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Operational risks and operational performance – a cross-sectional analysis of deposit money banks

Olusegun Timothy Odesola and Adedayo Michael Adebisi
Obafemi Awolowo University, Ile-Ife, Nigeria

Abstract

Purpose – This study examines the influence of operational risks (ORs) on the operational performance of deposit money banks (DMBs) in Nigeria, focusing on six dimensions: people-caused, internal process-caused, system-caused, damage to physical assets, external events and legal-caused operational risks (LORs).

Design/methodology/approach – A descriptive survey research design was employed. The population comprised all DMBs in Nigeria, with the sample including all 19 banks holding national and international authorisation. Primary data were collected through structured questionnaires administered to 25 senior management staff per bank using random sampling. Data were analysed to determine the effect of each OR category on operational performance (OP).

Findings – The results revealed that people-caused ($\beta = 0.619$, $t = 12.872$, $p < 0.001$), internal process-caused ($\beta = 0.285$, $t = 4.547$, $p < 0.001$), system-caused ($\beta = 0.694$, $t = 17.394$, $p < 0.001$), damage to physical assets ($\beta = 0.718$, $t = 16.920$, $p < 0.001$) and external events-caused risks ($\beta = 0.735$, $t = 19.884$, $p < 0.001$) all had significant positive influences on OP. LORs ($\beta = 0.253$, $t = 1.223$, $p = 0.222$) were not statistically significant.

Research limitations/implications – These findings highlight the critical impact of various ORs on the OP of DMBs in Nigeria, emphasising the need for comprehensive risk management strategies.

Originality/value – The study provides empirical evidence on the category-specific effects of ORs on bank performance in Nigeria. By identifying the most impactful risk dimensions, it offers practical insights for developing targeted OR management frameworks to enhance resilience and performance in the banking sector.

Keywords Operational risks, Operational performance, Deposit money banks, People caused risks, Internal processes risks, Systems risks, Damage to physical assets risks, External events risks, Legal issues risks

Paper type Research article

1. Introduction

How do operational risks (ORs) influence the operational performance (OP) of deposit money banks (DMBs) in Nigeria? Attempts have been made to answer this question through empirical investigations conducted in both developed and developing economies, providing specific information on the relationship between ORs and OP. Developed and developing economies cannot do away with the architecture of DMBs. They are key financial intermediaries who mobilise savings, provide credit, encourage small and medium-sized enterprises (SMEs) and promote economic growth and stability. OP of these institutions conceptualised in terms of innovativeness, quality, flexibility, speed of delivery and cost-efficiency is critical in maintaining competitiveness, coping with the demands of diverse customers and staying afloat in a dynamic banking environment (Ward *et al*., 1998; Boyer and Lewis, 2002; Leong *et al*., 1990; Odesola, 2025; Odesola *et al*., 2025). Along the way, ORs have emerged as a significant challenge affecting the capacity of DMBs to sustain and enhance OP. ORs are very wide and involve a wide variety of exposures, including human errors, system failures, poor internal processes, legal ambiguity, physical damage and external circumstances. The swift transition of financial services to a digital form, combined with increasing regulatory challenges and

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exposure to systemic shocks, further heightens the susceptibility of banks to the following risks. With the increase in the volatility and complexity of the operational environment, efficient management and comprehension of ORs are becoming strategic necessities to the sustainability and perpetual performance of DMBs; circumstances that are highly pronounced in emerging economies that exhibit premature infrastructural development and massive socio-economic diversity (Ogbuga *et al*., 2022).

Global regulation, as outlined in Basel II, emphasises the importance of OR management in institutions to withstand pressure. It is generally commonplace that empirical studies comprising those by Ko *et al*. (2019), Hunjra *et al*. (2022), Ekinci and Poyraz (2019a, b) have mainly investigated the association between OR and a financial performance outcome (e.g. the ratio of the returns in assets, equity or net interest margin). Although helpful, such studies do not provide much information on how ORs achieve an impact in terms of multidimensional OP; after all, it is a construct that comprehensively describes the competitive capabilities that sustainably guide banks to success. Such a one-dimensional consideration of financial indicators overlooks the subtle manner in which ORs influence day-to-day operations, service delivery, costs and innovation capabilities essential to bank sustainability. Such a research gap is especially glaring given the formative operations management literature that maintains that dimensions of operations performance have a superior ability to forecast sustained competitiveness than do financial measures alone, particularly, in the face of uncertainty and diversity of customers (as dramatically evident in case of the banking sector in Nigeria) (Ward *et al*., 1998; Leong *et al*., 1990; Boyer and Lewis, 2002).

Nevertheless, these studies are ill-founded, in that they seldom operationalise OP with validated competitive priorities regarding OR, particularly in culturally diversified and structurally complex emergent markets. In addition, a major methodological drawback plagues most of the available literature: the excessive use of secondary data derived from audited accounts and annual reports. This may be because such archival datasets can be non-granular and do not capture the operational realities of OR exposures and their direct effects on performance outcomes, which are institution-specific. The use of primary data, informed by the experience of senior bank employees, provides a more up-to-date and contextualised picture. However, it is not utilised to its full potential, particularly in Africa.

The research is fascinating in the context of Nigeria. As the largest economy in Africa and a multicultural entity comprising more than 250 ethnic groups and distinct federal institutional frameworks, the African banking sector faces a series of regulatory and infrastructural intricacies, as well as sociopolitical risks, which define the risk exposure and the way the banking sector manages these risks. The roles of Nigerian DMBs are multifaceted: they introduce the concept of financial inclusion through digital innovation, drive the development of SMEs, finance major critical infrastructure investment projects and ultimately have a significant impact on employment and GDP growth. However, on the other hand, their central location increases their susceptibility to various ORs, which may lead to loss in service quality, high costs, customer faith and competitive strength, unless they are well-handled. Past empirical research in Nigeria investigating the issue of OR and financial or organisational performance by Abubakar *et al.* (2023a, b), Olabisi-Ayodele and Salawu (2021) and Ololade *et al*. (2023) has provided significant insights into the topic. However, the main findings of these studies are the use of financial proxies, extensive reliance on secondary archival data and little concern for OP aspects that influence customer satisfaction and operational excellence. It exposes apparent empirical, methodological and population gaps:

(1) *Empirical gap:* The direct influence of ORs on the competitive dimensions of OP – cost, quality, delivery, flexibility and innovation – remains largely unexamined.

(2) *Methodological gap:* The scarcity of primary data-based investigations hinders our understanding of the current and contextual dynamics that influence OR and performance linkages.

(3) *Population gap:* Limited research, especially with primary data, addresses this relationship within Nigeria's distinct cultural and institutional context, undermining the external validity of findings from other settings.

In response to these gaps, the current research explores the impact of various ORs, including people, processes, systems, external events, legal issues and damage to physical assets, on the OP of Nigerian DMBs. The researchers target national and international DMBs that have widely distributed branch expenditures and a broad set of clients, as this approach covers local market differences and structural heterogeneity. The questionnaire was designed to collect data based on structured questionnaires administered to 25 senior employees in each bank, totalling 475 respondents, who held positions critical to operations, risk management, internal audit, legal compliance and controls. By operationalising OP based on the competitive priorities of the operations management literature, this study provides a foundation for innovating the multidimensional analysis of performance outcomes informed by ORs. The analysis, conducted using structural equation modelling (SEM), sheds light on the nuanced relationship between various types of OR and OP aspects, providing a unique empirical foundation in the body of knowledge on risk management and operational strategy in developing economies. The study not only expands academic knowledge but also adds value to the work of addressing the global financial crisis, based on evidence. Nigerian banks and regulatory agencies can implement measures to build their operational resilience, competitive adaptability and customer-oriented service provision in a complex risk environment. Overall, this paper contributes to both theory and practice by examining the influence of ORs on the daily competitiveness and sustainability of DMBs in the changing Nigerian financial environment. It fills significant knowledge gaps using primary data and applies a localised perspective to OP.

