Implementation of Sustainable Enterprise Risk Management (SERM) Paradigm in Enhancing Transport Sector's Performance

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Abstract

This study proposes the implementation of Sustainable Enterprise Risk Management (SERM) as a paradigm for enhancing transport sectors' performance in the Global South (GS) with a focus on the Nigerian Road Transport Sector. Sustainable transport has a key part to play in fostering sustainable economic growth and expanding access to essential services as a vital driver of economic and social development. However, transport sector faces an evolving landscape of sustainability (ESG) risks that can impact their success and even survival. It has been evidenced that current risk management practices are not adequately addressing sustainability risks. Preliminary findings have shown various organisational/institutional challenges in the Nigerian Transport sector driving the breakdown in sustainable ERM. Literature has established that organizational resilience starts at the top with the use of ERM paradigm to achieve good risk governance and organisational objective in normal, volatile and crisis situations. However, there have been a very limited literature regarding alignment of ERM with transportation sector. This paper explores contingency theory, Systems Thinking/Systems Dynamics (ST/SD, ERM Transport specific frameworks and the two dominant ERM frameworks with a view of adapting their standards and articulating the practices in the Global North (GN) to develop implementation guidance that could enhance the Nigeria road transport sector performance with reduced risk The study employs critical realism philosophy which aligns well with the potential benefits of applying sequential mixed methods research design and case study strategies using abductive approach. Secondary data from public domain will be collected to complement documentary evidence and primary data via semi-structure interview and research survey using convenience/judgement sampling techniques. These data will be analyse using text analysis and SPSS statistical analysis. It aims to provide a better understanding regarding ERM practical implementation guidance to help policy makers with improved decision-making, planning and prioritisation in the transport sector.

Keywords: Enterprise Risk Management (ERM), Systems Thinking/Systems Dynamics (ST/SD), Global North/South (GN, GS), Road Transport, Sustainability Risks

1. Introduction

This paper proposes the implementation of a Sustainable Enterprise Risk Management (SERM) for the transport sector in the Global South (GS) with a focus on the Nigeria transport sector. Transportation constitutes one of the major features of the economic development of Nigeria. It has a key part to play in fostering sustainable, inclusive, economic growth and expanding access to essential services as a vital driver of economic and social development [1]. The report from [2] below provides forecasted GDP contribution from Nigeria's Transport sector (see Figure 1).

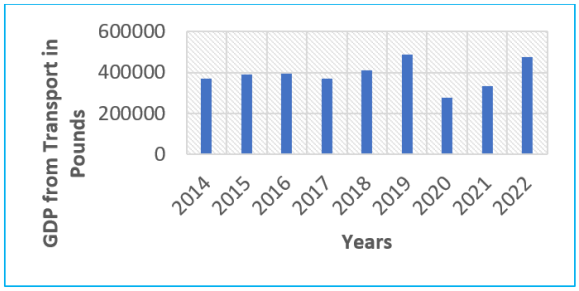

Figure 1. GDP Contribution from Transport (2)

However, the transportation sector in Nigeria is seriously challenged by under-investment in critical transport infrastructure, lack of maintenance and lack of diversity in modes of transportation as shown in (see Figure 2).

Figure 2. State of Nigeria Roads [3]

This is further exacerbated by the increase in population as shown in Figure (see Figure 3) economic growth and urbanisation-induced congestion [3], [4], [5].

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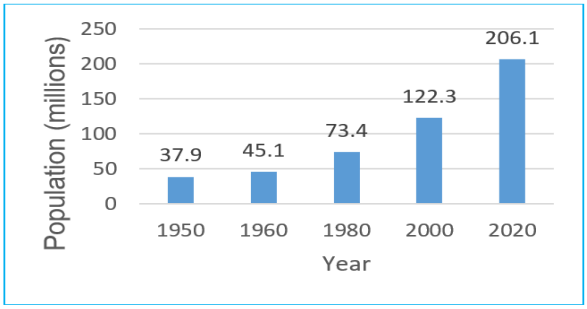

Figure 3. History of Nigerian Population [5]

The transport sector is dominated by road as the mode of transport as shown in Figures 4 and 5.

Figure 4. Road Transport Congestion in Nigeria [3]

Figure 5. Evidence of Environmental Pollution Nigeria [3,4]

As a result of this, demand for road transportation exceeds supply as noted by [3]. The authors found that this dominance results in a high frequency of road traffic accidents and environmental pollution (see Figure 5) posing a serious threat to the health and quality of life. Sustainable development applied to transport sector requires the promotion of linkages between environmental protection, economic efficiency and social progress. In this context, Table 1 illustrates the scope of sustainability (ESG-related) risks in the transport sector.

Table 1. Scope of Sustainability Risks in the Transport sector

3 Pillars	Theme	Key Issues
Environmental	Climate Change Pollution/Waste Natural Resources Environmental Opportunities	Carbon emissions and waste, Climate change Vulnerability Opportunities in clean technology and renewable energy
Social	Human Capital Product Reliability Stakeholder opposition Social opportunities	Health &Safety and Demographic risks, Human Capital development Access to health care
Governance	Corporate Governance. Corporate Behaviour	Board Diversity, Business ethics, Corruption and instability,

Literature from the public domain has revealed that most of the challenges mentioned above are rooted from poor management control systems put in place in the transport sector. Under the Volatile, Uncertainty, Complex and Ambiguity (VUCA) scenario of 21st century organisations; managing complex and multiple human, technological, political and natural resources is crucial to ensure success [6]. As noted by the founder and CEO of the World Economic Forum (WEF): our lives are changing at an unprecedented pace, transformational shifts in our economic, environmental, geopolitical, societal and technological systems offer unparalleled opportunities, but the interconnections among them also imply enhanced systemic risks.

The [7] research has evidenced that sustainability risks could lead to a significant impact on business, however, current risk management practices are not adequately addressing sustainability risks, In the Nigeria context, [8&9] also noted various organisational /institutional challenges in the Transport sector driving the breakdown in sustainable ERM (e.g. Limited ERM implementation guidance, Lack of specific legal framework/poor policy, poor risk management awareness and ERM culture, Lack of Leadership support, Budget-constraint, changing internal and external context; keeping up with technology, coordination with different Stakeholders etc.). Sustainability risks are often more challenging to quantify, managed and has longer timeline, therefore, the effectiveness with which organizations are identifying, and disclosing these risks are limited. The transport sector is facing an evolving landscape of sustainability (ESG) risks. According to [7] transportation sector could address sustainable transportation through regulatory compliance/policy directives, infrastructures and sustainable innovations such as ERM paradigm.

The idea that ERM can actually aid in minimizing organisational risks has resulted in governments across Global North (GN) adopting ERM in a wholesale fashion [10]. It has been established that organizational resilience starts at the

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top with an ERM paradigm to achieve good risk governance and organisational objective in normal, volatile and crisis situations. Consequently, many regulators, industry professionals and academics have advocated a new approach to risk management denominated ERM. However, despite the multiplicity of developed guidelines and frameworks, scholars still regard ERM as an unproven and emerging field in which important knowledge gaps remain in practice and academia [11], there are limited knowledge and difficulty in quantifying sustainability risks and current risk management practices do not adequately address sustainability risks [12], the frameworks are often criticized for failing to consider the specificity of organisations. Scholars and standard-setting bodies argued there may be considerable value in developing an ERM approach aligned with the requirements of specific organisational contexts. Furthermore, the contingency theory perspective has been suggested for developing customised ERM systems [13]. Furthermore the [6]) comprehensive transportation research has noted a very limited literature regarding alignment of ERM with transport organisational strategies and objectives (such as in Agency, Program and Project risk management). Managing the complexity inherent in transport and logistics based on context has therefore become a continuous test even for experienced managers.

This call for integration of Sustainability and ERM. To provide further understanding and insight into the role of ERM in enhancing transport sector performance, a Systems Thinking/System Dynamics paradigm will complement the proposed framework as a way of simplifying the inherent complexities, feedback, non-linearity and delays as captured in Figure 6. The academic arguments above underscores the need for a holistic and structured approach to running and managing public and private agencies (including transport sector). It highlights the urgent need to address and manage systemic global risks by involving and creating synergies among all stakeholders to enhance sustainable ERM in the transport sector.

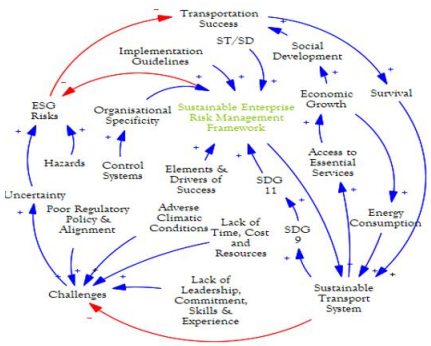

Figure 6. Overview and insight into ERM as paradigm towards a sustainable transport system

2. Literature Review

Global South (GS) is a term used to refer to developing countries that are mostly situated in the southern hemisphere, with generally low levels of income. It refers to developing countries with emerging economies and different structural problems [14]. The author argues that one of the hindrances to the development of (GS) is inadequate financial capital to invest in technology. However, it is acknowledged that the region is rich in natural resources. Though, this has led to a situation of a natural resource curse, considering the fact that despite the abundance of natural resources, the economies experience low-income levels, slow development and high levels of corruption.

