (2011) described risk management generally as encompassing the process of identifying risks to the bank, measuring exposures to those risks (where possible), ensuring that an effective capital planning and monitoring programme is in place, monitoring risk exposures and corresponding capital needs on an ongoing basis, taking steps to control or mitigate risk exposures and reporting to senior management and the board on the bank's risk exposures and capital positions.

In order to be able to ensure effective risk management practices, financial institutions must first understand the various risk exposures they face. According to Hamdu and Knapkova (2016), the

better an organisation understands the risks inherent in its business, the greater the confidence it would develop to pursue opportunities and they suggested that integration of risk management activities and documentation of risk management process could have better input in the identification of business opportunities and facilitate the distribution of knowledge and best practices. The businesses of financial services have expanded considerably over the years with attendant increase in the exposure to the risks associated with financial markets; the unmitigated exposure owing to expanded activities could be catastrophic for the financial system and have general spill-over (contagion) effect and the necessary complement to the development has been an increasing focus on risk management (CBN 2014). The importance of having sound risk management by financial institutions was also recognised by the Basel Committee on Banking Supervision (BCBS). The Basel Committee on Banking Supervision (BCBS) was formed by the Central Bank of G10 countries in 1975 with the objective of developing a framework that would further strengthen the soundness and stability of the international banking system. According to Tursoy (2018), this framework of the Basel Committee provides a vital relationship between capital and risk and specifically, banks need to adopt risk measurement and risk management procedures and processes in order to guarantee their risk-adjusted return in their business. The Basel Committee issued out Basel 1 in 1988 which specifically focused on credit risk because that was the only risk perceived at that time as the cause of bank failures. The Basel 1 Accord specified the minimum regulatory capital requirement for banks with consideration for only credit risk. However, the persistent failure of banks worldwide in spite of this Accord led to the discovery of other risks like Market and Operational risks, (Rufus 2006).

Basel II Accord was issued in June 2004 as an improvement on the earlier Accord. Operational risk and market risk were introduced in the computation of Capital Adequacy Ratio for banks in addition to the credit risk initially considered in the Basel 1 Accord. According to Debajyoti, Bindya and Swati (2013), Basel II focuses on three aspects namely Minimum Capital Requirement, Supervisory Review by Central Bank to monitor capital adequacy and internal capital assessment process and lastly Market Discipline by effective disclosure to encourage safe and sound banking practices. Basel III was later introduced in 2010 due to the financial crisis of 2008 which had serious liquidity impact on financial institutions. The banking industry had gone into crisis with too much leverage and inadequate liquidity buffers. Also, the capital under Basel II were no longer considered sufficient to contain any further risk. These crises were accompanied by poor governance and risk management, as well as inappropriate incentive structure (Fan Li & Yijun Zou, 2014). The purpose of Basel III was to focus on four vital banking parameters of Enhanced Capital Requirement, Leverage, Funding and Liquidity risk management, (Debajyoti, Bindya & Swati, 2013) and it introduced Liquidity risk, leverage ratio, cyclical buffer and counterparty risk. Also, the Central Bank of Nigeria, as part of its supervisory roles and to ensure sound risk management practices in the banks, has issued a number of guidelines for banks to adopt in their risk management practices. As one of the initiatives to enhance the quality of the banks, the Central Bank of Nigeria undertook a review of the prudential guidelines with the aim of addressing various aspects of banks' operations, such as risk management, corporate governance, KYC and anti-money laundering/ counter financing of terrorism and loan loss provisioning. The revised guideline provides guidance on recognition and measurement of loans, establishment of loan loss

allowances, credit risk disclosure and related matters (CBN 2010). There are other ratios and directives set by CBN in the prudential guidelines issues in 2010 like liquidity ratio currently at 30%, single obligor limit at 20%, sectorial limit for portfolio, capital adequacy ratio, limit on foreign borrowings by banks, exposures to directors and related parties, credit rating of counter parties/obligor and sector, policies and procedures for write off of accounts, among others.

There was also directive for banks to comply with the provision of IFRS 9 effective January 2018 in order to further ensure adequacy and proactiveness in loan loss provisioning by banks. Before now, banks were making provisions for loan losses based on 1AS 39. In order to cushion the impact of first-time adoption of IFRS9, a transitional arrangement was also issued to address the initial impact of the expected credit loss model of IFRS 9 on banks' financial statements. The Central Bank had issued a number of guidance notes on the computation of capital for credit, operational and market risk with the sole aim of ensuring that banks in Nigeria maintain adequate capital to cover all their major risks. CBN (2019) issued guidelines for management of other risks like credit concentration risk under the supervisory review process; management of interest rate in the banking book; management of reputational risk and guideline on stress testing for Nigerian banks. The essence of these guidelines is to continually ensure that banks operate with sound risk management practices which could adequately prevent failures.

In order to ensure sound risk management practices in financial institutions, there should be effective risk governance which defines the responsibilities of directors, management staff and all employees of the financial institutions. Fajembola, Rahman and Md-Rus (2018) concluded that in many systemic important banks all over the world, cases of weak governance contributed to loss and ineffective internal checks thereby leading to poor risk management strategies which encouraged excessive risk taking. The authors also explained that in Nigeria, the board failed to control the risks taken by the management of banks but instead allowed the executives to operate freely and without restraint which generated a rapid growth in risky assets that led financial institutions into instability, insolvency and in severe cases the collapse of the affected banks. Grove and Clouse (2017) posited that risk management should be a key concern of board members to enhance corporate governance in any organization but regrettably this is often not the case as evidenced in the case of Lehman Brothers, JP Morgan Chase, among others. The tone for risk management is usually set at the top. That is, the board of directors own it, and have direct responsibility for ensuring that it works.

Operational Risk Management

BCBS (2011) defined operational risk as the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events failures. This definition includes legal risk but excludes strategic and reputational risk. Muriungi, Waithaka, Were and Muriuki (2017) posited that the resultant events from the above failures and inadequacies of systems, people, process and external events have now been put into a category of risk referred to as operational risk, a nomenclature that was intended to promote risk visibility, particular risk management, and regulatory intervention. Operational risk became prominent in banking and regulatory circles after a rogue trader caused the collapse of Barings Bank in 1995 and this event highlighted the

importance of internal controls and corporate governance in managing financial losses associated with fraud, human errors, and technical failures as well as other breakdowns in normal business processes and operations (Peter, Gordon & Yueran, 2016).