2. Literature review

2.1 Operational risk

As noted earlier, several definitions have been proposed to explain the concept of OR. ORs refer to the potential for financial loss or damage due to the failure of a company's operational processes, systems or people. The ORs include risks related to information technology, human error, natural disasters and other unexpected events. Simply put, OR is the risk of how a company runs its business. ORs were described by Basel (1999) as the dissipation emanating from human beings, insufficient or malfunctioning internal procedures, structures or external incidences. The OR concept has evolved significantly since the Basel Committee on Banking Supervision's (1999) foundational work. The Basel II framework (BCBS, 2006) marked a significant milestone in formally recognising OR and introducing a definition centred on internal process failures, human error, system inadequacies or external events. Three capital allocation methods were proposed: the basic indicator approach (BIA), the standardised approach (SA) and the advanced measurement approach (AMA). Subsequent regulatory updates, including Basel III and IV, have refined these approaches, introducing the standardised measurement approach (SMA) to replace AMA, providing a more consistent and risk-sensitive framework (BCBS, 2017).

Meanwhile, King (2001) described OR as a means of evaluating the relationship or connection that unites a company's business operations to the dissimilarity in the results of that business. The author opined that a company's shareholder value can be improved by doing all that is humanly possible to reduce the sum of ORs compared to the firm's earnings. There are many ORs, but some common examples include cyber-attacks, data breaches, system failures, supply chain disruptions and legal and regulatory compliance issues. Each industry has its own unique set of ORs. While a manufacturing company worries about supply chain disruptions, DMBs are particularly concerned about cybersecurity risks. DMBs, also known as commercial banks, are a significant part of any economy and face a variety of ORs. One of the biggest

concerns for them is cybersecurity risk. This is because DMBs hold a wide range of sensitive customer data and a data breach could have serious financial and reputational consequences. From their empirical investigative study, Muehlenbrock *et al*. (2012) identified six sources of ORs. These include legal, people, external events, systems, damage to physical assets and internal processes.

2.2 Operational performance

OP refers to the effectiveness of a company's operational processes. It can also be described as a firm's ability to efficiently and effectively utilise its resources (money, materials and manpower) to achieve its objectives. It implies that OP goes beyond how well a firm's operations are running; it also involves how well they support the company's goals and objectives. Liu and Wu (2020), Odesola (2025) and Odesola *et al*. (2025) opined that OP is connected with the policies or tactics that organisations adopt as a weapon to compete in a competitive market to gain a competitive advantage over their rivals to secure a proportion of the market share, to supply products and offer services of high quality within a short time frame to ensure that their customers are satisfied. There are several methods for measuring OP. However, the most common ones are productivity (how much output is produced per unit of input), quality (the degree to which products or services meet customer expectations), time (how quickly products or services are delivered) and cost (the cost of inputs, labour and overhead).

The trio of Slack *et al*. (2010) submitted that every organisation has some total quality management benchmarks used in conducting its business and this is shown as indicators that include efficiency, productivity, cycle time, capacity utilisation, effectiveness, the perceived value of offerings, waste reduction and regulatory compliance. The authors concluded that measuring the aforementioned quality standards is referred to as OP. OP has five primary objectives: quality, reliability, flexibility, cost and speed, which organisations must consider very important when competing in competitive markets.

2.3 Operational risk and operational performance

The effect of OR on OP is complex. It is because it is being predicted that if ORs can result in downtime, financial losses as well as disruptions to the operations of a firm, it should impact negatively on the OP of the firm, except the ORs are managed efficiently and effectively to ensure that the attendant effects of the ORs are brought to the barest minimal and to be of no effect on OP. Odesola (2025) opined that OP focuses on the efficiency and effectiveness of internal processes and operations. It is measured using proxies such as the quality of products/services, flexibility, operational costs and speed of delivery, as highlighted in this study. These metrics assess how well an organisation executes its core functions to deliver customer value.

A substantial gap in the empirical literature is evident regarding the association between ORs and OP of DMBs in Nigeria, despite the country's strategic position in Africa and the West African sub-region. Although several empirical investigative studies that include Abubakar *et al*. (2023a, b), Ololade *et al*. (2023), Ogbuga *et al*. (2022), Onyefulu *et al*. (2022), Abubakar *et al*. (2021a, b), Olufemi and Sunmisola (2022), Olabisi-Ayodele and Salawu (2021) had investigated the influence of many varied dimensions of risk on either performance or financial performance of DMBs, however, the relationship connecting the various dimensions of risk to OP has not adequately explored not only in Nigeria, Africa but globally (Muehlenbrock *et al*., 2012; Hussain and Al-Ajmi, 2012; Koch and Macdonald, 2014; Ko *et al*., 2019). The aforementioned previous empirical investigations ignored the strategic position of OP in determining the financial performance of businesses. It is evident from the review of previous empirical investigations that the relationship between all other types of risk except OR has been adequately explored. However, many empirical investigations have not been conducted to examine the relationship between OR and OP in a developing economy, especially in Nigeria. In light of the above, this study adopted the causes of ORs identified by

Muehlenbrock *et al*. (2012) to investigate the relationship between ORs and OP among DMBs in a developing economy like Nigeria.

3. Hypothesis development

This section establishes the hypotheses for the current study.

3.1 Legal operational risks (LORs) and operational performance (OP)

Muehlenbrock *et al*. (2012), based on their empirical investigation, described LORs as risks arising from a lack of certainty or predictability owing to a company's legal actions (in this case, DMBs) or a lack of certainty or predictability in applying or elucidating policies, laws, contracts or regulations by a company in the course of carrying out its operations. Examples include lawsuits and failure to comply with guidelines or rules, such as the withdrawal of contracts by the Central Bank of Nigeria. This study proposes that LORs will have a significant effect, influence or impact on the OP of DMBs in a developing economy like Nigeria. For instance, if a company, in this case, any of the DMBs, violates any of the laws or regulations guiding its operations in Nigeria, such a bank will be heavily fined, impacting its bottom line. LORs can damage the company's reputation, negatively impacting its ability to attract and retain customers. In some extreme cases, LORs can cause a business outfit to close the shop completely.

Although several empirical investigative studies that include Abubakar *et al*. (2023a, b), Ololade *et al*. (2023), Ogbuga *et al*. (2022), Onyefulu *et al*. (2022a, b), Abubakar *et al*. (2021a, b), Olufemi and Sunmisola (2022), Olabisi-Ayodele and Salawu (2021) had been carried out a substantial gap in the empirical literature is evident concerning the association connecting legal, operational risks (ORs) to OP of DMBs in Nigeria despite the strategic position of the country is occupying in Africa and West Africa sub-region even though DMBs in Nigeria operate in a highly regulated and dynamic business environment. Although DMBs have increasingly embraced appropriate and sustained risk management practices to achieve an improved OP, empirical evidence concerning the relationship between LORs and OP is lacking. However, there is a shortage of empirical studies assessing the impact of LORs on the OP of DMBs in emerging economies like Nigeria. Consequently, this research hypothesises that:

H1. LORs have a significant positive effect on the OP of Nigerian DMBs.