2.1. The concept of Sustainability

The Brundtland Report [15] defines Sustainable development as development which meets the needs of the present without compromising the ability of future generations to meet their own needs. It emphasises that technology and social organization can be both managed and improved to make way for a new era of economic growth. Similarly, the report from [7] noted that sustainability practices encourage businesses to frame decisions in terms of Economic, Environmental and Social effects to ensure resilience and long-term value creation. [16] argues that sustainability is a paradigm for thinking about a future in which interactions and interdependencies between environmental, social and economic variables are balanced in the pursuit of development and an improved quality of life. Figure 7 illustrates how these three pillars add value to global, sustainable societies. In addition, the areas of overlap, such as socio-environmental, socio-economic, and eco-economic also create further opportunities for sustainable development.

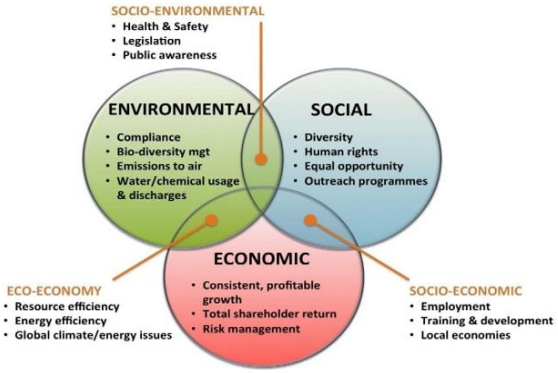

Figure 7. Balancing the Pillars of Sustainable Development [16]

Good majority of business practices are now aware of the dangers to the environment and social

responsibility concern, therefore, incorporating sustainability risk management (SRM) and sustainability agendas into transportation corporate strategy could have an impact on the transport organisation's financial performance as well as ensuring its long-term viability in the transport sector. Properly executed sustainability policies could promote faster growth, reduce risk associated with transportation and enhance transport sector performance.

2.1.1 Sustainability Risk. [17] define sustainability risks as uncertain social, governance or environmental event that, if it occurs, can cause significant negative and positive (opportunities) impact on an organisations. [7] research evidence confirm that sustainability risks are not being managed or disclosed effectively: notably, the report noted that: 1) sustainability risks disclosed in organisations sustainability reports and legal filings are not aligned, 2) there are challenges in integrating sustainability into mainstream risk management 3), there are historical examples of consequences from organisations failing to integrate sustainability risks. Yet in spite of these, capital markets, regulators and shareholders are showing greater concern in understanding how organisations are managing and responding to sustainability risks. Figure 3 illustrates growing investors expectation of report on sustainability practices. Sustainable development applied to transport sector requires the promotion of linkages between environmental protection, economic efficiency and social progress. In this context, Table 1 and Figure 8 illustrate the scope of sustainability (ESG-related) risks in the transport sector.

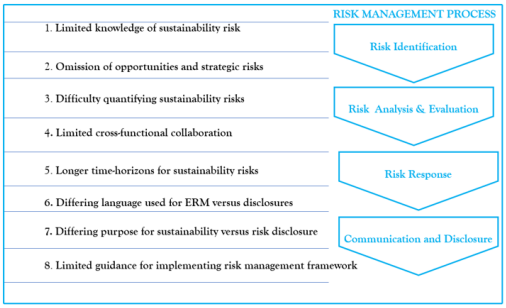

Figure 8. Factors driving the breakdown in Sustainability Risk Management (Adapted from WBCSD, 2016)

2.2. Sustainable Transportation

The transport sector has extensive environmental, social and economic impacts on society and thus it is imperative for this sector to embrace the concept of sustainable development. sustainable transportation has received great attention of researchers, policy makers and industry practitioners. In the 2030 Agenda for Sustainable Development, sustainable transportation is integrated into a number of SDGs (3, 9 & 11) and targets, particularly those that deal with food security, health, energy, economic growth, infrastructure, cities, and human settlements. The United Nations Framework Convention on Climate Change (UNFCCC) also acknowledges the significance of transport for addressing climate change. Given that nearly a quarter (24%) (see Figure 9) of all energy-related global greenhouse gas emissions are generated by transportation [18], with road transport accounting for about (75%) three-quarters of transport emissions.

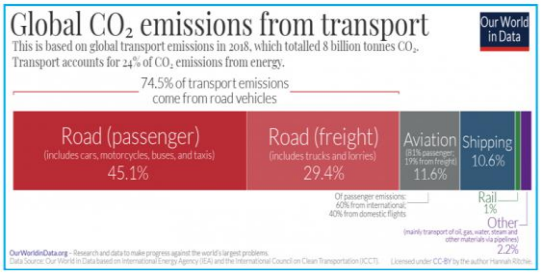

Figure 9. Global CO2 emissions from transport (18)

These emissions contribute to the global climate change and are expected to increase significantly in the years to come [19], as the global population increases, incomes rise and more people can afford cars, trains and flights (see Figures 10 and 11). The transportation sector will be playing a particularly crucial role in the achievement of the Paris Agreement.

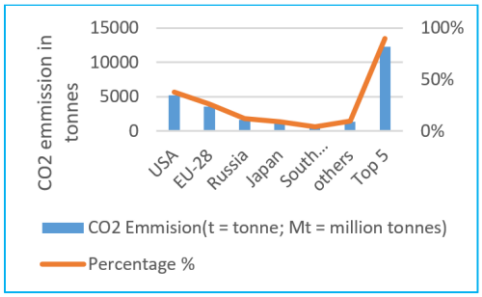

Figure 10. CO2 Emission by countries from GN [19]

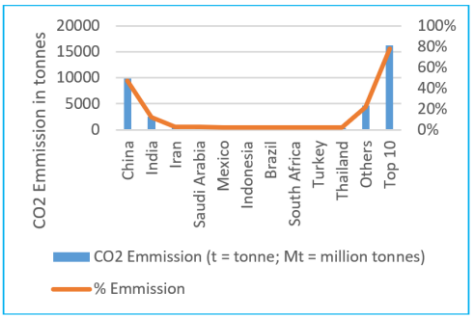

Figure 11. CO2 Emission from GS countries [19]

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According to [19] sustainable transportation is the capacity to support the mobility needs of a society in a manner that is the least damageable to the environment and does not impair the mobility needs of future generations. It also refers to low-and zero-emission, energy-efficient, affordable modes of transport, including electric and alternative-fuel vehicles. The benefits of sustainable transportation include: cost savings on fuel and vehicles, reduced carbon emissions from burning fossil fuels, resulting in less air pollution, job creation with increased vehicle and battery manufacturing and fuel production, improved accessibility to reliable and affordable transportation options, enhanced energy security and independence with less reliance on foreign sources of materials and fuels.

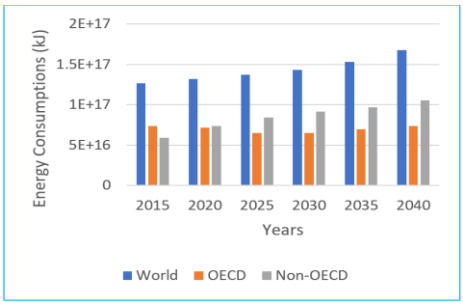

Figure 12. Transportation Energy Consumption [20]

Fig 13. GN Forecasted GDP contribution from Transportation [2]

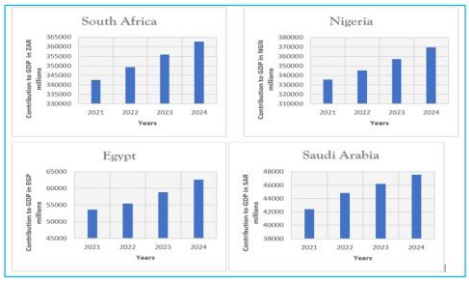

Figure 14. GS Forecasted GDP contribution from Transportation [2]

Sustainable transport has a key part to play in fostering sustainable inclusive growth, employment and expanding access to essential services as a vital driver of economic and social development [1]. Report from [2], [20] has forecasted that global Gross Domestic Products (GDP) contributions from transportation will increase significantly (see Figures 12, 13 and 14) leading to an increase in energy consumption.

2.3. Contribution of ERM to Sustainability Risks

According to [7] Transportation sector could address sustainable transportation through regulatory compliance/policy directives related to modes (such as natural gas/ electricity, recycling/reuse strategies), infrastructures (expansion of roads/right of ways) and sustainable innovations such as ERM paradigm. [21] noted that ERM practices are pivotal to adapting to the changing complexity of risk, enhancing alignment among strategy, performance and ERM, recognizing the market globalization and operations, and expanding reporting practices to address expectations for greater stakeholder transparency. Similarly, [7] confirms that ERM function is critical to monitoring and managing the risks and opportunities that stem from internal and external context–whether social / environmental / legal, political / technological / or economic as illustrated in Figure 15. The ERM function collaborates with other business functions to identify and respond to risks that may impact the business. An enterprise-wide focus allows an organisations to filter out the risks that would have the most significant organisational impact and aggregate those which might be present across multiple departmental silos. Within an organization, ERM drives organisations to identify and measure risks and balance the company's exposure to risk against reward in the context of the organisation's risk profile, long-term business objectives, compliance with regulations and stakeholder expectations. Also critical is a process to communicate to shareholders the most significant risks and opportunities and how the organisations are responding.