This operational risk could arise from poor credit appraisal, approval and monitoring process which could lead to credit risk or inappropriate assets and liability management process leading to liquidity risk as in the case of the global financial crisis triggered by the sub-prime mortgage crisis in the United States which greatly influenced the global economy especially with the takeover of Fannie Mae and Freddie Mac by the U.S. government and the Lehman Brothers Holdings' and Merrill Lynch bankruptcy cases Xiao (2016). Operational risk could also arise from failure of the system or people which results into late or non-rendition of regulatory returns and breach of regulatory requirements in transactions processing thereby leading to regulatory or compliance risk as we had in the case of Wells Fargo which was caused to slash its profit estimate for the year by up to $400million (Risk.net 2019). Operational risk could also lead to legal case for the bank arising from employees' actions or inactions towards customers, vendors, host communities and others and example was the Hewlett Packard shareholder lawsuit alleging negligence by the executives and directors during an acquisition of UK software company, Autonomy Corporation, which resulted in an $8.8 billion write-down and it was anticipated that HP will payout $1 billion in losses depending on the number of shareholders who join the lawsuit (Neary, 2014). Also, operational risk could arise from internal frauds or inadequate process and procedures which encouraged employees to get involved in activities that exposed banks to higher risk in order to achieve personal gains as in the case of the LIBOR fraud which was discovered in the summer 2012 (Knežević, 2013). Also, since electronic platform facilitates easy movement or transfer of funds across the world, there is the risk of money laundering where proceeds of frauds or terrorist activities are sent through customers' account and this was the case when HSBC UK, was sanctioned with huge fine of $1.9Billion due to the failure of the bank to manage and govern anti money laundering practices (Ogunbadewa 2013). In addition, the occurrence of external events like floods, earthquakes and other natural disasters could cause disruption of operations or destruction of the banks' assets which is also an operational risk issue like the unprecedented losses in the late 1980s and early 1990s driven significantly by natural catastrophe events which caused global re/insurance sector to enter a period of crisis (Douglas 2014).

Organizations and industries face operational risk in every area of their business endeavours ranging from employee conduct, third parties, data, business processes, controls inherent cultural, moral, and ethical risks and layered on top are technology risks which are compounded as organizations embrace new technologies like automation, robotics, and artificial intelligence (Deloitte 2017). The financial institutions in Nigeria, like their counterparts all over the world, are faced with some forms of risks arising from their processes, procedures and other activities. Banks render financial, insurance and investment services to customers and this nature of banking services creates some form of risks which if not properly and adequately managed could have great impact on the banks' financial stability. In addition to accepting deposits and making loans, the financial industry is a rapidly innovative sector which drives banks to continually roll out products and services to satisfy customers' needs and in turn boost profitability (Adeusi, Akeke, Adebisi &

Oladunjoye 2014). This drive by banks to create new products and services comes with some forms of risks to them.

Most of the times, when any of the risks of credit, market, liquidity e.t.c. crystalize there would always be some elements of operational risk therein. That is, for any of these other risks to happen there must have been inadequate or failed process or systems or misconduct or error of people in the lending, accepting deposit, account opening and interest rate activities of the bank and Huber and Funaro (2018) gave example of how unathorised trading can cause billions in direct losses and multimillion more in regulatory, legal and restructuring costs. According to Medovan and Berg-Yuen (2009), the chairman of the Basel Committee stated that banks will have to develop more rigorous approaches to measure and manage their operational risk exposures and hold capital that is commensurate to the risk. The Basel Committee reported an informal survey that highlights the growing realisations of significance of the risks that are neither market nor credit risks, but operational risks that have become the main cause for some important financial and business problems during the past couple of years (Dejan & Jovo, 2013). In view of the need to regulate the management of risks in large internationally active banks and promote risk based regulatory capital for all the risk exposures, Basel II included two other types of risk called Market and Operational Risks.

The Basel Committee has classified the operational risk events into seven categories namely (1) internal fraud, (2) external fraud, (3) employment practices and work securities, (4) client, products and business practices, (5) damage to physical assets, (6) business disruption and systems failure, (7) execution, delivery and process management (Dejan & Jovo 2013). Sound internal governance forms the foundation of an effective operational risk management framework and sound operational risk management is a reflection of the effectiveness of the board and senior management in administering its portfolio of products, activities, processes, and systems BCBS (2011). Effective operational risk management has some benefits and Accenture (2015) highlighted some of them to include freeing up capital to allocate to income earning activities, better decision making, lower cost of funds arising from good rating from the rating agencies, lower operating cost from improved controls and monitoring tools, minimize volatility, especially as it relates to meeting revenue and profit targets, increased customer and staff satisfaction and better regulatory compliance. However, achieving effective operational risk management has its own challenges and some of these challenges were highlighted by Andrew and Sandy (2010) in their study to include getting the board to buy into the it, getting the buy in of others throughout the organisation, setting risk appetite for operational risk and reporting challenges. Okeke, Aganoke and Onuorah (2018) also gave inability to get quality data on operational risk as hinderance to the progress operational risk research.

Financial Stability

Ini, Eze and Inim (2018) explained that maintaining financial stability in the financial system in Nigeria has been a major macroeconomic policy objective and this, to some extent, is due to aftermath effect of the series of financial crisis the country has witnessed in the past. As shown in the work of Gadanecz and Jayaram (2009), giving a specific definition to financial stability is difficult while it is even more difficult measuring it but they went ahead to give the characteristics

of a stable financial system as absence of excessive volatility, stress or crisis. This was supported by Healey, Mosser, Rosen and Tache (2018) when they posited that there is no single comprehensive definition of "financial stability but in general, it refers to the ability of the financial system "to facilitate and enhance economic processes, manage risks, and absorb shocks. However, Muriungi, Waithaka, Were and Muriuki (2017) defined financial stability is a condition in which the mechanisms of the economy for pricing, allocating, and managing financial, credit, liquidity, counterparty and market risks are functioning well enough to contribute to the performance of the economy. They highlighted three major areas involved in comprehensive assessment of financial stability to include identification of the plausible and systemically important sources of risks and vulnerabilities that could pose challenges to financial stability in future; an appraisal of the potential costs in case some combination of these identified risks and vulnerabilities materialize and forming a judgment about the individual and collective strengths and robustness of the constituent parts of the financial system, institutions, markets and infrastructures.