3.2 People Operational Risks (PORs) and operational performance (OP)

Muehlenbrock *et al*. (2012) also identified people as another cause of ORs. The authors described LORs as losses that are deliberately or inadvertently caused by a member or members of a company or damages caused as a result of the association or connection that a company (in this case, any of the DMBs) has with either its customers, owners, third parties or regulators (in Nigeria, it could be Central Bank of Nigeria, Nigerian Deposit Insurance Corporation, Federal Government or its agencies or Assets Management Company of Nigeria). This study proposes that PORs, risks due to human error or misconduct, can significantly impact the OP of DMBs because they can lead to data breaches, safety incidents or even catastrophic failures of the DMBs in Nigeria. Examples of PORs include illegal trading, fraud within the company, unlawful termination of a staff member's appointment, harassment and discrimination in sales, among others.

Several empirical investigative studies that include Abubakar *et al*. (2021a, b, 2023a, b), Ololade *et al*. (2023), Ogbuga *et al*. (2022), Onyefulu *et al*. (2022a, b), Olufemi and Sunmisola (2022), Olabisi-Ayodele and Salawu (2021) have been carried out. However, a substantial gap in the empirical literature is evident concerning the association connecting people's ORs and OP of DMBs in Nigeria despite the strategic position of the country occupying in Africa and

the West Africa sub-region, even though DMBs in Nigeria operate in a highly regulated and dynamic business environment. It is evident from previous empirical investigations that DMBs worldwide have deployed and continue to apply appropriate and sustained risk management practices to achieve an improved OP. However, empirical evidence regarding the relationship between PORs and OP is lacking. However, there is a shortage of empirical studies assessing the effect of PORs on the OP of DMBs in emerging economies like Nigeria. Consequently, this research hypothesises that:

H2. PORs significantly positively affect the OP of Nigerian DMBs.

3.3 Internal processes operational risks (IPORs) and operational performance (OP)

Another source of ORs discovered by Muehlenbrock *et al.* (2012) through their empirical investigation is internal processes' operational risks (IPORs). They described IPORs as damages resulting from failed transactions by DMBs, including customers' accounts, settlements and business processes that are carried out daily. This study proposes that IOPRs have a significant impact on OP because if they occur, they will lead to a decline in a company's customer productivity, efficiency and satisfaction. Specifically, a bank with outdated, inefficient or ineffective internal processes may lead to customer service delays, errors and customer frustration. IOPRs could result from a lack of communication and training because a staff member may not know how to follow procedures correctly.

Quite a lot of empirical investigative studies that include Abubakar *et al.* (2021a, b, 2023a, b), Ololade *et al*. (2023), Ogbuga *et al*. (2022), Onyefulu *et al*. (2022a, b), Olufemi and Sunmisola (2022), Olabisi-Ayodele and Salawu (2021) have been carried out. However, a substantial gap in the empirical literature is evident concerning the association between IPORs and OP of DMBs in Nigeria despite the strategic position the country is occupying in Africa and the West Africa sub-region, even though DMBs in Nigeria operate in a highly regulated and dynamic business environment. It is not an overstatement to submit that DMBs worldwide have deployed and continue to apply appropriate and sustained risk management practices to achieve an improved OP. However, the empirical evidence concerning the association between IPORs and OP has not been adequately explored. To the best of the authors' knowledge, there is a shortage of empirical studies assessing the influence of IPORs on the OP of DMBs in an emerging economy like Nigeria. Consequently, this research hypothesises that:

H3. IPORs significantly positively affect the OP of Nigerian DMBs.

3.4 System-caused operational risks (SORs) and operational performance (OP)

System-caused operational risks (SORs) are one of the sources of ORs discovered by Muehlenbrock *et al*. (2012) through their empirical investigation. SORs refer to the risks of malfunctioning or failing an organisation's information technology (IT) systems. SORs range from hardware and software to data losses or cyber-attacks. A system failure in a bank may result in downtime, data loss and in some cases, financial loss. SORs are ever-present risks because well-managed systems can fail at any time. SORs can also be described as damages incurred when a bank's business operations are disrupted or a system fails due to a lack of infrastructure or specific information and communication technology (ICT) facilities. Examples of SORs are a breakdown of the system's hardware or software, failure of telecommunications installations, errors in programming, computer viruses and disruption or outage of a utility.

More than a few empirical investigative studies that include Abubakar *et al.* (2021a, b, 2023a, b), Ololade *et al*. (2023), Ogbuga *et al*. (2022), Onyefulu *et al*. (2022a, b), Olufemi and Sunmisola (2022), Olabisi-Ayodele and Salawu (2021) have been carried out. However, a substantial gap in the empirical literature is evident concerning the association connecting SORs to OP of DMBs in Nigeria despite the strategic position the country is occupying in

Africa and the West Africa sub-region, even though DMBs in Nigeria operate in a highly regulated and dynamic business environment. This study suggests that SORs have a significant effect on OP. For instance, when a system goes down, it can result in a complete halt to a bank's operations, leading to a decline in productivity and revenue. Even when the system failure is not severe, it can also lead to inefficiencies and delays in operations. A slow system may waste time waiting for pages or files to load, resulting in a significant loss of productivity over time. Although DMBs in developed and developing economies have increasingly embraced appropriate and sustained risk management practices to achieve an improved OP, empirical evidence concerning the connection between SORs and OP is lacking. There is a shortage of empirical studies assessing the influence of SORs on the OP of DMBs in an emerging economy like Nigeria. Consequently, this research hypothesises that:

H4. SORs significantly positively affect the OP of Nigerian DMBs.

3.5 External events' operational risks (EEORs) and operational performance (OP)

The sixth OR discovered by Muehlenbrock *et al.* (2012) are external event operational risks (EEORs). EEORs are described as damages resulting from the activities of third parties, which may include fraud perpetrated by external individuals, losses to properties or assets or losses due to changes in regulations and attendant effects on a company's ability to continue operating as a business entity. EEORs can also be described as risks originating from outside a firm, such as natural disasters, political instability and pandemics like COVID-19. These events may significantly impact a company's OP, as damage to assets or pandemics can result in a loss of revenue or a decrease in demand for products or services. In some cases, such as with COVID-19, the business may have to close completely. Examples of EEORs are extortion, computer-related crime and credit card-related fraud. This study opines that EEORs would significantly affect businesses' operations, but the magnitude of the effect would depend on the severity of the events and the specific business. Its impacts could be severe, resulting in a shutdown of operations and substantial financial loss for DMBs. At the same time, EEORs may be less severe for other businesses, but they can still disrupt business operations and cause significant financial loss.

Some empirical investigative studies that include Abubakar *et al.* (2021a, b, 2023a, b), Ololade *et al.* (2023), Ogbuga *et al.* (2022), Onyefulu *et al.* (2022a, b), Olufemi and Sunmisola (2022), Olabisi-Ayodele and Salawu (2021) have been carried out. However, a substantial gap in the empirical literature is evident concerning the association connecting EEORs and OP of DMBs in Nigeria despite the strategic position the country is occupying in Africa and the West Africa sub-region, even though DMBs in Nigeria operate in a highly regulated and dynamic business environment. It is evident from previous empirical investigations conducted in developed or developing economies that DMBs have deployed and continue to apply appropriate and sustained risk management practices to achieve an improved OP. However, the empirical evidence concerning the relationship between EEORs and OP has not been adequately explored. There is a shortage of empirical studies assessing the effect of EEORs on the OP of DMBs in an emerging economy like Nigeria. Consequently, this research hypothesises that:

H5. EEORs significantly positively affect the OP of Nigerian DMBs.