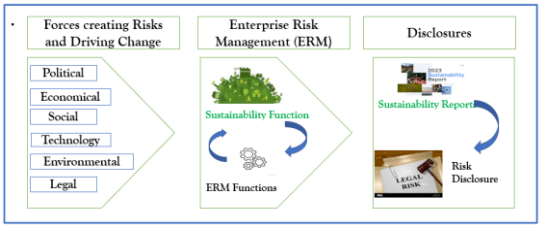

Figure 15. The Role of ERM in Transport Organisations (7)

2.3.1. Sustainable ERM in the Transportation Sector. The 21st century technological-driven organisations are embedded in a dynamic and increasingly complex environment, where risk has a multitude of forms and sources and where

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adaptability, resilience and forward-thinking innovative strategies are key [22]. [7] confirm that current risk management approach (ERM) hardly assesses the emerging risks and other non-quantifiable risks arising from unforeseeable events. Existing ERM frameworks, including [23], [24] focus on the quantitative analysis, predominantly on management of internal operational and financial risks that yield gains solely for the interest of the business owners and the management to the detriment of 'external' stakeholders [12]; it was also noted that sustainability issues are still not included in the ERM strategy. Furthermore, the [7] report noted that organizations find it challenging to integrate emerging sustainability (ESG) risks into existing risk management frameworks, which in practice means that organisations are exposed to a range of risks that are not being properly accounted for. ERM does not take into consideration the environmental and social performance in the company's wide view, it was suggested that sustainability should be integrated as a critical component of the ERM [25]. The author argues that sustainable ERM includes risks to the reputation deriving from social, environmental, and economic impacts. In addition, literatures from public domain have confirmed that many of the top risks are social or environmental, therefore a robust Sustainable Enterprise Risk Management (SERM) framework that includes social and environmental aspects could preserve value, reduce downside exposure, connect risk, strategy and decision-making while enhancing Transport sector performance. According to [6] globally, risk management has been recognised as implicit in transportation business practices as shown in Figure 16.

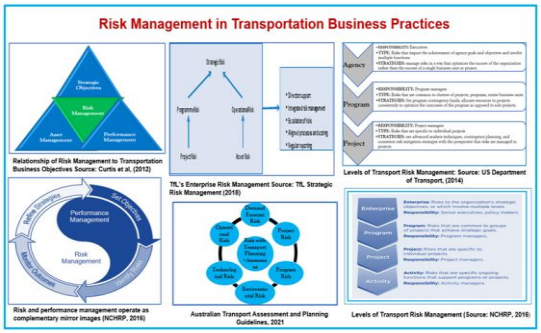

Figure 16. Relations of Risk Mgt.to Transportation Objectives [6]

[6] identified three (3) ERM practices at Agency, Program and Project management levels, they confirm that transport agency personnel could be managing risk daily, however, holistic risk management, from the agency level to the program and then to project level is not a common practice, similarly, [26] identified five (5) key areas of transport risk management practice shown in Figure (16) they include: 1) Strategic risks (2) Operational risks (3) Asset risks 4) Program risks and 5) Project risks.

Risk management approaches in transportation are influenced by an interplay of institutional and technical factors and among others, by the business environment, the hazardous nature of transportation operations, regulatory framework, organisational risk profiles and associated organisational aims and objectives [22]. As the concept of ERM gained prominence scholars have analysed a multiplicity of driving forces of both the institutional and technical nature behind ERM adoption and implementation. [27] Identified: regulatory requirements, internal audit effectiveness, human resource competency and top management commitment; other driving forces includes: the importance of demonstrating legitimacy to shareholders and the influence of risk specialists within organisations; the relevance of agency ratings (e.g. Moody, Standard & Poor) and the propensity of large organisations to adopt ERM was empirically demonstrated to drive ERM adoption. [28] conducted a comparative analysis of the landmark ERM frameworks and concluded that updated [23] and [24] are the most recognized and applied worldwide. Synthesis (see Table2) of these landmark frameworks highlights the same continuous and consistent risk management processes customised to the organisational context and emphasises the importance of integrating the risk management function within the organisation's culture, core strategies and business processes.

2.4. Transportation specific ERM Frameworks

Figures 17 and 18 illustrate the Transport for London (TfL)'s Enterprise Risk Management Framework (ERMF, 2018) and Australian Transport Assessment and Planning Framework (2022).

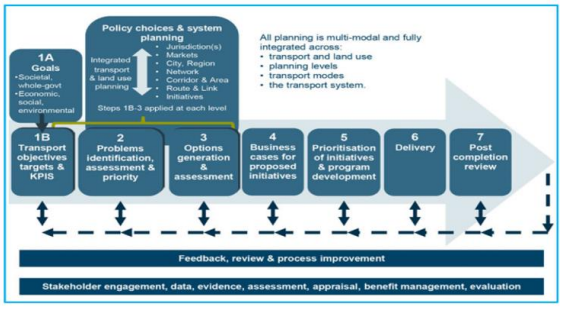

Figure 17. Transport System Managt. Framework (ATAP, 2022)

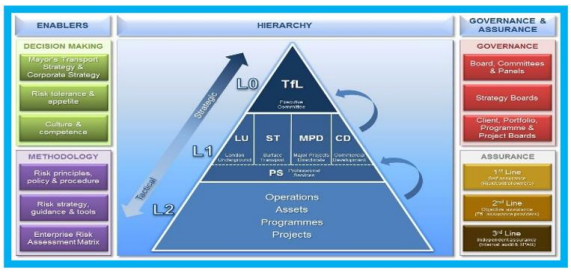

Figure 18. TfL's ERM Framework (Transport for London, 2018)

The Frameworks illustrates activities and decision support system, with a logical, multi-step approach aimed at achieving the high-level goals and transport system objectives. The Framework include the following steps in alignment, closely, with [24]:

Step 1 involves the identification of high-level jurisdiction goals (1A), and supporting transport objectives, targets and KPIs (1B).

Steps 1B to 3: The policy choices and system planning phase involves repeated application of an 'objective-problem-option' focus to the various levels of planning. It provides direction-setting guidance for all major transport system decisions.

Step 4 is the culmination of the planning process, resulting in a Business Case for each proposed initiative that demonstrates the proposal has merit, is sensible and is justified.

In Steps 5 and 6, the range of justified initiatives are prioritised, compiled into an overall program of highest priority initiatives, and delivered.

Step 7 involves review of proposals after they have been delivered, plus reviews of all aspects of the Framework.

These steps and phases are complemented throughout by key supporting processes: stakeholder engagement, use of quantitative and qualitative data and evidence in planning, assessments, appraisals, benefit management and evaluations. Finally, there is a theme of feedback, reviews and continuous improvement throughout to ensure the learnings from practice can further improve the Framework and its use on an ongoing basis.

2.5. COSO-Integrated Framework for Enterprise Risk Management (IFERM)

The ERM framework, published in 2004 by the Committee of Sponsoring Organisations of the Treadway Commission, is believed to have become a global template for risk management best practices. As risks continuously change and dramatically impact Organisational success because of their increasing complexity, the updated version of COSO framework in 2017 (see Figure 19) highlighted the fact that, executive management and board of directors should concentrate their efforts on improving ERM processes and enhanced risk reporting mechanism.

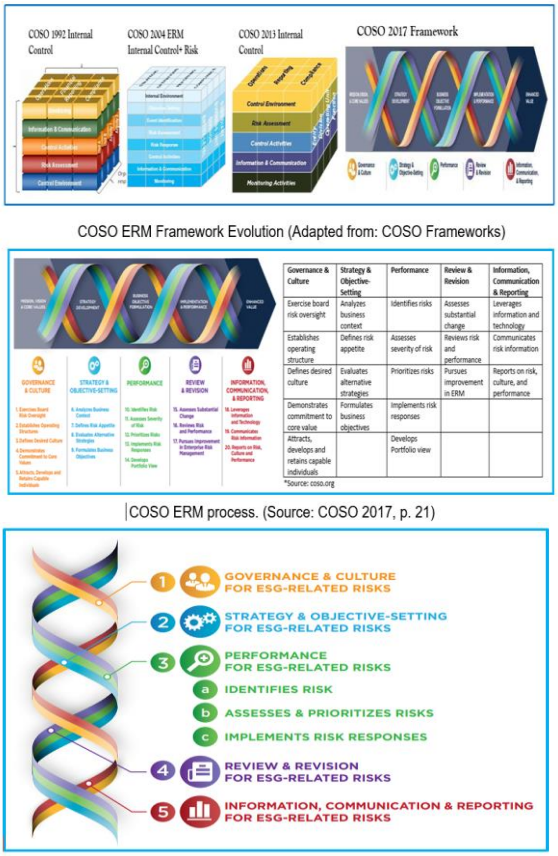

Figure 19. COSO-WBCSD Sustainability Risk Management (2018)

The updated framework considers ERM evolution stages, along with the rising Organisational needs for upgrading risk management processes, to cope with the dynamic environment [23]. What distinguishes this Framework is its composition of five parts that can be adopted by various structures and the framework's inclusion and consideration of new technologies and changes in markets and demographics, all of which have evolved the managerial expectation of ERM. Further to the review of COSO Framework, the components that have undergone major changes concern: strategy and objective setting, performance and information, communication and reporting. The new update provides a multidimensional focus in strategy-setting highlighting that risk to the strategy is not the only dimension of risk to consider strategically [28]. There is the possibility of a strategy not aligning with

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the company's mission, vision and core values; moreover, management must consider the implications of the strategy chosen considering that each alternative strategy has its own risk profile. Furthermore, the updated framework provides a road map to improve cyber risk management and introduces a focus on reporting that must supports personnel at all levels to understand the relationships between risk, culture, and performance and to improve decision-making in strategy- and objective-setting, governance, and day-to-day operations [23].