The importance of financial stability to the economy was emphasised by Charmler, Musah, Akomeah and Gakpetor (2018) that a strong and resilient banking industry is critical for economic growth and development in every economy. Over the years, there have been various reforms in the banking industry in Nigeria which were aimed mainly at ensuring effective financial intermediation, financial stability and confidence in the financial system (CBN 2012). In the last three decades or more, several reforms have been introduced by the government one of which was the reform of 1986 through the structural adjustment programme leading to the proliferation of banks due to the deregulation in the banking industry while another era of reform was between 1993 to 1998 called re-regulation era (Akpasung & Gidigbi, 2014). Soludo initiated another reform through a 13point agenda aimed at developing bigger banks with stronger balance sheet, ensuring safe and sound banking practice and enhancing regulatory capacity to supervise the industry. The key element of this banking reform was the increase in the minimum capital base of banks from N2 billion to N25 billion and all banks were required to comply by December 2005 (Ikeora, Igbodiga & Andabai 2016). This policy encouraged consolidation by some banks through mergers and acquisition in order to meet up with the new capital requirement. According to a CBN (2005) report, the number of banks had reduced from a total of 89 in the pre-consolidation era to 25 banks after the consolidation and later to 24 with the merger of Stanbic Bank and IBTC Bank to form Stanbic IBTC in 2007. According to Sanusi (2012), the other areas of banking reforms in Nigeria include adoption of risk focused and rule based regulatory framework, strict enforcement of corporate governance principles, ensuring greater transparency and accountability in the implementation of banking laws and regulations. Also, in response to the global challenges of bank failure, the Basel Committee was formed in 1974 by the central bank of G10 countries to give guidance and regulations on financial system stability.

Also, as part of the initiative to enhance the quality and stability of banks after the global financial melt down, the Central Bank of Nigeria in 2010 undertook a review of the previously issued prudential guideline. This revised guideline aimed to address various aspects of operations in banking such as risk management, corporate governance, anti money laundering and counter terrorism financing and loss provisioning (CBN 2010). The Central Bank also gave directives for

banks to comply with the provision of IFRS 9 effective January 2018 in order to further ensure adequacy and proactiveness in loan loss provisioning by banks. Before now, banks were making provisions for loan losses based on 1AS 39 (CBN, 2016). There are other ratios set by CBN like liquidity ratio currently at 30%, single obligor limit at 20%, sectorial limit for portfolio and so on. The Central Bank has also issued many directives and circulars on anti money laundering for banks in order to guide against the risk of money laundering and other compliance issues (CBN, 2010).

In measuring financial stability in the banking system, the International Monetary Fund (2006) as shown in the compilation guide for financial soundness indicator, specified some quantitative factors that serve as indicators of financial soundness in deposit money banks. Some of these indicators are Capital Adequacy, Asset Quality, Earnings and Profitability, Liquidity and Sensitivity. These indicators are core and relevant to banking business and are compatible with the CAMELS methodology for the assessment of the soundness of individual financial institutions (Adam & Jaroslav, 2007). The Basel Committee on Banking Supervision proposed CAMEL framework for assessing financial institutions in 1988 and later introduced the six factor Sensitivity in 1997 to make it CAMELS. In the work of Rostami (2015), CAMELS rating is a very effective, efficient and accurate tool used as performance evaluator in the banking industries and to anticipate the future and relative risk. The IMF report showed some other indicators like Capital to Assets, Large Exposures, Foreign Currency denominated loans to total loans and so on.

THEORETICAL REVIEW

Many researchers have used different theories to explain the impact of operational risk management on financial stability of deposit money banks. The following three theories will be examined in this study vis risk theory of profit, extreme value theory and anticipated income theory. However, the study adopted extreme value theory and risk theory of profit. Extreme value theory was chosen because it gives better analysis of events or activities or financial risks which could lead to large operational risk loses while risk theory of profit address the earning capacity in relation to the risk exposure in order to ensure financial stability of deposit money.

Risk Theory of Profit

The relationship between risk and profit was put into a theory by Hawley (1893) and he posited that business repays men, not only for their labour but for their fears and it is assumed that without risk there can be no great profit for an entrepreneur. Hawley opined that factors of production should not only be limited to three variables of land, capital and labour but should also include risk taking and the higher risk, the higher the level of reward. This was supported by Landqvist and Stalhandske (2011) when they concluded that entrepreneurship would not be an object of fascination to the same extent as it is today without risk taking.

The relationship between risk and profit varies and some professionals have argued that risk needs to be present in a business for the owner to earn significant profits while some others have contended that risk is merely an extension of imprudent financial decisions and affect higher profit levels (Lister 2018). According to Shaikh (2019), entrepreneur faces risk in

business and in return expects to get reward in form of profit for the risk taking.

Some economists, including professor and author Frank Hyneman Knight, criticise Hawley's approach to risk and profit on the belief that risk doesn't necessarily have to be present for a business owner or investor to make high profit. That is, a high level of risk will not automatically generate a high level of profit (Lister 2018). Another criticism was given by professor Carve when he posited that profit is not based on the ability of the entrepreneur to undertake the risks in business but instead his capability to manage the risk (Shaikh 2019). The author also concluded that risk theory of profit only focuses on risks and risks alone without any consideration for other factors attributable to profit.