3.6 Damage to physical assets' operational risks (DPAORs) and operational performance (OP)

Also, Muehlenbrock *et al.* (2012) discovered another source of ORs: damage to physical assets operational risks (DPAORs). They described DPAORs as damages resulting from physical assets (such as buildings, equipment, computers and vehicles) or losses resulting from natural disasters that are beyond the control of the bank or a company or other unforeseen events. The DPAORs can lead to direct costs (repairing or replacing the damaged assets) and indirect

costs (loss of productivity). Examples of DPAORs include losses due to natural disasters and human losses resulting from external sources, such as vandalism and terrorism. Several factors, including accidents, natural disasters and vandalism, can cause the DPAORs. This study opines that DPAORs significantly affect the OP of DMBs because if equipment is damaged or lost, it may lead to a halt or delay in production. If, for example, the building is damaged by a storm or wind, the operations of such a firm will be disrupted, leading to a loss in revenue and an increase in costs as money will be spent on repairs or replacement, as the case may be.

Numerous empirical investigative studies that include Abubakar *et al*. (2021a, b, 2023a, b), Ololade *et al*. (2023), Ogbuga *et al*. (2022), Onyefulu *et al*. (2022a, b), Olufemi and Sunmisola (2022), Olabisi-Ayodele and Salawu (2021) have been carried out. However, a substantial gap in the empirical literature is evident concerning the association between DPAORs and OP of DMBs in Nigeria despite the strategic position the country is occupying in Africa and the West Africa sub-region, even though DMBs in Nigeria operate in a highly regulated and dynamic business environment. It is not an overstatement to submit that DMBs in developed or developing economies are making concerted efforts to deploy and continue applying appropriate and sustained risk management practices to achieve an improved OP. However, the empirical evidence concerning the association connecting DPAORs to OP has not been adequately explored. There is a shortage of empirical studies assessing the influence of DPAORs on the OP of DMBs in emerging economies like Nigeria. Consequently, this research hypothesises that:

H6. DPAORs significantly, positively affect the OP of Nigerian DMBs.

4. Theoretical justification

The risk-return trade-off theory (RRTOT) provides a rigorous framework for understanding the intricate relationship between ORs and OP in DMBs. Although RRTOT was historically used in cases involving financial matters, where it is applied to measure investment choice, the concepts can also be successfully applied in cases involving OR in banks. In the banking sector, where risk exposure directly impacts the delivery of services, customer trust and financial sustainability, it is imperative. DMBs also undertake several businesses, including lending and investment, financial intermediation and the digital service sector, which expose them to distinct ORs. These risks comprise people-caused operational risks (POR; e.g. errors or misconduct of employees), IPORs (e.g. improper procedures and controls), SORs (e.g. technology failure and hacking), DPAORs (e.g. damage to the branch facilities and the automated teller machines), EEORs (e.g. natural disaster or decline in business) and LORs (e.g. regulatory violation or legal suits). All these types of risks have different management approaches, which makes OR management in DMBs quite complicated. As RRTOT implies, to achieve higher returns, it is essential to be willing to take a significantly greater risk. Within the context of the DMBs, banks that aim to enhance the OP of their operations, taking into account operational efficiency, continuity and customer satisfaction, must critically control their exposure to OR. To overcome such a dilemma, banks have several OR management options, such as:

(1) Routine risk evaluation and auditions to determine possible weaknesses.

(2) Use of strong internal controls and a computerised system to curb risks.

(3) Spending on digital infrastructure and cybersecurity in order to secure against the risks associated with technologies.

(4) Awareness and staff training to create a risk-minded culture.

(5) Business continuity planning is a means of making the operation resilient in the face of perturbation.

Regulations, Such as External regulatory requirements like Capital Adequacy Ratios (CAR) and Stress Testing (ST), also play a vital role in defining risk management practices of banks. By inserting the RRTOT into a sector-specific framework, this study will likely provide an in-depth understanding of how ORs affect DMB performance and can inform the development of appropriate risk management strategies.

5. Methodology

5.1 Nigeria banking industry

Nigeria's banking industry is a vital sector in the country's economy. It includes 19 permitted DMBs that hold a commercial banking license, operating under both foreign and domestic authorisation (CBN, 2024), as shown in Table 1. To make the industry more stable and competitive, the following reforms happened: consolidation and recapitalisation. Notwithstanding these challenges, the industry continues to face difficulties, including ORs that may impact its performance and stability.

5.2 Methods of empirical analysis

This study employed a descriptive survey research design to collect data from the sampled DMBs in Nigeria. The survey instrument was administered to senior-level managers, including operation managers, internal auditors, financial officers and legal officers. The study utilised Partial Least Squares Structural Equation Modelling (PLS-SEM) to examine the effect of operational hazards on the OP of DMBs in Nigeria.

5.3 Questionnaire

A well-structured and self-administered questionnaire was used to measure the ORs and OP in DMBs in Nigeria – the questionnaire consisted of three parts – the initial part utilised

Table 1. List of commercial banks with international and national authorisations

SN	Name of institution	License type
1.	Access Bank Plc	International Authorisation
2.	Fidelity Bank Plc	International Authorisation
3.	First City Monument Bank Plc	International Authorisation
4.	First Bank Nigeria Limited	International Authorisation
5.	Guaranty Trust Bank Plc	International Authorisation
6.	Union Bank of Nigeria Plc	National Authorisation
7.	United Bank of Africa Plc	International Authorisation
8.	Zenith Bank Plc	International Authorisation
9.	Citibank Nigeria Limited	National Authorisation
10.	Ecobank Nigeria Plc	National Authorisation
11.	Heritage Bank Limited	National Authorisation
12.	Keystone Bank Limited	National Authorisation
13.	Polaris Bank Plc	National Authorisation
14.	Stanbic IBTC Bank Plc	National Authorisation
15.	Standard Chartered Bank Plc	National Authorisation
16.	Sterling Bank Plc	National Authorisation
17.	Titan Trust Bank Limited	National Authorisation
18.	Unity Bank Plc	National Authorisation
19.	Wema Bank Plc	National Authorisation

Source(s): CBN (2024)

demographic information, including gender, age and level of education. The second section was used to measure the dimensions of ORs that are likely to be faced in companies; these are LORs, PORs, IPORs, SORs, EEORs and DPAORs on a five-point Likert scale. There were several items to measure each dimension. The third segment analysed the variables of performance within the operations, examining efficiency, effectiveness, continuity and resilience on a 5-point Likert scale. The design of the questionnaire revolves around the existing literature that is based on the works written by Ko *et al*. (2019), Abubakar *et al.* (2021a, b), Hunjra *et al*. (2022) and Abubakar *et al.* (2023a, b). Such operationalisation provided construct-specific measurement of the association between ORs and performance as it complements theoretical premises and industrial practice.

5.4 Data collection

A total of 25 individuals were issued questionnaires in each of the sampled banks, resulting in a total of 475 questionnaires analysed in the study. The respondents were top managers, namely operation managers, internal auditors, financial officers and legal officers.

5.5 Main variables and models

ORs and OP were the main variables investigated in this paper. Partial Least Squares Structural Equation Modelling (PLS-SEM) was used in the study to compare the consequences of operational hazards on the OP of DMBs in Nigeria.

5.6 Validity of the research instrument

Experts carefully studied the questionnaire to ascertain its validity and clarity. To verify its construct validity, a preliminary study was also conducted using a smaller sample size in the manufacturing sector, which was not part of the main study.

5.7 Reliability of the research instrument

The reliability and internal consistency of the collected data were assessed using Cronbach's Alpha. It was found that the given questionnaire was both reliable and internally consistent.