2.6. International Organisation for Standardisation (ISO 31000:2018)

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The ISO 31000: (2018) is claimed to be universally applicable and is regarded as an important benchmark for enterprise risk management best practices [28]. The standard establishes the creation and protection of value as the core purpose of risk management. These standards provide a complete set of guidelines and benchmarks for ERM initiatives in any organisation. The updated standard places an increased emphasis on: 1) Review of the principles of risk management, which are the key criteria for its success; 2) Focus on leadership by top management who should ensure that risk management is integrated into all organizational activities, starting with the governance of the organization; 3) Greater emphasis on the iterative nature of risk management, drawing on new experiences, knowledge, and analysis for the revision of process elements, actions, and controls at each stage of the process; 4) Streamlining of the content with a greater focus on sustaining an open systems model that regularly exchanges feedback with its external environment to fit multiple needs and contexts [24].

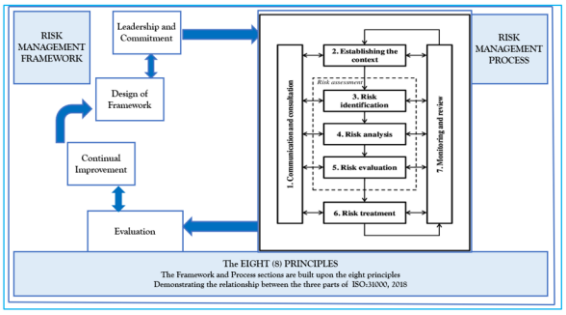

Figure 20. ISO 31000 Risk Mgt. Architect (Adapted by the Author)

Working toward this goal, the standard starts with a set of eight (8) risk management principles as foundation, then, using these principles to guide the establishment of the risk management framework; and finally, using the framework to guide the establishment of the risk management process. Together, these three sections make up what ISO 31000 calls the risk management architecture as shown below in Figure 20.

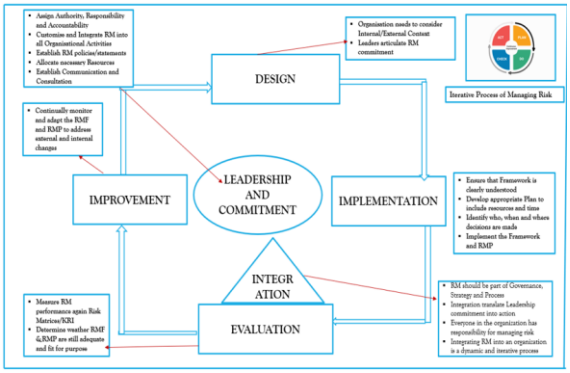

Figure 21. Components of the ISO Framework (Adapted by Author)

Table 2. Synthesis of the stages of Risk Management Process

Phase	ATAP, 2022) Framework	AS/NZS 4360 2009: Risk Mgt.	COSO: 2017 Enterprise Risk Management	ISO, 2018 Risk Mgt.
1	Goals: ESG Establishing the context, Transport objectives and KPIs	Establishing the context	Governance/Culture, Strategy /Objective-Setting	Establishing the Context
2	Problem Identification and Risk Assessment	Risk Assessment /Treatment	Performance	Risk Assessment / Treatment
3	Risk Treatment and Program Development	Risk Treatment Monitoring and review	Review and Revision	Risk Treatment Monitoring and Review
4	Comm/Consultation and Record/Report	Communicate and Consult	Information /Communication and Reporting	Comm./ Consul. Report

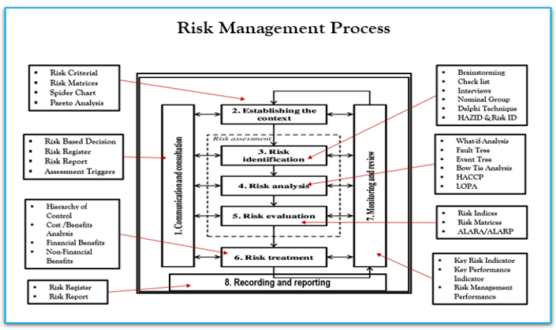

Figure 22. Risk Mgt. Process and associated Tools

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The guidelines provide organisations with recommendations regarding, among others, designing enterprise-wide risk governance structures and risk management processes, developing positive risk cultures and formal frameworks of policies and procedures, or adopting adequate risk management tools and technological solutions. Further, literature review from the public domain has confirmed the potential benefits that implementation of ERM frameworks may bring to organisations such as increased capital efficiency, improved risk-based decision making, increased firm value, or recognition among important external stakeholder groups [28]. As mentioned earlier, this is of particular relevance for organizations in the transport sector, as the nature of their operations is by default challenged by a diverse set of hazards and risks. In this paper some of the identified ERM literature gaps are presented in Table 3.

Table 3. Synthesis of ERM Literature

ERM Areas	ERM Literature Research Gap	Research Author (Year)
ERM Concept	Existing frameworks are often criticised for failing to consider the specificity of organisations Contingency theory perspective has been suggested for developing customised ERM	Arena et al. 2010) Woods, (2011); Kaplan and Mikes, (2014), Chen et al (2019)
Support from Top Management	Lack of intensive support by the management, Lack of meaningful risk reporting. Boardroom is lacking adequate set of skills in risk management	Rubino Michele (2018), Mishal (2018)
ERM integration with strategy and processes	Unclear understanding of the link between aligning ERM with strategy and decision making Risk aware culture is a significant component of ERM Implementation Low consideration of the changes occurring in internal and external environments.	Protiviti, 2016), Misha (2018), Rubino *et al*, (2018) Keith (2014); Misiura (2015) Chen *et al*., (2019); Allini *et al*., (2022)
ERM Challenges	ERM is still guided by the global perspectives. Existing risk management frameworks lack effective understanding and implementation	Anton and Nucu, (2020), IRM (2018a). Albasteki (2021)

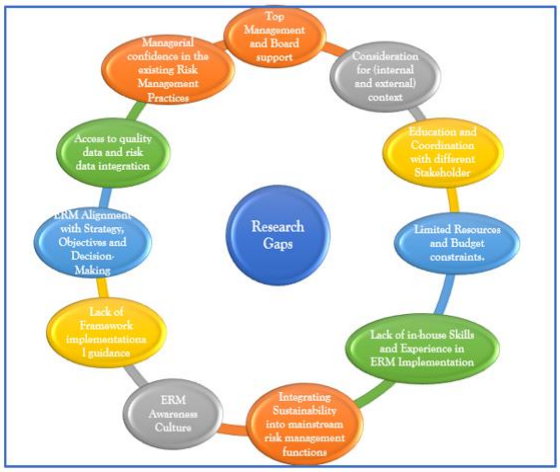

Figure 23. ERM Literature Gaps

2.7. Theoretical ERM Model and its Components

The theoretical sustainable framework in Figure 24 is mainly developed to cover gaps currently existing in the literature review (section 4 above). It will work as a decision support tool to reveal the important Organisational dynamics within both internal and external environments. The key aim of this framework is to ensure a consistent and enhanced transport sector performance, through reducing volatility of their portfolios and increasing predictability of value creation. It also aims to manage possible risks that could have negative impacts on the transport organisation's performance, by improving methods used to achieve business goals and objectives at corporate, program and project levels. The framework comprises of four (4) strategic (interrelated) ERM components viz: inputs, core, integration and outputs. These elements composed of key factors that are usually impacted by changes in the financial, economic, political and cultural environmental context.

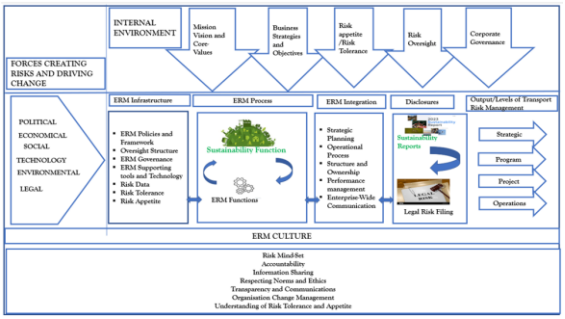

Figure 24. Theoretical model for enhancing Transport Sector Performance 3

3. Methodological Approach

This study proposes to approach the complexity of the design of the proposed sustainable framework through the application of contingency theory considering its context alignment nature. It employs Critical Realism Philosophy which aligns well with the potential benefits of applying sequential mixed methods research design as proposed in this research. The philosophy recognises the historical causal explanation and experiential verbal explanation in data collection and aligns well with the proposed Case study (Nigeria's transport sector) strategies using abductive approach. Secondary data from public domain will be collected to complement documentary evidence and primary data via semi-structure interview and research survey using convenience/judgement sampling techniques. These data will be analyse using Text analysis and Statistical analysis.