Extreme Value Theory

According to Gumel (1958) as cited by Bukwimba (2015), study on extreme value problem could be dated back to as early as 1709 when Nicolas Bernoulli explained the mean largest distance from the origin when n points lie at random on a straight line of length t. Teply (2012) opined that one of the earliest studies on operational risk management was carried out by Embrechts, Klüpperberg and Mikosch in 1997 in which they did the modelling of extreme events for insurance and finance. According to Garrido and Lezaud (2013), extreme value theory primarily aims to predict the occurrence of rare events that are not within the range of the available data and is one of the standard approaches to studying risks; it is a branch of statistics that deal with the extreme deviations from the median of probability distributions i.e. based on the language of probability theory and thus the first question to ask is whether a probability approach applies to the studied risk.

As highlighted in the work of Bukwimba (2015), Extreme Value Theory is a tool used to determine the probabilities (risks) associated with extreme events and it helps in promoting the assessment and management of extreme financial risks. He opined further that this theory is used by Investors in situations where there is/expected to occur higher stress on investment portfolios and it is also used to model the behaviour of tips (Maxima) and or dips (Minima) in a series of asset returns etc. In recent times, portfolio managers, investors, risk managers, claim managers etc, have become more concerned over occurrences under "Extreme market conditions and hence the need for the extreme value theory. Embrechts, Resnick and Samorodnitsky (1999) explained that extreme value theory helps to quantify market crashes or industry losses and their consequences in a statistically optimal way. The rising complex nature of financial instruments requires sound risk management tool and this theory expands the knowledge of operational risk management in insurance, reinsurance and finance (Okeke, Aganoke & Onuorah 2018).

One of the criticisms of extreme value methods is that it will only be appropriate if the original dataset is reasonably large and as such extreme value methods have traditionally been used in disciplines where large amounts of data are routinely (and often automatically) collected, such as finance and oceanography.

Anticipated Income Theory

The anticipated income theory was developed by Prochanow in 1949 and presented in his book titled "Term loan and Theories of Bank Liquidity". According to this theory, regardless of the nature and character of a borrower's business, the bank plans the liquidation of the term-loan from the anticipated income of the borrower. This theory posited that the liquidity of a bank can be managed through the proper arrangement and structuring of the loan commitments made by a bank to the customers and that liquidity can be planned if the scheduled loan redemption by customers is based on the future of the individual borrower (Olanrewaju and Adeyemi, 2015).

Fagboyo, Adeniran and Adedeji (2018) opined that anticipated income theory holds that liquidity can be ensured if scheduled loan repayments are made on future income of the borrower. The authors explained that anticipated income theory relates loan repayment to income rather than rely on collateral. The bank puts restrictions on the financial activities of the borrower while granting this loan and at the time of granting a loan, the bank takes into consideration not only the security but the anticipated earnings of the borrower. Thus, a loan by the bank gets repaid out of the future income of the borrower in instalments, instead of in a lump sum at the maturity of the loan. This theory satisfies the safety principle because the bank grants a loan not only on the basis of a good security but also on the ability of the borrower to repay the loan in terms of the earning capacity.

One of the criticisms of the theory is that loan repayment is only based on the anticipated earnings of the borrower which might not be certain.

Empirical Review

Related studies previously done by some scholars and researchers were reviewed with the objective of establishing the relationship between operational risk management and financial stability in deposit money banks.

Olalere, Aminul, Yusoff and Shamsuddin (2018) investigated operational risk in the banking industry using 16 commercial banks covering 2009 and 2015. The authors found out that the major factor that determines the banks' performance are operational risk variables and concluded that the lower the cost to income ratio, which is a measure of operational risk, the better the performance of the banks.

Muriithi and Muigai (2017) analysed the effect of operational risk on profitability of all the 43 licensed commercial banks in Kenya between 2005 and 2014. Operational risk was measured by cost to income ratio while return on equity was used as proxy for profitability. The results of the study showed that operational risk has negative significant impact on profitability and recommended that operating cost management should be given more attention by the commercial banks' management.

Okeke, Aganoke and Onuorah (2018) examined operational risk management and organizational performance using selected banks in Edo state. Specifically, the study aimed to investigate the effect of People risk, Process risk, System and technology risk and external risk variables on

organizational performance. The results showed that people risk, system and technology risk variables had a negative significant effect on organizational performance of the banks in Edo State while Process risk and External risk variables had a negative moderate influence and positive weak influence respectively on organizational performance of the banks in Edo State. The study thereafter concluded that operational risk management has a negative significant effect on organizational performance of the banks in Edo State.

Yousfi (2012) determined the impact of risk management practices on Jordanian Islamic banks' performance. The study adopted credit risk, operational risk, liquidity risk, market risks and financial crisis as explanatory variables while return (ROA) on assets and return on equity (ROE) were used as dependent variables for the period of fifteen years from 1998 to 2012. The results revealed that liquidity, credit and operational risk management practices have a negative and significant impact on Islamic banks' performance while market risk management practices have a positive and significant statistical impact on banks' performance.

Mulandi (2016) determined the relationship between liquidity and operational risk of commercial banks in Kenya with the objective of establishing the influence of liquidity, asset quality, bank size, capital adequacy and ownership type on operational risk of commercial banks. The study covered 40 fully operational commercial banks in Kenya as at December 2015. The study concluded that bank's size, asset quality, liquidity, capital adequacy and ownership type affect the operational risk of a bank. Liquidity, capital adequacy and ownership type were found to have an inverse relationship with the operational risk of a bank. The study recommended that, commercial banks should focus on maintaining high levels of liquidity and capital adequacy, so as to enhance performance by cushioning themselves against operational risk.

Yinglin and Yating (2017) assessed the determinants of bank's profitability over the period of 2003 to 2015 with United States as evidence. The study concluded that banks with higher profitability are the banks that have: (i) a higher deposit to total asset ratio, (ii) a higher diversification ratio, and (iii) higher operational efficiency (cost to income ratio). The study also showed that banks with better capital tend to be more profitable only when return on assets is used as the measure of profitability while loans have a positive impact on profitability before the financial crisis, but not during the crisis.

Al-Tamimi, Miniaoui and Elkelish (2015) examined the relationship between financial risk and performance of Gulf Cooperation Council Islamic banks and the relative importance of the most common types of risk. The study was based on a sample of 11 of the 47 Islamic banks of the Gulf Cooperation Council region from 2000 to 2012 and the results showed that significant negative relationship exist between GCC Islamic bank performance and capital risk and operational risk. Although the study could not confirm the positive relationship between risk and performance of the GCC Islamic banks but it concluded that the most important type of risk is capital risk followed by operational risk.