5.8 Model specification and data analysis techniques

The current study employed the concept of partial least squares structural equation modelling (PLS-SEM) to examine the dimensions of OR and their relationships with OP. The PLS-SEM can be used when there are numerous constructs and indicators and when a theory has to be built or an outcome predicted (Hair *et al*., 2019). The structural model was used to test the unmediated impact of 6 OR dimensions on OP:

LOR → OP

POR → OP

IPOR → OP

SOR → OP

EEOR → OP

DPAOR → OP

To determine the strength and significance of the relationship, path coefficients (β), standard deviations, t-values and *p*-values were estimated. The model was able to explain 68.2% of the variance in OP ($R^2 = 0.682$), thus showing that the OR dimensions had a considerable impact. The analysis was carried out using SmartPLS 4.0, which enabled the measurement model to be measured and the hypothesis to be tested. Bootstrapping (5,000 subsamples) yielded a robust

standard error and statistically significant results. This approach facilitated a comprehensive examination of the relationships between ORs and performance.

5.9 Ethical considerations

The study ensured that all respondents provided informed consent before participating in the survey. The questionnaire was designed to ensure confidentiality and anonymity and all data collected were stored securely to prevent unauthorised access.

6. Results

6.1 Reliability and validity analysis

Table 2 shows the factor loadings, Cronbach's alpha, composite reliability (CR) and average variance extracted (AVE) for each construct. All constructs except IPOR showed acceptable reliability and validity. For DPAOR, all item loadings were above 0.70. Cronbach's alpha was 0.828, CR was 0.886 and AVE was 0.660, which met the thresholds of $\alpha \geq 0.70$, CR ≥ 0.70 and AVE ≥ 0.50. EEOR had item loadings ranging from 0.813 to 0.867. Cronbach's alpha was 0.847, CR was 0.897 and AVE was 0.686. These values indicate good internal consistency and convergence validity. IPOR showed low reliability and validity. One loading (IPOR3) was 0.525 and another (IPOR1) was 0.589. Cronbach's alpha was 0.660, CR was 0.773 and AVE was 0.468. AVE was below the 0.50 threshold, suggesting weak convergent validity. This may indicate measurement issues within the IPOR construct. LOR had loadings above 0.70.

Table 2. Reliability and validity analysis output

Constructs	Indicators	Loadings	Cronbach's alpha	CR	AVE
DPAOR	DPAOR1 ← DPAOR	0.775	0.828	0.886	0.660
	DPAOR2 ← DPAOR	0.813			
	DPAOR3 ← DPAOR	0.824			
	DPAOR4 ← DPAOR	0.836			
EEOR	EEOR1 ← EEOR	0.815	0.847	0.897	0.686
	EEOR2 ← EEOR	0.813			
	EEOR3 ← EEOR	0.816			
	EEOR4 ← EEOR	0.867			
IPOR	IPOR1 ← IPOR	0.589	0.660	0.773	0.468
	IPOR2 ← IPOR	0.829			
	IPOR3 ← IPOR	0.525			
	IPOR4 ← IPOR	0.749			
LOR	LOR1 ← LOR	0.830	0.777	0.851	0.589
	LOR2 ← LOR	0.745			
	LOR3 ← LOR	0.790			
	LOR4 ← LOR	0.701			
POR	POR1 ← POR	0.847	0.874	0.914	0.726
	POR2 ← POR	0.847			
	POR3 ← POR	0.849			
	POR4 ← POR	0.865			
SOR	SOR1 ← SOR	0.703	0.784	0.861	0.609
	SOR2 ← SOR	0.775			
	SOR3 ← SOR	0.862			
	SOR4 ← SOR	0.772			

Note(s): CR = composite reliability (rho_c), AVE = Average Variance Extracted. DPAOR = Damaged to Physical Assets caused OR, EEOR = External Events caused OR, IPOR = Internal Processes caused OR, LOR = Legal caused OR, POR = People caused OR and SOR = Systems caused OR

Source(s): Researchers' Computation, 2024

Cronbach's alpha was 0.777, CR was 0.851 and AVE was 0.589. These results meet the accepted criteria. POR showed high reliability and validity, with all loadings above 0.84. Cronbach's alpha was 0.874, CR was 0.914 and AVE was 0.726, indicating strong internal consistency and convergent validity. SOR also showed acceptable reliability. Loadings ranged from 0.703 to 0.862. Cronbach's alpha was 0.784, CR was 0.861 and AVE was 0.609. These results indicate that five constructs (DPAOR, EEOR, LOR, POR and SOR) have strong psychometric properties.

6.2 Discriminant validity criteria

Discriminant validity was assessed using the Fornell–Larcker criterion, as shown in Table 3. The square roots of the AVEs are shown on the diagonal. Each construct's AVE square root was higher than its correlation with any other construct. For instance, DPAOR had a square root of AVE of 0.812, which was greater than its correlation with EEOR (0.608), IPOR (0.230), LOR (0.196), POR (0.494) and SOR (0.562). Similarly, POR had a square root of AVE of 0.852, which is higher than its correlations with other constructs, such as EEOR (0.582), SOR (0.551) and DPAOR (0.494). These values confirm that each construct is empirically distinct from the others, thus satisfying the Fornell-Larcker criterion.

6.3 Multicollinearity test

Table 4 presents the variance inflation factor (VIF) values for the predictive constructs. All VIF values are below the standard threshold of 5.0, indicating the absence of multicollinearity. Specifically, the VIF values range from 1.080 for LOR to 2.856 for EEOR. The values for

Table 3. Fornell–Larcker criterion output

Constructs	DPAOR	EEOR	IPOR	LOR	POR	SOR
DPAOR	0.812					
EEOR	0.608	0.828				
IPOR	0.230	0.306	0.684			
LOR	0.196	0.158	0.094	0.768		
POR	0.494	0.582	0.320	0.252	0.852	
SOR	0.562	0.761	0.297	0.189	0.551	0.780

Note(s): DPAOR = Damaged to Physical Assets caused OR, EEOR = External Events caused OR, IPOR = Internal Processes caused OR, LOR = Legal caused OR, POR = People caused OR, SOR = Systems caused OR and OP Operational Performance

Source(s): Researchers' Computation, 2024

Table 4. Variance inflation factor (VIF) output

Constructs	VIF
DPAOR → OP	1.718
EEOR → OP	2.856
IPOR → OP	1.147
LOR → OP	1.080
POR → OP	1.723
SOR → OP	2.560

Note(s): DPAOR = Damaged to Physical Assets caused OR, EEOR = External Events caused OR, IPOR = Internal Processes caused OR, LOR = Legal caused OR, POR = People caused OR, SOR = Systems caused OR and OP Operational Performance

Source(s): Researchers' Computation, 2024

DPAOR (1.718), IPOR (1.147), POR (1.723) and SOR (2.560) also remain within acceptable limits. These results suggest that the predictor constructs do not pose multicollinearity issues in the structural model.

H1. Effect of POR on the OP of DMBs in Nigeria

The path analysis for H1 tested the effect of POR on the OP of DMBs in Nigeria. Table 5 shows that POR has a strong and statistically significant positive effect on OP, with a standardised coefficient of 0.619, $t = 12.872$ and $p < 0.001$. This result confirms that people-related risks have a significant influence on operational outcomes. The adjusted R-squared value is 0.381, indicating that approximately 38.1% of the variance in OP is explained by POR alone. Model fit indices demonstrate that the model fits the data very well. The SRMR value is 0.034, which is below the standard threshold of 0.08, indicating a good fit between observed and predicted correlations. The d_ULS value is 0.062 and the d_G value is 0.035, both suggesting minimal discrepancies between the empirical and model-implied correlation matrices. The Chi-square value is 83.749 and the NFI is 0.961, which is well above the acceptable level of 0.90, indicating excellent model fit. As shown in Figure 1, all POR indicators (POR1 to POR4) have high and significant loadings, confirming strong measurement reliability. The OP node includes an adjusted R-square of 0.381, visually reinforcing the explained proportion of variance explained.