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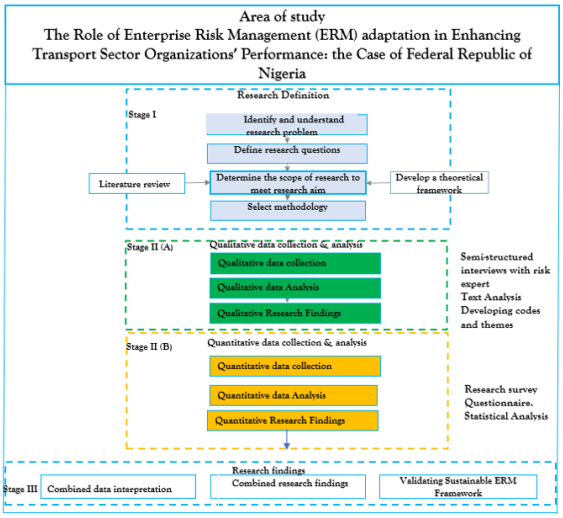

Figure 25. Proposed Research Design

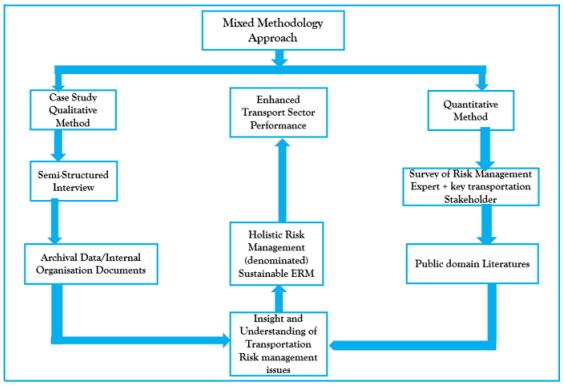

Figure 26. Proposed Mixed Methodology Approach

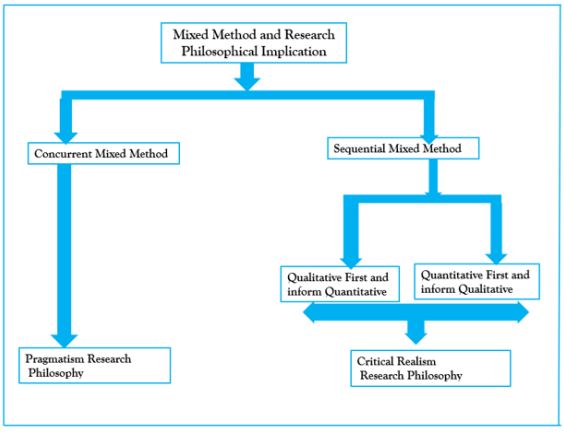

Figure 27. Mixed Method and Research Philosophical Implications [41]

3.1. Research process

The study was divided into three main phases as shown in Figure 25. The structure starts with building the research context, problem identification through to an in-depth literature review, followed by identification of the ERM literature gaps which provides a theoretical basis for developing the theoretical sustainable ERM Framework. The second phase focuses on appropriate research design for mixed method of data collection and analysis. Consequently, a data collection strategy built on semi-structured interview and research survey was developed, following the objective of this research, and focusing on understanding and analysing the role of ERM adaptation in enhancing transport sector performance with reduced risk. The final stage comprises of interpreting the combined qualitative and quantitative datasets presented in the next section.

3.2. Sampling Techniques and Research Sample

The first stage of data collection involved conducting qualitative semi- structured interviews with a sample of twelve (12) key risk management practitioners at the focused transportation agency (LAMATA) representing various department within the organisations, who met the relevant research criteria. Convenience sampling is usually determined by the availability of certain individuals who are otherwise difficult to contact (Wardhaugh 1996). Therefore, both convenience and judgement sampling techniques were deemed as most appropriate at this stage. Because of the nature of the research and restrictions on employees' time, the sample was limited to those industry professionals having key involvement in the road transport risk management. This limited population of potential participant with specific expertise made non-probability snowball or judgement sampling appropriate. Adler and Adler (1998; 2011) was reputed as sufficient a sample of between twelve (12) and sixty (60), with thirty (30) being the mean.

At the second stage of data-gathering, an online research survey was conducted using stratified random sampling, data were collected from other transportation agencies across the Nigeria's six (6) geo-political zones to supplement the findings of the data collected via semi-structure interviews. The sample selected for the research survey consisted of industry professionals who met the research criteria, who had worked in the risk management field for a number of years, had good knowledge of road transport risk management and could therefore provide sufficient theoretical and practical expertise, from which sixty (60) respondents were selected. Against the background of achieving an appropriate level of research validity, this research aimed for data saturation, defined as being reached when the collection of new data does not shed any further light on the issue under investigation.

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4. Data Collection and Analysis

According to [43], the choice of data analysis tools is usually determined by the techniques of data collection, the circumstances of the research and the expected results. Data is given a theoretically meaningful structure through the use of coding [45], this allow new categories to be added while examining emerging themes, concepts and factors in the course of the research interviews. In this study, all factor codes were developed by the researcher, with each based on its logical association and relevance to ERM. Dichotomous (0/1) codes are exported into Excel indicating the presence or absence of a concept, with counts indicating the frequency. This technique was applied to both interview and survey data. As there are no strict rules to define how much of the collected data should be coded to allow valid conclusions to be drawn [44], the researcher relied on the ingenuity of the participants and the data they provided to construct reasoned arguments in support of this study. Considering the nature of qualitative research and the size of the interview sample, a basic descriptive reporting in Excel was performed and presented as frequencies.

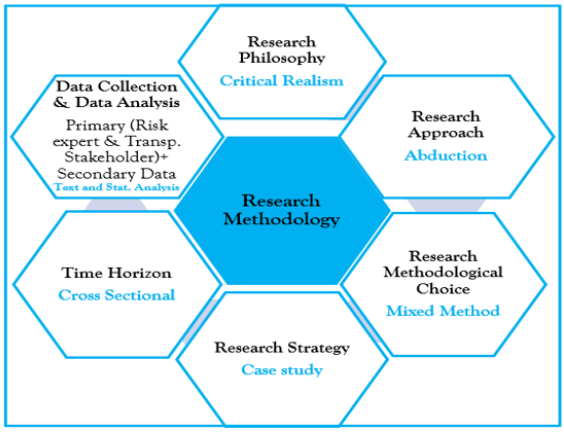

Figure 28. Proposed Research Summary

4.1. Section A: Descriptive profile

The interview questions have been categorised and grouped into four sections, reflecting the areas of the research focus. To make references to participants' views and responses, the participants' names were replaced by unique identifiers (interviewee 1 to interviewee 12) in line with ethical considerations. To analyse the qualitative data, researcher developed critical factor codes to represent themes and subthemes, identified in the transcripts of the interview data. Researcher will refer to these codes in the analysis, and the codes will be placed within brackets. Tables 4, 5, 6 and 7 list the interview questions, along with initial factor codes, representing themes and subthemes.

Table 4. Interview Questions' Codes (Descriptive profile)

No	Questions	Code
1	How many years have you been involved in risk management?	RM_EXP_1
2	What is your current role in the organization? Which department/section within the organization area you working at?	ROLE ROLE_AREA