Obiakor (2016) examined the relationship between capital adequacy and risk management in

Nigerian banking sector between 2009 and 2015 and found out that negative and significant relationship exist between capital adequacy and risk management in the banks. Mohammad and Mohammad (2019) also investigated the impact of non-performing loan on capital adequacy of four categories of bank in Bangladesh for the period between 2008 and 2017. The results of the work provided empirical evidence that nonperforming loan has significant impact on capital adequacy of bank.

Edirin (2014) assessed the relationship between non-performing loans and the financial soundness of banks in Nigeria for a period of 10 years covering 2003 and 2012. The study showed that return on equity was not significantly affected by non-performing loans while a significant relationship exists between return on assets and non-performing loans on the one hand and capital adequacy ratio and non-performing loans on the other hand. The author recommended, amongst others, that the Central Bank of Nigeria should develop and enforce policies on data quality in banks to checkmate banks in the area of accounts/financial statements' manipulation aimed at hiding the huge amount of NPLs in the asset portfolio of banks in Nigeria in order to guarantee a sound and viable banking sector.

METHODOLOGY

This study employed ex post facto research design in obtaining existing secondary data from the population. This study adopted a convenient sampling method, which is one of the variants of non-probability sampling techniques, in selecting samples from the population of study. This sampling method was used because banks were deliberately selected from the population as samples due to the ease of generating the required data necessary for the study.

The sample size of this study consisted of eleven deposit money banks selected from the total population of twenty-two deposit money banks in Nigeria as at the September 30, 2018 and the data collected covered eleven-year period from 2009 to 2018. The sample deposit banks are divided into international banks consisting of Access Bank Plc, Fidelity Bank Plc, First City Monument Bank Limited, First Bank Limited, Guaranty Trust Bank Plc, Union Bank Plc, United Bank for Africa Plc, Zenith Bank Plc, and national banks made up of Sterling Bank Plc, Wema Bank Plc and Unity Bank Plc.

In this study, operational risk management variable is the independent variable or explanatory variable while financial stability of deposit money banks is the dependent variable. In order to determine the relationship between operational risk management and financial stability in deposit money banks in Nigeria, the study employed linear regression model as given below:
Operational Risk Management (X)…. Independent variable
Financial Stability (Y) …. Dependent Variable
$Y=f(X)$
Operational Risk Management (ORM) was measured using Ratio of Non-Performing Loans to Total Loan (RNPL), Ratio of Cost to Income (ROCI) and Ratio of Total Loan and Advances to Total Deposit (RTLD)

Financial Stability (Dependent Variable) was measured using Capital Adequacy Ratio (CAR), Return on Equity (ROE) and Liquidity Ratio (LR).

FS = f (ORM)

Where Y = (y_1, y_2, y_3)

X = (x_1, x_2, x_3)
and
y_1 = Capital Adequacy Ratio (CAR)
y_2 = Return on Equity (ROE)
y_3 = Liquidity Ratio (LR)
x_1 = Ratio of Non-Performing Loan to Total Loan (RNPL)
x_2 = Ratio of Cost to Income (ROCI)
x3 = Ratio of Total Loan and Advances to Total Deposit (RTLD

Functional Relationship

CAR = f (RNPL, ROCI, RTLD) ……Equation 1
ROE = f (RNPL, ROCI, RTLD) …… Equation 2
LR = f (RNPL, ROCI, RTLD) …… Equation 3
FS = f (RNPL, ROCI, RTLD) …… Equation 4

F1 to F3 are the working functional relationships in this study that were used to assess the effect of operational risk management on financial stability. F4 showed the combined impact of operational risk management on financial stability.
For the purpose of evaluating the relationship between operational risk management and financial stability of deposit money banks in Nigeria, the study adopted the under listed models from the work of Amahalu, Obi, Chidoziem and Abiahu, (2017)

$CAR_{it} = \beta 0 + \beta_1 RNPL_{it} + \beta_2 ROCI_{it} + \beta_3 RTLD_{it} + \mu it1$ ……..Model 1

$ROE_{it} = \beta 0 + \beta_1 RNPL_{it} + \beta_2 ROCI_{it} + \beta_3 RTLD_{it} + \mu it2$ ……...Model 2

$LR_{it} = \beta 0 + \beta_1 RNPL_{it} + \beta_2 ROCI_{it} + \beta_3 RTLD_{it} + \mu it3$ …… .Model 3

$FS_{it} = \beta 0 + \beta_1 RNPL_{it} + \beta_2 ROCI_{it} + \beta_3 RTLD_{it} + \mu .it$ ……. …… Main Model

Where:
$\beta 0$ = Constant parameter/Intercept
$\beta 1 - \beta 4$ = Coefficients of the independent variables.
t = Number of period
μ = Error term, which measures the probability of statistical error encountered.

RESULTS, ANALYSIS AND DISCUSSION OF FINDINGS

Model 1:

$$CAR_{it} = \beta 0 + \beta_1 RNPL_{it} + \beta_2 ROCI_{it} + \beta_3 RTLD_{it} + \mu_{it}$$

$$CAR_{it} = 1.040 - 0.206 RNPL_{it} - 0.368 ROCI_{it} + 0.541 RTLD_{it}$$

$H_0 1$: There is no significant effect of operational risk management on the capital adequacy ratio of deposit money banks in Nigeria.