H2. Influence of IPORs on the OP of DMBs in Nigeria

The path analysis for H2 examined the influence of IPOR on the OP of DMBs in Nigeria. Table 6 and Figure 2 show that IPOR has a positive and statistically significant effect on OP, with a standardised coefficient of 0.285, $t = 4.547$ and $p < 0.001$. This indicates that internal process-related risks contribute meaningfully to variations in OP. The adjusted R-squared is 0.079, indicating that IPOR alone explains approximately 7.9% of the variance in OP. The model fit statistics support an acceptable model structure. The SRMR value is 0.072, which is below the 0.08 threshold, indicating a good fit. The d_ULS is 0.283 and the d_G is 0.060, suggesting that the model does not significantly deviate from the observed data. The Chi-square value is 139.551 and the NFI is 0.908, which exceeds the minimum acceptable level of 0.90. As seen in Figure 3, all IPOR indicators (IPOR1 to IPOR4) are retained in the model and demonstrate significant outer loadings, confirming the reliability of the measurement model. The OP node displayed an adjusted R-square value of 0.079, consistent with the variance explained in the statistical table.

Table 5. Effect of People's caused OR on operational performance

Hypothesised path	Coef	Mean	STDEV	T statistics	*P* Values
POR → OP	0.619	0.624	0.048	12.872	0.000

	Estimated model
R-Square	0.383
Adj. R-Square	0.381
SRMR	0.034
d_ULS	0.062
d_G	0.035
Chi-square	83.749
NFI	0.961

Source(s): Researchers' Computation, 2024

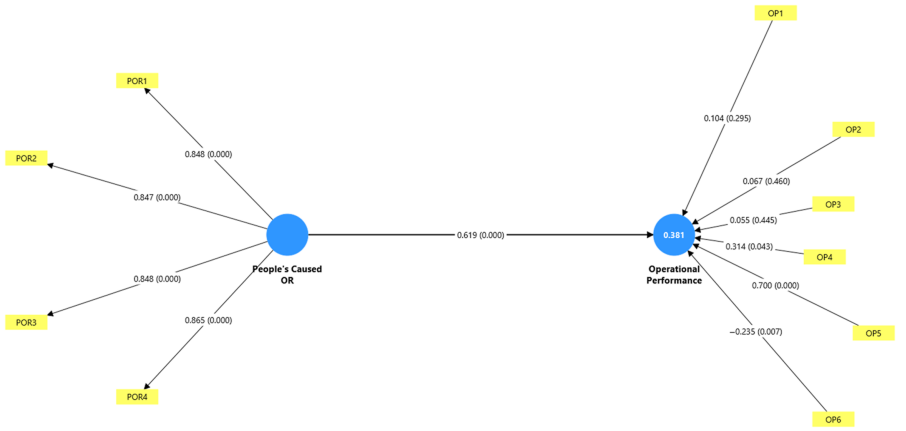

Figure 1. Path analysis of people-caused ORs and operational performance. Source: Smart PLS graphic output

Table 6. Effect of internal processes' caused OR on operational performance

Hypothesised path	Coef	Mean	STDEV	*T* statistics	*p* Values
IPOR → OP	0.285	0.316	0.063	4.547	0.000

	Estimated model
R-Square	0.082
Adj. R-Square	0.079
SRMR	0.072
d_ULS	0.283
d_G	0.060
Chi-square	139.551
NFI	0.908

Source(s): Researchers' Computation, 2024

H3. Influence of SOR on the OP of DMBs in Nigeria

The path analysis for H3 evaluated the influence of SOR on the OP of DMBs in Nigeria. Table 7 shows that SOR has a strong and statistically significant positive effect on OP, with a standardised coefficient of 0.694, $t = 17.394$ and $p < 0.001$. This result indicates that risks related to systems significantly enhance the explanatory power for OP. The adjusted R-squared value was 0.481, meaning that SOR alone accounts for 48.1% of the variance in OP. The model fit indices confirm a well-fitting model. The SRMR value is 0.051, which is below the acceptable threshold of 0.08, indicating minimal residual differences between observed and predicted values. The d_ULS is 0.143 and the d_G is 0.067, suggesting a close approximation between empirical and model-implied correlation matrices. The Chi-square value is 152.342 and the NFI is 0.922, exceeding the 0.90 benchmark and confirming good model fit. Figure 3 displays all SOR indicators (SOR1 to SOR4) with high and significant loadings, verifying the reliability of the measurement model. The adjusted R-squared value of 0.481 is also displayed in the OP node, reinforcing the explained proportion of variance explained.

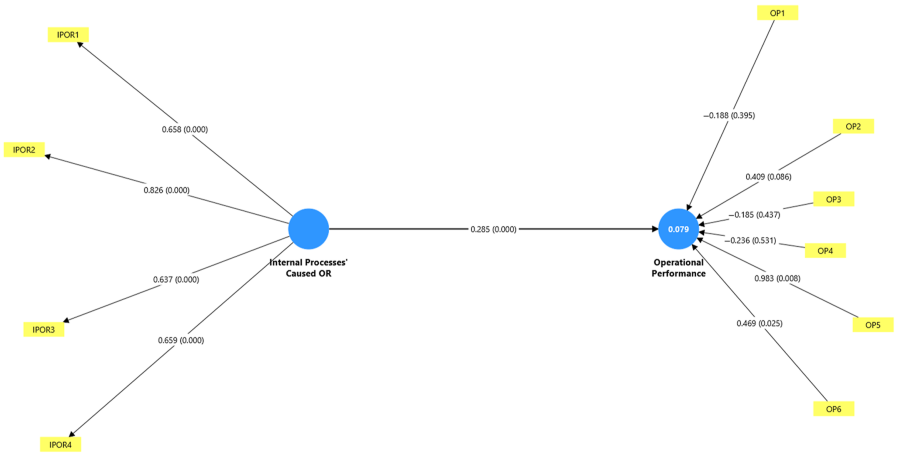

Figure 2. A path analysis of the internal process and operational performance. Source: Smart PLS Graphic Output

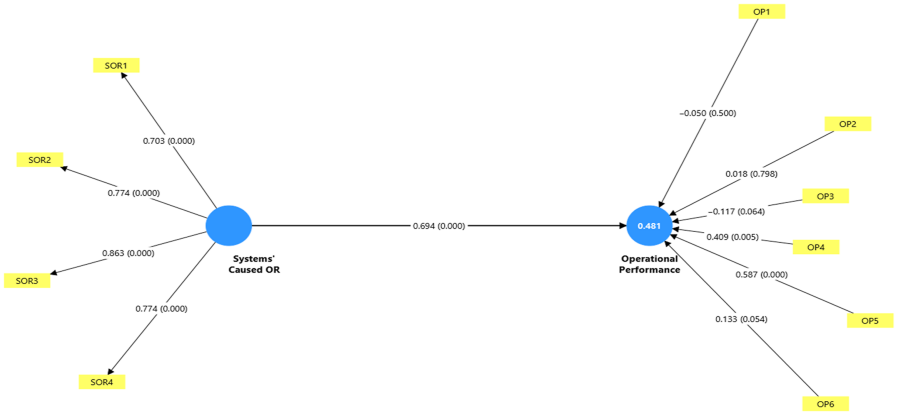

Figure 3. Path analysis of the association among systems caused by ORS and operational performance. Source: Smart PLS Graphic Output

H4. Effect of DPAOR on the OP

The analysis for H4 tested the effect of DPAOR on the OP of DMBs in Nigeria. Table 8 indicates a strong and statistically significant positive relationship, with a standardised path coefficient of 0.718, $t = 16.920$ and $p < 0.001$. It shows that DPAOR is a substantial predictor of OP. The adjusted R-squared value was 0.515, indicating that DPAOR alone accounts for 51.5% of the variance in OP. Model fit statistics confirm the model's adequacy. The SRMR value is 0.043, which is well below the threshold of 0.08, indicating a good fit. The d_ULS value is 0.100 and the d_G is 0.041, both of which suggest minimal discrepancies between the observed and model-estimated matrices. The Chi-square value is 96.068 and the NFI is 0.953, exceeding the 0.90 criterion and confirming excellent model fit. Figure 4 displays DPAOR indicators (DPAOR1 to DPAOR4) with substantial and statistically significant outer loadings. The OP node displayed an adjusted R-squared value of 0.515, confirming a high level of variance in OP explained by DPAOR.