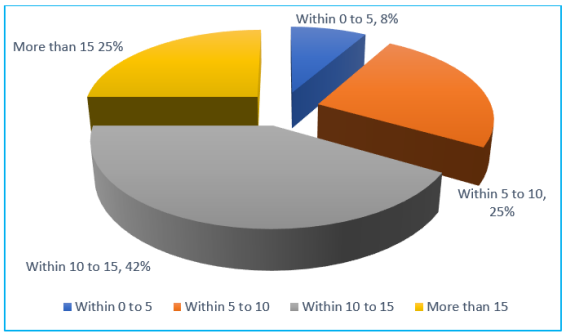

Figure 29. Percentage distribution of participants' risk management experience

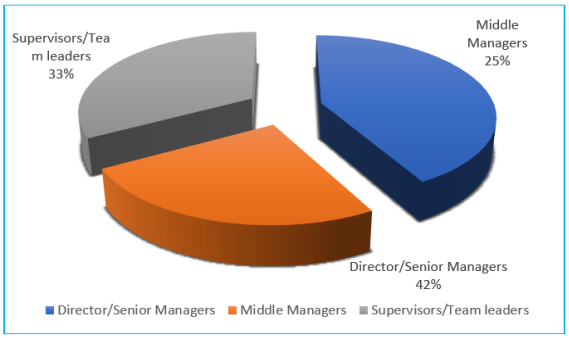

Figure 30: Percentage distribution of participants' role level

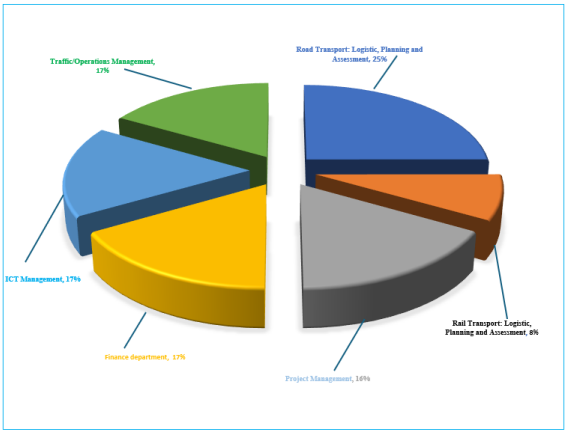

Figure 31. Percentage distribution of participants' organization areas

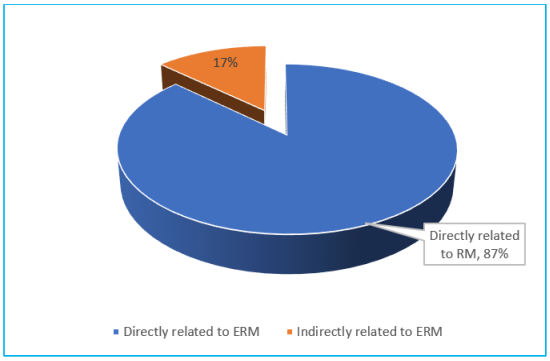

Figure 32. Percentage distribution of participants involvement with transport risk management

4.2. Section B: ERM Practice Analysis

The interview questions of this section relate to the ERM practice within the selected transportation agency. A list of interview questions along with factor codes, which represent themes and subthemes are as shown in Table 5. The aims of this section are: 1) to find out the current state of ERM and the level of ERM maturity in this sector, and 2) to identify key Organisational factors critical to ERM implementation.

Table 5. Interview Questions' Codes (ERM practice)

No	Questions	Codes
1	What are the major risk areas in your organisation that are covered by the RM?	RM_AREA
2	To what extent has your organisation incorporated systematic consideration of risk into the decision-making processes?	RM_DSS
3	Please, describe the current state of ERM implementation in your organization ▪ Investigation ERM ▪ Planning ERM ▪ Partial ERM ▪ Comprehensive ERM	ERM_LEVEL ERM_L1 ERM_L2 ERM_L3 ERM_L4 ERM_L5
4	What is the current level of ERM maturity in your organization? ▪ Undeveloped ▪ Formalised ▪ Established ▪ Optimised ▪ Strategic	ERM_MATUR ERM_M1 ERM_M2 ERM_M3 ERM_M4 ERM_M5
5	Does your organization aware and intend follow a common or universal framework of ERM risk management?	FRAM_UNIFRAM
6	What challenges does your organization expect to experience during ERM implementation?	ERM_CHALL
7	How does the board of directors of your organisation support RM? How important is this support from senior management team?	ERM_SENSUP_1 ERM_SENSUP_2

Some of the major risks encountered in the road transport include political, hazard, financial, strategic and operational risks. Two third of those interviewed (33%) respectively stated that hazard risk and political risk are at the top of the risk areas, as shown in (see Figure 35). Taking these one by one, most of the participants noted that political risk ranks highest because if not well managed, could lead to financial risk and other types risk. The research findings noted that political risk source could be internal or external to LAMATA. It is internal if key personnel of LAMATA are reshuffled by the management overseeing the project. It could be external if there is a change in regime of the state administration. For instance, if the term of an administration elapses and a new Governor emerges, this could affect the smooth flow of the project. Depending on the mood and interest of the new administration, this could have substantial impact on the running of the project. This could also create financial stress for the operational activities leading to a two-in-one crisis for the project. Interviewee 4 stated that:

"An incidence of political risk was recorded earlier in the state when a particular governor was not favourably disposed to LAMATA activities and projects. This led the entire Authority into doldrums for several years only to be resuscitated by another administration.

The impact that such politic-related scenario can have on the entire infrastructure could better be imagined than experienced. The financial impact could be more devastating leading to inflationary effect on the costs of materials and resources which may not be sourced locally".

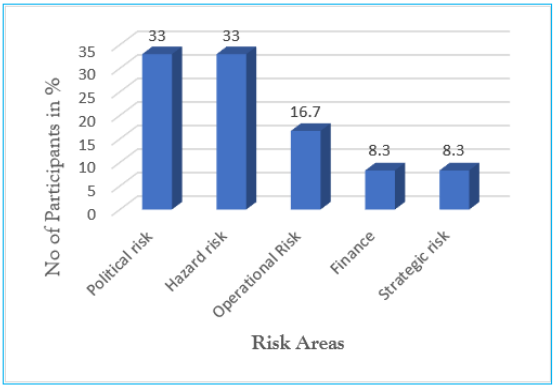

Figure 33. Risk Areas covered by corporate risk management

Further, it is not surprising that hazard risk is also on the top of the risk areas; this is due to the nature of transportation operations. This is followed by operational risk ranked at 16.7%. Finance and Strategic risks have been identified respectively by 8.3% of the interviewees as risk areas covered by the current corporate risk management. This low percentage supports the need for this study, which aims to develop a strategic and sustainable risk management framework. Both, strategic risk and

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finance risk, generally require long term planning. It is not surprising; they are identified equally by the interviewees.

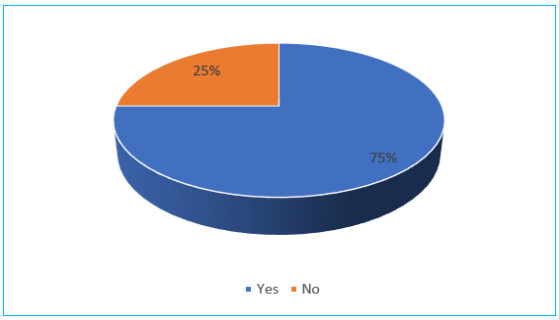

Figure 34. Participants' views about incorporating risk considerations into the decision-making processes

Subsequent to question 2, this question explored the current stage of ERM implementation at LAMATA. Not surprisingly, there was full agreement among the interviewees that there is no formal enterprise risk management in place but there are plan to implement one (ERM_L2). The role of ERM is still at infancy stage in the scheme of things in LAMATA. ERM is a growing development in the activities of the Authority. The conventional risk management (RM) rather is the adoption as far as road project is concerned.

One of the experts, interviewee 1 stated that:

"Just like I said, because we don't have a frame structure for enterprise risk management, all we do is project-based risk management. Once you want to implement a system that involves several stakeholders you will look at all those impediments that could threaten the project. That is the only reason why we run a risk metrics on our plans. Aside from running our project designs through the.... And coming up with the mitigants, we don't do beyond that. So, we would have designed our infrastructure such that the mitigants would have been structured into it. That's all we do. It's not that we go into the nitty-gritty of ERM".

Again, there was full agreement among the interviewees that maturity level is underdeveloped, there is an awareness of risk but there is no formal ERM approach applied (ERM_M1). Almost all participants agreed that their organizations intend to apply one or more ERM universal frameworks. However, not all of them were able to identify which frameworks they intend to adopt. The more experienced interviewees were able to identify ISO and COSO as the two standard frameworks of choice. They contend that LAMATA has customized their own project RM approach based on LAMATA organizational needs and experience over time.

Regarding the key challenges that could impede the implementation of ERM (ERM_CHALL). Figure 35 illustrates key challenges which are identified by interviewees based on five descriptors of importance from "unimportant" to "critical" options.

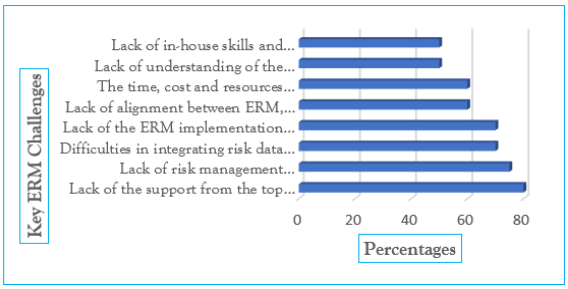

Figure 35. Key ERM Challenges

The most significant ERM challenges noted were as follows: lack of top management support (80%), lack of risk management and ERM awareness culture (75%), lack of clear ERM implementation guidelines (70%), Difficulties in integrating risk data across the organization (70%), lack of alignment of ERM with Organisational strategies and objectives (60%), Budget constraints (60%) and lack of understanding of ERM benefits and challenges and lack of in-house skills and experiences in ERM implementation were ranked equally at (50%).

ERM academic and practice Literature from public domain agree with the majority of participants' views of contextualising the ERM implementation to the specific Organisational context that each organisation faces in terms of its own set of challenges to implement ERM. Depending on this context, ERM can help achieve specific goals and at the same time can result in it being exposed to particular challenges. Among the challenges mentioned most often were gaining the support of senior management and buying-in of other managers to see the need for consistent and iterative ERM processes. The empirical evidence complies with (Beasley et al; 2010), who argues that top management support for ERM is critical for ERM implementation.

According to Interviewee 1:

"Senior management support is essential to the successful implementation of ERM in terms resources commitment, gaining political support to implement project. This is a big challenge where transport agencies have multiple project lines that are offered through many legal entities and in different part of the country. The support needs to be coupled with long-term commitment".