Regression Analysis Table 4.1

Variable	**Coefficient**	**Std Error**	**t-Stat.**	**Prob.**
Constant	1.040**	0.524	1.985	0.050
RNPL	-0.206**	0.086	-2.397	0.018
ROCI	-0.368**	0.156	-2.365	0.020
RTLD	0.541**	0.217	2.497	0.014
Adjusted R-squared	0.316			
F-Statistic	18.23			
Prob.(F-Stat)	0.000			
Hausman Test	2.14			0.86
Breusch and Pagan Lagrangian multiplier test	1.07			0.954
Heteroskedasticity Test	139.77			0.000
Wooldridge test for autocorrelation	48.95			0.000
Pesaran's test of cross-sectional independence	3.549			0.0000

Dependent Variable: CAR ***significant at 5% **Significant at 10%**
Source: Researcher's Study, 2020

Discussion of findings: From table 4.1 above, the regression estimates of model 1 show that operational risk management has significant effect on capital adequacy ratio of selected deposit money banks in Nigeria. This implies that non-performing loan to total loan ratio, cost to income ratio and total loan and advances to total deposit ratio were significant factors influencing changes

in capital adequacy ratio of deposit money banks in Nigeria. The Adjusted R^2,which measure the proportion of the changes in capital adequacy ratio of the selected deposit money banks as a result of changes in non-performing loan to total loan ratio, cost to income ratio and total loan and advances to total deposit ratio of the banks, explains about 32 per cent changes in capital adequacy ratio of selected banks in Nigeria, while the remaining 68 per cent were other factors explaining changes in capital adequacy ratio of selected banks in Nigeria but which were not captured in the model. The *F*- Test of 18.23 with a probability of 0.0000 and the *Wald*- Test of 19.55 with probability of 0.000 are both statistically significant at 5% level of significance.

In particular, the results indicated that ratio of non-performing loan to total loan and ratio of cost to income have negative significant relationship with capital adequacy ratio of deposit money banks in Nigeria (β_1= -0.206, t-test= -2.397, $p < 0.05$ and β_2= -0.368, t-test =-2.365, $p < 0.05$). This aligns with the *a priori* expectations and it implies that a percentage increase in non-performing loan to total loan ratio and cost to income ratio will lead to 0.206% and 0.368% decrease in capital adequacy ratio of the selected deposit money banks in Nigeria respectively. This finding aligns with the work of Obiakor (2016) who found out that a negative and significant relationship exist between risk management and capital adequacy. Again, this result conforms with the findings of Mulandi (2016). The author concluded, among others, that capital adequacy has negative and significant effect on the operational risk of commercial banks in Kenya

The result of the regression also showed that ratio of total loan and advances to total deposit has positive significant relationship with capital adequacy ratio of deposit money banks in Nigeria (β3=0.541, t-test= 2.497, $p < 0.05$). This indicates that a percentage increase in total loan and advances to total deposit ratio will lead to 0.541% increase in capital adequacy ratio of the selected deposit money banks in Nigeria. Although this result is not in line with the a priori expectation but it is consistent with the findings of Denada (2016) that operational risk, using exchange rate USD/ALL, has positive significant relationship with capital adequacy ratio in Albania

Model 2:

$$ROE_{it} = \beta 0 + \beta_1 RNPL_{it} + \beta_2 ROCI_{it} + \beta_3 RTLD_{it} + \mu_{it}$$

$$ROE_{it} = 1.484 - 0.255 RNPL_{it} - 0.459 ROCI_{it} + 0.237 RTLD_{it}$$

$H_0 2$: Operational risk management does not significantly affect the return on equity of deposit money banks in Nigeria

Regression Analysis Table 4.2

Variable	**Coefficient**	**Std Error**	**t-Stat.**	**Prob.**
Constant	1.484**	0.715	2.075	0.038
RNPL	-0.255**	0.129	-1.974	0.048
ROCI	-0.459**	0.213	-2.155	0.031
RTLD	0.237	0.300	0.788	0.431
Adjusted R-squared	0.389			
Wald Test	22.52			
Prob.	0.000			
Hausman Test	2.94			0.401
Breusch and Pagan Lagrangian multiplier test	4.87			0.013
Heteroskedasticity Test	476.64			0.000
Wooldridge test for autocorrelation	1.28			0.0283
Pesaran's test of cross sectional independence	6.12			0.0000

Dependent Variable: ROE ***significant at 5% **Significant at 10%**
Source: Researcher's study, 2020

Discussion of findings: The regression results in table 4.2. above show that operational risk management has joint significant relationship with return on equity of the selected deposit money banks in Nigeria. The Adjusted R^2 which measure the proportion of the changes in return on equity of the selected deposit money banks as a result of changes non-performing loan to total loan ratio, cost to income ratio and total loan and advances to total deposit ratio of the banks explains about 39 per cent changes in return on equity of selected banks in Nigeria, while the remaining 61 per cent were other factors explaining changes in return on equity of selected banks in Nigeria but which were not captured in the model. The *F*- Test of 23.47 with a probability of 0.0000 and the *Wald*- Test of 22.52 with probability value of 0.0000 are both statistically significant at 5% level of significance.

Specifically, the results show that the non-performing loan to total loan ratio and cost to income ratio have negative significant relationship with return on equity of the selected banks in Nigeria (β_1= -0.255, t-test= -1.974, $p < 0.05$ and β_2= -0.459, t-test =-2.155, $p < 0.05$) respectively. This is consistent with the *a priori* expectations and it indicates that a percentage increase in bad loans and operational cost increase will lead to decline in return on equity by 0.255% and 0.459%. This finding supports the conclusion made by Lasisi, Mustapha, Irom & Bulus (2018) ratio of non-performing loans to total loans and ratio of operating cost to operating revenue have significant negative effect on return on equity and earnings per share of banks in Nigeria. Also, the result is in line with the findings by Al-Tamimi, Miniaoui and Elkelish (2015) that total loans to total assets and cost to income have negative significant relationship with return on equity. Ofosu-Hene and Amor (2016) also concluded in their study that non-performing loans to net total loans ratio and cost to income ratio have negative significant effect on return on equity.

Conversely, the results showed evidence that total loan and advances to total deposit ratio of banks has positive insignificant relationship with return on equity of selected deposit money banks in Nigeria (β_3= 0.237, t-test= 0.788, p > 0.05). This also implies that that total loan and advances to total deposit ratio of banks is not a significant factor influencing changes in return on equity of selected deposit money banks in Nigeria. This means that ratio of total loans and advances to total deposit did not conform with the *a priori* expectations. This result is also not consistent with the findings of Saifu (2019) who concluded that loans to deposit ratio has positive significant relationship with return on equity of Indonesian banks. Again, the result did not support the findings of Yousfi (2014) who asserted that ratio of loans and advances to total deposit has negative and significant effect on profitability using return on asset.