Table 7. Effect of systems' caused OR on the operational performance

Hypothesised path	Coef	Mean	STDEV	*T* statistics	*p* Values
SOR → OP	0.694	0.699	0.040	17.394	0.000

	Estimated model
R-Square	0.482
Adj. R-Square	0.481
SRMR	0.051
d_ULS	0.143
d_G	0.067
Chi-square	152.342
NFI	0.922

Source(s): Researchers' Computation, 2024

Table 8. Effect of damage to physical assets caused by OR on the operational performance

Hypothesised path	Coef	Mean	STDEV	*T* statistics	*p* Values
DPAOR → OP	0.718	0.722	0.042	16.920	0.000

	Estimated model
R-Square	0.516
Adj. R-Square	0.515
SRMR	0.043
d_ULS	0.100
d_G	0.041
Chi-square	96.068
NFI	0.953

Source(s): Researchers' Computation, 2024

H5. Effect of EEORs on the OP of DMBs in Nigeria

The analysis for H5 examined the effect of EEOR on the OP of DMBs in Nigeria. Table 9 shows a strong and statistically significant positive relationship, with a standardised path coefficient of 0.735, $t = 19.884$ and $p < 0.001$. This confirms that EEOR has a significant impact on OP. The adjusted R-squared was 0.538, indicating that EEOR alone accounts for 53.8% of the variance in OP. Model fit indices support a well-fitting model. The SRMR value is 0.039, which is below the 0.08 benchmark, indicating an acceptable level of fit between the observed and predicted values. The d_ULS value is 0.085 and the d_G value is 0.040, both of which are within acceptable limits, indicating a low deviation from the observed correlation matrix. The Chi-square value is 94.133 and the NFI is 0.956, which exceeds the 0.90 threshold and confirms excellent model fit. As shown in Figure 5, all EEOR indicators (EEOR1 to EEOR4) load significantly onto the construct and the OP node displays an adjusted R-square of 0.538, reinforcing the proportion of variance explained by external event-related risks.

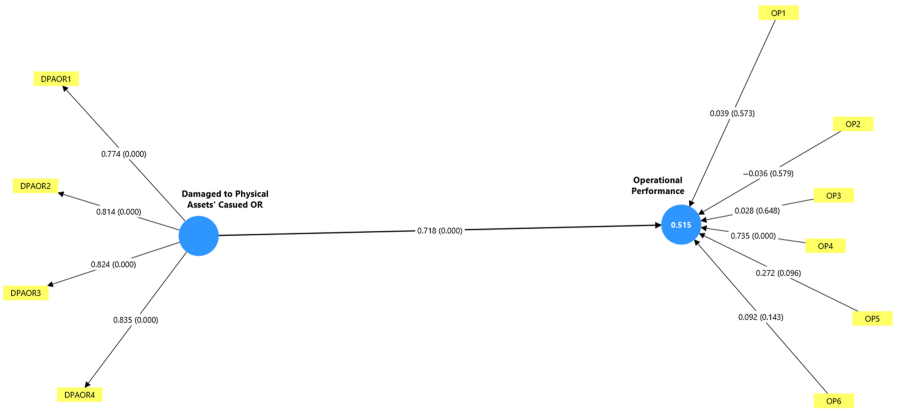

Figure 4. A path analysis of DPAOR and operational performance. Source: Smart PLS Graphic Output

Table 9. Effect of external events caused by ORs on the operational performance

Hypothesised path	Coef	Mean	STDEV	*T* statistics	*p* Values
EEOR → OP	0.735	0.737	0.037	19.884	0.000

	Estimated model
R-Square	0.540
Adj. R-Square	0.538
SRMR	0.039
d_ULS	0.085
d_G	0.040
Chi-square	94.133
NFI	0.956

Source(s): Researchers' Computation, 2024

H6. Influence of LOR on the OP of DMBs in Nigeria

The analysis for H6 investigated the effect of LOR on the OP of DMBs in Nigeria. As presented in Table 10, the hypothesised relationship was positive but not statistically significant, with a standardised path coefficient of 0.253, $t = 1.223$ and $p = 0.222$. This indicates that LOR does not have a statistically significant direct effect on OP at the conventional 0.05 level. The adjusted R-squared value is 0.062, indicating that LOR accounts for only 6.2% of the variance in OP, suggesting weak explanatory power. Model fit indices show an acceptable model structure. The standardised root mean square residual (SRMR) value of 0.068 is below the 0.08 benchmark, indicating a satisfactory fit between the predicted and observed data. The d_ULS and d_G values are 0.257 and 0.093, respectively – both within acceptable limits, suggesting reasonable model approximation. The Chi-square value is 222.716 and the normed fit index (NFI) is 0.873, which, although slightly below the ideal threshold of 0.90, still indicates a fair model fit. As illustrated in Figure 6, all observed indicators of legal-caused operational risk (LOR1 to LOR4) load onto the LOR construct, while the OP node displays an adjusted R-square of 0.062, reflecting the limited variance in OP explained by legal risk factors.

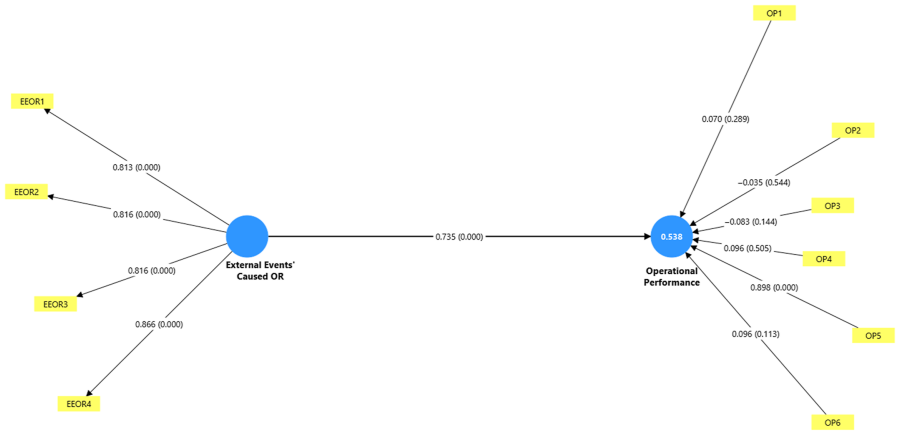

Figure 5. A path analysis of external events caused and operational performance. Source: Smart PLS Graphic Output

Table 10. Effect of legal caused OR on operational performance

Hypothesised path	Coef	Mean	STDEV	*T* statistics	*p* Values
LOR → OP	0.253	0.196	0.207	1.223	0.222

	Estimated model
R-Square	0.064
Adj. R-Square	0.062
SRMR	0.068
d_ULS	0.257
d_G	0.093
Chi-square	222.716
NFI	0.873

Source(s): Researchers' Computation, 2024

7. Discussions of findings

This study examined the impact of various OR categories on the OP of DMBs in Nigeria. The results reveal varying degrees of influence across the risk categories, consistent with earlier literature but with nuances worth exploring. The first objective explored the effect of POR on OP. The analysis revealed a strong and statistically significant relationship ($\beta = 0.619$, $t = 12.872$, $p < 0.001$), with 38.1% of the variance in performance explained by this factor. This finding aligns with Onyefulu *et al.* (2022a, b), who found that personnel misconduct, poor training and employee error significantly impaired service quality in Nigerian banks. Similarly, Ekinci and Poyraz (2019a, b) noted in their Turkish study that human factors, such as errors and insider threats, were leading contributors to operational inefficiency in banks. The results validate the notion that banking institutions, being service-intensive, are vulnerable to personnel-related disruptions if employee risk is not systematically mitigated.