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Similarly, Interviewee 4 stated that:

"key ERM challenge is a political understanding, it is more about getting the buy-in, getting the time and funding for projects, getting the people to get the time off for risk training and to attend risk workshops and to educate people regarding risk impact and how to use new risk system".

Next challenged ranked highly by most interviewee is the lack of risk management and ERM awareness culture, this was consistent with Towers Watson (2010) survey report that saw a lack of risk culture and employee buy-in as key challenges to ERM implementation. Another significant finding is the issues of integrating risk data across the organization as noted by a considerable number of the interviewees. This was in line with Hofmann (2009), who stated that integrated and transparent approach to deal with risk data is vital to produce robust risk reporting strategy and consistent risk information. This is a critical challenge as it rests significantly on the supporting ICT systems which also depends on the country's energy supply. Interviewee 5 noted that a failure to demonstrate how ERM adds value and contributes to performance can make it difficult to quantify sustainability and operational risks and therefore, making it difficult to integrate ERM into decision-making processes. Another thought-provoking finding is the possibility of lack of alignment between ERM, core organizational strategies and key objectives, as emphasized by the majority of interviewees. These findings underscore the need for developing a sustainable ERM alignment framework, which is the main aim of this research.

4.3. Section C: Sustainability Practice Analysis

As part of this research a series of interviews were conducted with a selection of key staff of LAMATA to build an understanding of the perceptions and challenges of managing sustainability risk from the perspective of risk management and sustainability practitioners. The questions were aimed at understanding to what extent participants felt risk leaders and risk processes appropriately accommodated sustainability risks within the selected transportation agency. A list of interview questions along with factor codes, which represent themes and subthemes are as shown in Table 6.

Table 6. Interview Questions' Codes (Sustainability Practice)

No	Questions	Codes
1	Does your Organisation have an awareness of Sustainability (ESG) Risk?	SUS_AWARE
2	Does your Organisation have a separate department for Sustainability (ESG) Risk?	SUS_DEPT
3	If yes to the above, are there functional collaboration between the risk management team and sustainability practitioner?	SUS_COLL
4	Are there policies in place within your organisation around sustainability risk disclosure? Does your organisation disclose sustainability risk to shareholder?	SUS_POLICY
5	Do you or your organisation view sustainability risks as less likely and less impactful on your Organisation 's performance than financial risk?	SUS_P
6	Does the current risk management practices adequately address sustainability risks?	SUS_RM
7	Do you feel that failure to manage sustainability risk could lead to significant impacts on your organisation performance?	SUS_PERF2

As shown in Figure 36 (83%) of the interviewee agreed there is an awareness of sustainability (ESG) risk within their organisation, however, there is no separate department for sustainability (ESG) risk which implies there is no functional collaboration between the risk management team and sustainability practitioner.

One of the interviewees (Director for road infrastructure) stated that:

"Yes, friends, experience made us to be aware of sustainability risk basically. And from knowledge and awareness training programs all over Nigeria now. We have to be sustainable in all our dealings in as regards to LAMATA policy. In terms of our infrastructure provision, and operations, we need to be thinking and operating sustainability".

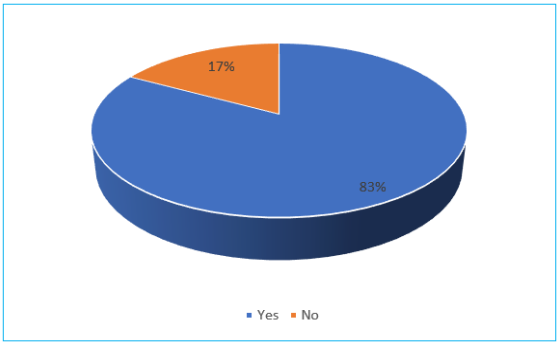

Figure 36. Participants' views about their awareness of Sustainability (ESG) Risk

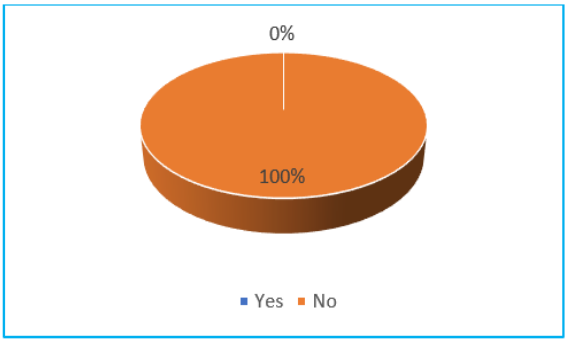

Figure 37. Participants' views on whether the current risk management practices adequately address sustainability risk

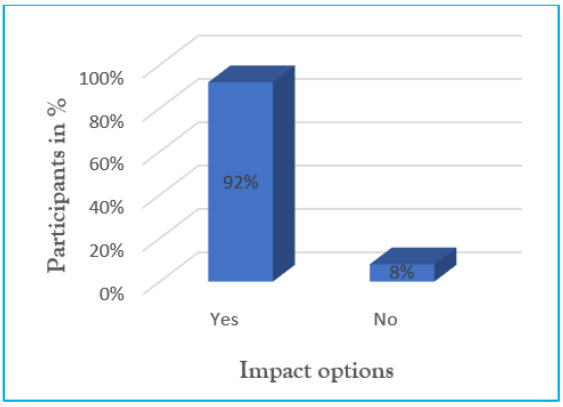

Figure 38. Participants' views about the impact of Sustainability (ESG) risk on organisational performance

4.4. Section D: Developing of Sustainable ERM Framework Analysis

This questions in this section aimed to support the development of the sustainable ERM framework. The first question investigates the importance of aligning ERM with key organisation areas (FRAM_ALIGN), with focus on key elements of the proposed framework. The second question explored the role and the effects of internal environment on ERM framework implementation (FRAM_INTER), while the third question examined the roles and the importance of risk management culture on ERM implementation (FRAM_CULT). Correspondingly, the fourth question focused on the role and effect of ERM infrastructure on ERM framework implementation (FRAM_INFR). Lastly, the fifth question examined the role and the effect of ERM integration (FRAM_INTEG)

Table 7 provides a list of interview's questions along with factor codes, which represent themes and subthemes in this section. The analysis of participants responses follows in the sub-sections.

Table 7. Interview Questions' Codes (Sustainable ERM Framework Analysis)

No	Questions	Codes
1	How is important to align ERM with key organization areas? ▪ Core organizational strategies and key objectives ▪ Enterprise Risk Awareness and Culture ▪ Corporate Risk Governance ▪ Technology ▪ Key Risk Indicators (KRIs) and Key Performance Indicators (KPIs)	FRAM_ALIGN
2	What are the most influential internal environment factors which can ERM framework implementation? ▪ Mission, vision and core values ▪ Strategies and objectives ▪ Appetite aligned with risk tolerance ▪ Risk oversight ▪ Corporate governance	FRAM_INTER FRAM_INTER_VIS FRAM_INTER_STR FRAM_INTER_APP FRAM_INTER_OVE
3	How important is the enterprise risk culture to the realisation of effective ERM framework implementation? ▪ Understanding of risk appetite and tolerance ▪ Organizational change management ▪ Transparency and Communication ▪ Respecting norms and ethics ▪ Information Sharing ▪ Accountability ▪ Risk mind-set	FRAM_CULT FRAM_CULT_APP FRAM_CULT_CHNG FRAM_CULT_TRANC FRAM_CULT_ETHIC FRAM_CULT_INF FRAM_CULT_ACC FRAM_CULT_MIND
4	What are the roles and the effect of ERM infrastructure in ERM framework implementation? is robust and supportive ERM infrastructure critical to realize the full effectiveness of ERM framework implementation? ▪ ERM policies and framework ▪ ERM governance ▪ Oversight structure ▪ ERM supporting tools and technologies ▪ Risk tolerance and apatite ▪ Risk data	FRAM_INFR FRAM_INFR_FRAM FRAM_INFR_GOV FRAM_INFR_OVE FRAM_ INFR_TOOL FRAM_ INFR_APP FRAM_ INFR_DATA
	What are the roles and the effect of ERM integration in ERM framework implementation? is comprehensive ERM integration critical to realize the full effectiveness of ERM framework implementation? ▪ Strategic planning ▪ Structure and ownership ▪ Operational processes ▪ Performance management Enterprise-wide communication	FRAM_INTEG FRAM_INTEG_SPLAN FRAM_INTEG _STR FRAM_INTEG _OWN FRAM_INTEG _PROS FRAM_INTEG _PERF FRAM_INTEG _COM

The first question was designed to gather the participants' view on the importance of aligning the ERM with key organization areas (FRAM_ALIGN) to enhance its sustainability. The interviewees priorities the following organizational components: 1) Organizational strategies and key objectives (FRAM_INTER_STR), 2) Enterprise risk awareness and culture (FRAM_CULT), 3) Cooperate risk governance (FRAM_INTER_GOV), 4) Technology (FRAM_INTER_TECH) and 5) Key risk indicators (KRIs) and Key performance Indicators (KPIs) as key organization areas which need to be aligned with ERM.