Model 3:

$LR_{it} = \beta 0 + \beta_1 RNPL_{it} + \beta_2 ROCI_{it} + \beta_3 RTLD_{it} + \mu_{it}$

$LR_{it} = 1.551 + 0.021 RNPL_{it} + 0.120 ROCI_{it} - 0.094 RTLD_{it}$

$H_0 3$: Operational risk management has no significant effect on the liquidity ratio of deposit money banks in Nigeria

Regression Analysis Table 4.3

Variable	**Coefficient**	**Std Error**	**t-Stat.**	**Prob.**
Constant	1.551***	0.165	9.425	0.000
RNPL	0.021	0.030	0.677	0.498
ROCI	0.120**	0.049	2.453	0.014
RTLD	-0.094	0.069	-1.358	0.174
Adjusted R-squared	0.389			
Wald Test	22.45			
Prob.	0.000			
Hausman Test	7.43			0.059
Breusch and Pagan Lagrangian multiplier test	16.58			0.000
Heteroskedasticity Test	65.73			0.000
Wooldridge test for autocorrelation	4.70			0.005
Pesaran's test of cross sectional independence	6.12			0.0000

Dependent Variable: LR ***significant at 5% **Significant at 10%**
Source: Researcher's study, 2020

Discussion of findings: The regression estimates on table 4.5 show that operational risk management has joint significant effect on liquidity ratio of selected deposit money banks in Nigeria. The Adjusted R^2 which measure the proportion of the changes in liquidity ratio of the

selected deposit money banks as a result of changes non-performing loan to total loan ratio, cost to income ratio and total loan and advances to total deposit ratio of the banks explains about 39 per cent changes in liquidity ratio of selected banks in Nigeria, while the remaining 61 per cent were other factors explaining changes in liquidity ratio of selected banks in Nigeria but which were not captured in the model. The *F*- Test of 21.11with a probability of 0.0000 and the *Wald*- Test of 22.45 with probability value of 0.0000 are both statistically significant at 5% level of significance

Specifically, there is evidence that cost to income ratio of banks have positive significant relationship with liquidity ratio of selected deposit money banks in Nigeria (β_2= 0.120, t-test= -2.453, $p < 0.05$). This does not align with the *a priori* expectation that ratio of cost to income would have negative significant effect on liquidity ratio of deposit money banks in Nigeria. The implication of this is that a percentage increase in operational cost of the banks will lead to 0.120% increase in the liquidity ratio of the banks. This result did not support the findings in Soyemi, Ogunleye and Asogbon (2014) who found out that cost to income ratio has negative insignificant effect on financial performance of Nigerian deposit money banks.

Also, the results showed that ratio of non-performing loans to total loans has positive insignificant relationship with liquidity ratio of deposit money banks in Nigeria (β_1= 0.021, t-test= -0.677, $p > 0.05$). This is not consistent with the *a priori* expectation and the position of Gadzo (2018) who posited that ratio of non-performing loans to total loans directly influence the liquidity of banks. Again, the regression results revealed that total loan and advances to total deposit ratio has negative insignificant relationship with liquidity ratio of deposit money banks in Nigeria (β_3= -0.094, t-test =-1.358, $p > 0.05$). This suggests that total loan and advances to total deposit ratio is not a significant factor influencing changes in liquidity ratio of deposit money banks in Nigeria. This does not conform with the research expectation that ratio of loan and advances to total deposit would have negative significant effect on liquidity ratio of deposit money banks in Nigeria. This result is not consistent with the findings of Mulandi (2016) who stated that liquidity is negatively and significantly related to operational risk of commercial banks and the conclusion by Daniel (2017) that a positive significant relationship exist between loans and advances to total deposit and the performance of deposit money banks in Nigeria. Olusanmi, Uwuigbe and Uwuigbe (2015) also gave a contrary result that ratio of loans and advances to total deposit has negative non-significant relationship with financial performance of banks in Nigeria.

Model 4 (Main Model):

$$FS_{it} = \beta 0 + \beta_1 RNPL_{it} + \beta_2 ROCI_{it} + \beta_3 RTLD_{it} + \mu_{it}$$

$$FS_{it} = 2.462 - 0.218RNPL_{it} - 0.279ROCI_{it} - 0.294RTLD_{it}$$

H_04: Operational risk management has no significant effect on the financial stability of deposit money banks in Nigeria

Regression Analysis Table 4.4 (Main Model)

Variable	**Coefficient**	**Std Error**	**t-Stat.**	**Prob.**
Constant	2.462***	0.321	7.671	0.000
RNPL	-0.218***	0.046	-4.739	0.000
ROCI	-0.279***	0.099	-2.821	0.005
RTLD	-0.294***	0.144	-2.044	0.041
Adjusted R-squared	0.4091			
Wald Test	24.46			
Prob.	0.000			
Hausman Test	14.13			0.002
Breusch and Pagan Lagrangian multiplier test	29.21			0.000
Heteroskedasticity Test	324.17			0.000
Wooldridge test for autocorrelation	15.38			0.003
Pesaran's test of cross sectional independence	3.84			0.0001

Dependent Variable: LR *significant at 5% **Significant at 10%
Source: Researcher's study, 2020

Discussion of findings: The regression estimates for Model 4, as shown above in table 4.6, indicate that operational risk management has negative significant effect on financial stability of the selected deposit money banks in Nigeria. The Adjusted R^2 which measure the proportion of the changes in financial stability of the selected deposit money banks as a result of changes non-performing loan to total loan ratio, cost to income ratio and total loan and advances to total deposit ratio of the banks explains about 41 per cent changes in financial stability of selected banks in Nigeria, while the remaining 59 per cent were other factors explaining changes in financial stability of selected banks in Nigeria but which were not captured in the model. The *Wald*- Test of 24.46 is statistically significant at 5% level of significance.