The second objective evaluated the influence of IPOR. Despite reliability issues in measurement (AVE = 0.468; $\alpha = 0.660$), a moderate but significant effect was observed

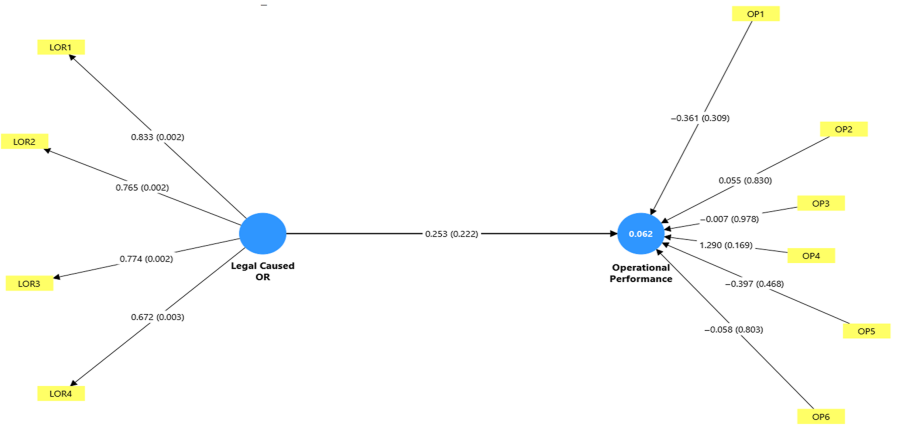

Figure 6. A path analysis of legal caused ORs and operational performance. Source: Smart PLS Graphic Output

($\beta = 0.285$, $t = 4.547$, $p < 0.001$), with an adjusted R^2 of 0.079. This suggests that while internal process flaws do influence performance, their direct impact may be smaller than other risk categories. It supports Muehlenbrock *et al*. (2012), who found that internal controls and process documentation errors in European banks had a modest but measurable effect on customer delivery efficiency. However, Ko *et al*. (2019) argue that the effect of internal processes is often amplified when coupled with IT or human error, which might explain the limited standalone effect found here.

Regarding the third objective, the findings showed that SORs had a strong and statistically significant effect ($\beta = 0.694$, $t = 17.394$, $p < 0.001$), explaining 48.1% of the variance in OP. It aligns with Abubakar *et al*. (2021a, b), who demonstrated that poor IT infrastructure and digital system failures were key factors in deteriorating banking performance in Nigeria. Likewise, Eling and Wirfs (2016) concluded, in a multi-country study, that IT-related disruptions are one of the fastest-growing sources of OR in financial institutions. Given Nigeria's increasing digital transformation in banking, this substantial impact is expected.

The fourth objective assessed the role of DPAOR in determining performance. The findings revealed a significant and strong relationship ($r = 0.718$, $t = 16.920$, $p < 0.001$) with the variance of performance explained by carrying out 51.5% of the variance. Such a finding is corroborated by an article by Abubakar *et al*. (2023a, b), which notes that vandalism, fire outbreaks and physical theft adversely affect banking efficiency and customer confidence. On the same note, another supporting factor was identified by KPMG (2020), which reported an increase in physical asset disruptions in Sub-Saharan Africa due to infrastructural vulnerabilities, thereby highlighting the relevance of this result.

The study of EEOR had a significant impact (8 = 0.735, 8 = 19.884, $p < 0.001$) on the variance explained by 53.8% in performance in the fifth target. This supports the results of Olabisi-Ayodele and Salawu (2021), who found that the decreases in the post-1999 performance of banks in Nigeria were associated with macroeconomic stability and regulatory factors. Furthermore, Chernobai *et al*. (2021) found that firms are vulnerable to external shocks, such as political instability and pandemics, which, as a rule, lead to inefficient work and increased costs.

The sixth aim of the study, in turn, explored LOR and demonstrated their lack of significance (Be = 0.253, $t = 1.223$, $p = 0.222$) and relatively poor explanatory power (Adj. $R^2 = 0.062$). This finding contrasts with those of Ko *et al*. (2019), who noted a significant impact of legal compliance failures on reputational damage and financial loss in East Asian

banks. However, this non-significance aligns with Abiola and Olausi (2014), who found that Nigerian banks have increasingly adopted compliance structures and internal legal audit mechanisms that reduce the immediate impact of legal risks on performance metrics. The result may suggest that while legal risks exist, their direct operational consequences are either well-managed or materialise less frequently than other risk categories.

In sum, the findings reveal that people-related, system-based and external event risks are the most influential OR types affecting Nigerian banks, with internal process and physical asset-related risks following. Legal risks although important, have a limited direct impact on performance in this context. These findings align with a growing body of literature that identifies technological, human and environmental factors as central to OR management in developing economies.

8. Conclusion

Based on the study's outcomes, ORs may negatively influence DMBs' quality of service/product, customer satisfaction, delivery speed of their services or products, flexibility and efficiency if appropriate management fails to implement appropriate mechanisms to manage and prevent them properly.

9. Theoretical and practical implications

The findings of this empirical study confirm that various forms of ORs – specifically, PORs, IPORs, SORs, DPAORs, EEORs and LORs – have significant impacts on the OP of DMBs in Nigeria. This paper is based on the risk-return trade-off theory and confirms this theory as well as generalises its financial application to the field of operational management. The study will be helpful to the theory in that it determines how the risk and return trade-off model can be implemented in an OR environment. It fills the emptiness that still exists between financial theory and practice, as the principle of risk versus return is as important in day-to-day operations as it is in the formulation of investments. In addition, the analysis explores new avenues for developing theoretical models that capture the complexity of ORs and their various ways of affecting performance across different sectors. In a practical sense, the paper emphasises the need to balance OR by considering both potential losses and positive performance outcomes. In the case of DMBs, this implies adopting a balance and evaluating the trade-off between exposure and risks and operational effectiveness. The results are indicative of how banks ought to:

(1) Incorporate risk-return consideration into their decision-making tools of operation;

(2) Enhance current risk management policies by making them consistent with the quantifiable achievers.

(3) Train on the development of risk-aware organisational culture through the development of human capital

(4) Reformation of the performance measurement systems, considering the presence of the OR indicators to increase resilience and strategic foresight.

To conclude the research, it is essential to note that it supports the need for financial institutions to internalise the concept of risk-return trade-offs in their operations. This will allow them to maximise performance and remain resilient to business interruptions.

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Corresponding author
Olusegun Timothy Odesola can be contacted at: segunodesola@oauife.edu.ng