In particular, the results showed that that non-performing loan to total loan ratio, cost to income ratio and total loan and advances to total deposit ratio of banks have significant relationship with financial stability of selected deposit money banks in Nigeria ((β_1= -0.218, t-test= -4.739, $p < 0.05$ and β_2= -0.279, t-test =-2.821, $p < 0.05$ and β_3= -0.294, t-test= -2.044, $p < 0.05$). This implies that ratio of non-performing loan to total loan, ratio of cost to income and ratio of total loans and advances to total deposit were significant factors influencing changes in return on equity of deposit money banks in Nigeria and a percentage increase in non-performing accounts, operational cost and loans to total deposit will lead to 0.218%, 0.279% and 0.294% decrease in capital adequacy, profitability and liquidity of the banks respectively and this could pose serious threat to financial stability.

This result is consistent with the *a priori* expectation and also align with the findings of Olalere, Aminul, Yusoff and Shamsuddin (2018) that operational risk is a major factor that influence financial performance of banks in Nigeria. It also supports the conclusion made by Muriithi and

Muigai (2017) and Okeke, Anogozie & Onuorah (2018) that operational risk and operational risk management have negative significant effect on the performance of banks in Kenya and Nigeria respectively.

Table 4.7: Summary of Hypotheses Testing

No	Hypothesis (Null)	Result
1.	There is no significant effect of operational risk management on the capital adequacy ratio of deposit money banks in Nigeria	Rejected
2.	Operational risk management does not significantly affect the return on equity of deposit money banks in Nigeria.	Rejected
3.	Operational risk management has no significant effect on the liquidity ratio of deposit money banks in Nigeria	Rejected

Source: Researcher's Study, 2020

Implications of findings

The findings of this study have implications for various stakeholders which consists of potential and existing investors and the general public, managers, scholars and researchers, and standard setters and regulators. These implications are listed as follows:

The results of this study being significant, will serve as motivation for the standard setters and regulators of the banking sector in Nigeria such as Central Bank of Nigeria (CBN) and Nigeria Deposit Insurance Commission (NDIC) in ensuring effective regulations, guidelines and policies are put in place to adequately manage operational risks by banks in other to achieve financial stability.

The result of this study provides useful information to both potential and existing investors and the general public on how operational risk arising from increasing bad loans and high operational cost could affect the return on their investment in the banks.

The managers of banks should understand that the degree at which they manage operational risk will have great impact on capital adequacy, return on equity and liquidity of the banks. Therefore, the findings of this study provide information and data that will
help managers in formulating strategies to effectively manage operational loses.

The study helps to provide data on the how operational risk management affects financial stability of deposit money banks
and measures to prevent large operational losses which could lead to bank failure. In view of this, the results of this study
and the data contained therein will be very useful empirical evidence and form the basis on which scholars and other
researchers can conduct similar studies.

CONCLUSION

This study examined effect of operational risk management on financial stability of sampled deposit money banks in Nigeria
Findings from the results of hypothesis one indicated that operational risk management has joint significant relationship with Capital Adequacy Ratio of deposit money banks in Nigeria The result of hypothesis two showed that operational risk management significantly influence the return on equity of deposit money banks in Nigeria while the result of hypothesis three supported the significant effect of operational risk management on the liquidity ratio of deposit money banks in Nigeria. Hypothesis four, which is the main model, proved that operational risk management proxied by Ratio of Non-Performing Loans to Total Loans (RNPL), Ratio of Cost to Income (ROCI) and Ratio of Total Loans to Total Deposit (RTLD) have negative significant effect on the financial stability measured by Capital Adequacy Ratio (CAR), Return on Equity (ROE) and Liquidity Ratio of deposit money banks in Nigeria for the period between 2009 to 2018.

The result also provides an affirmation of the extent to which the variations in the dependent variable are caused by the independent variables covered in the models as depicted by the adjusted R-squared. Thus, the study concluded that operational risk management has a significant effect on the financial stability of the selected deposit money banks in this study.

Recommendations

Based on the findings and conclusions of this study, the following recommendations were proffered:

Banks should manage their operational risk properly because of its negative impact on capital adequacy ratio. Thus, banks should follow the rules guiding credit facilities as non- performing loans of these banks retard their financial sustainability.

The study also recommends that operational risk management should be enhanced because of the negative impacts on return on equity. This is because potential investors are not likely to invest were their capital will be eroded by non-performing loans and excessive operating cost.

Banks should improve their operational risk management because of its negative impact on liquidity, as banks which are not liquid are more likely to erode customers confidence thereby leading to financial crisis.

Proper regulations and sanctions should be imposed by banks in managing their loan portfolio and operational cost so as to enhance financial stability. The purpose for this recommendation was premised on the fact that all the proxies for operational risk management had negative significant impact on financial stability of selected deposit money banks in Nigeria.

Contribution to Knowledge

This study has made the following contributions to knowledge:

The study provided useful data and information required by regulators like Central Bank (CBN), Nigeria Deposit Insurance Corporation (NDIC) in assessing the effectiveness of operational risk management practices in deposit money banks and how these practices could be enhanced to strengthen financial stability. The study also contains information that could assist regulators in formulating new policies and frameworks and in reviewing the existing policies and frameworks on operational risk management practices in order to ensure financial system stability.

The findings of the study agreed with the proposition that extreme value theory is a good tool for analysing the events or activities or financial risks which could lead to large operational risk loses to financial institutions while risk theory of profit is a good indicator for managers in measuring earning capacity in relation to the risk exposure of financial institutions

This study contributed to the existing literature by providing an in-depth examination of the effect of operational risk management on financial stability of quoted deposit money banks in Nigeria by the findings that have been examined; implications of the findings, the recommendations that have been made and future research should focus extensively on ways that can improve financial stability of quoted deposit money banks in Nigeria.

The study provides empirical evidence of the effect of operational risk management proxied by Ratio of Non-performing Loan to Total Loans (RNPL), Ratio of Cost to Income (ROCI) and Ratio of Total Loans to Total Deposit (RTLD) and financial stability measured by Capital Adequacy Ratio (CAR), Return on Equity (ROE) and Liquidity Ratio (LR) and through the model formulated, tested and evaluated.

The study also serves as a reference point for scholars on the operational risk management and provides basis on which further research could be carried out.

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