Figure 39. Frequency Distribution of FRAM_ALIGN code

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Figure 39 shows the frequency distribution of each Organisational area, as identified by interviewees, based on five descriptors of importance from "unimportant" to "critical" options. It is believed unanimously that people are the most important Organisations asset.

5. Initial Findings

5.1. Overview of Transportation role in Nigeria

Nigeria is a multi-ethnic and culturally diverse federation of 36 autonomous states and the Federal Capital Territory (see Figure 40). As noted by [3] transportation constitutes one of the major features of the economic development of Nigeria. It has a key part to play in fostering sustainable, inclusive, economic growth, social development and expanding access to essential services. The report from [2] show the distribution of Gross Domestic Product (GDP) across the three (3) major economic sectors in Nigeria (see Figure 41).

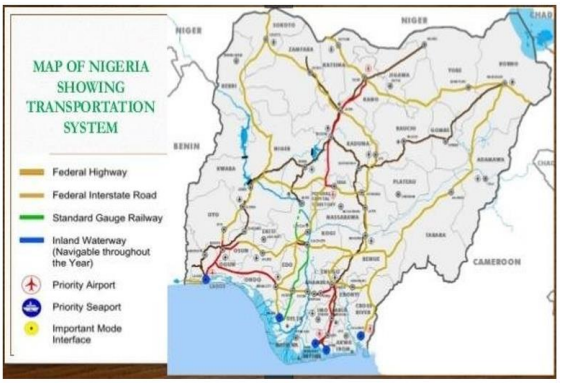

Figure 40. Map of Nigeria Showing the Transportation System

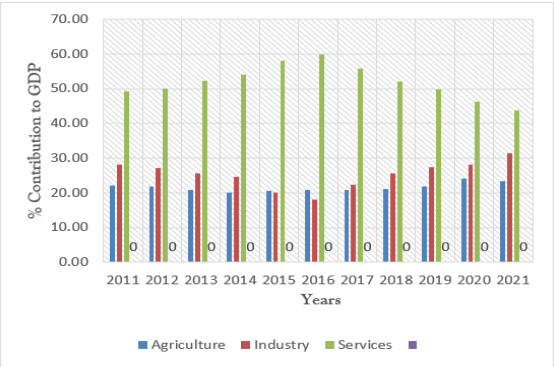

Figure 41. GDP Contribution across Economic Sector in Nigeria [2]

In 2021, agriculture contributed around 23.36 percent to Nigeria's GDP, 31.41 percent came from industry and 43.79 percent from the services sector. Like in most thriving economies nowadays, the services sector which includes the transportation sector is gaining momentum in Nigeria. More specifically to the transport sector, the report from [2] indicates a growing Gross Domestic Products (GDP) contributions particularly from this sector (see Figure 42).

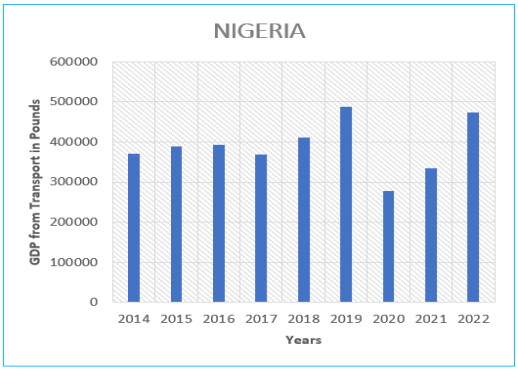

Figure 42. GDP Contribution from Transport [2]

5.2. Nigerian Transportation modes

According to [29], transport activity in Nigeria is overseen by the Federal Ministry of Transport, which includes dedicated bodies such as the Nigerian Airspace Management Agency, Nigerian Ports Authority (NPA), Nigerian Railway Corporation (NRC), Nigerian Civil Aviation Authority, Nigerian Shippers' Council and the Federal Airports Authority of Nigeria (FAAN). Development plans for the sector are incorporated into the Nigeria Integrated Infrastructure Master Plan (NIIMP), a 30-year roadmap established in 2014.

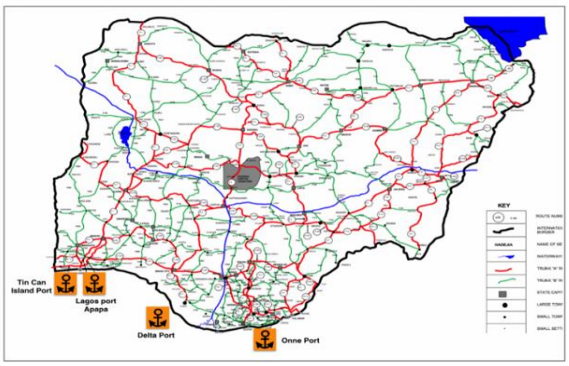

Figure 43. Transportation Distribution channels in Nigeria

Four modes of transportation which continues to play very significant roles in the social and economic development of Nigeria as noted by [3] are railways, roads, airways and the ports/waterways which collectively handle over 99% of transportation in the

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country. Figure 43 shows the Nigerian transportation distribution channels.

5.2.1. Road Transportation in Nigeria. According to [30], Nigeria's roads and highways form the backbone of the country's transport network. Road transport is the largest segment and the most commonly used mode of transportation in Nigeria, accounting for more than 90 per cent of the sub-sector's contribution to the Gross Domestic Product (GDP). Figure 44 illustrates the Nigeria Road Network, based on data from Logistic Capacity Assessment report, Nigeria has the largest road network in West Africa. It has an estimated length of 200,000km of which 18% is owned by the federal government, 16% owned by the state government and 66% (mostly earth roads) are owned by the local government. The federal roads constitute only 18% of the road network but carry over 70% of the vehicular traffic.

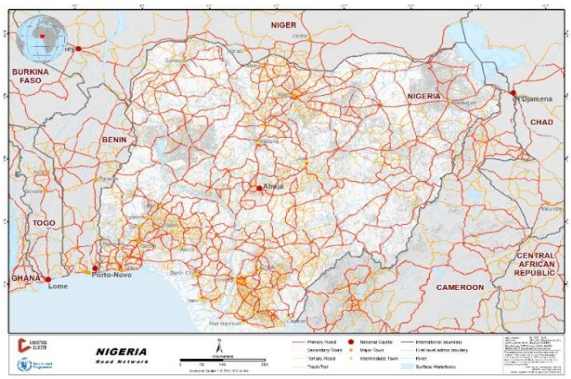

Figure 44. Nigeria Road Network [30]

Nigerian government is focused on both servicing existing roads – many of which are in poor condition or unpaved and constructing new ones. Towards this end, in its 2018 budget the Government allocated N295 billion (£532million) for road capital works and maintenance, the year 2021 budget earmarked N168bn (approx. £303million) for the construction, rehabilitation and dualisation of roads (Oxford business group, 2022). Road transport carry more than 90% of internal cargo and passengers as the dominant mode of transportation in Nigeria and its contribution to GDP continues to grow over the years (see Figure 45). The large-scale transfers of goods and passengers that could have been transported more cheaply by other modes, like railways and inland waterways, characterise the current transportation activities. The excessive road infrastructure deterioration and associated economic burden are caused by the prevalence of truck transportation. Some transportation routes are particularly busy, displaying patterns of connections that are important for sector planning and investments. Such corridors include: a) Lagos - Ibadan/Lagos-Shagamu; b) Lagos - Ibadan-Kaduna-Kano; c) Port Harcourt – Aba-Abuja-Kaduna-Kano; d) Lagos-Shagamu-Benin city; e) Benin- Lokoja-Abuja-Kaduna-Kano; f) Benin-Asaba- Onitsha; g) Port Harcourt-Aba-Enugu; h) Kano-Maiduguri-Ngala [30].

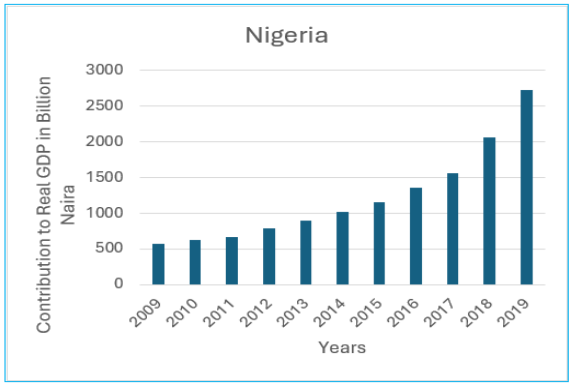

Figure 45. Road Transport Contribution to Real GDP [30]

5.3. ERM Challenges Facing Transport Organisations

The literature review in this paper suggested both a growing need and interest in the development of enterprise-wide risk management approaches in the transport sector. Concerns have been raised that ERM is a critical determinant of the success of effective risk resiliency for transport organisations [35,36]. Based on [37] matrix of evaluating literature, most of the contributions made to the literature relating to ERM are mainly descriptive rather than implementational. Reviewed archival data (from public domain) revealed that there is generally an under-representation of GS countries in ERM and transportation risk management literature. In Nigeria, in particular, no sector's specific ERM Framework for Transport organisations is developed yet. Available Literature discussing ERM and transport issues in Nigeria has focused mainly on the general challenges of transportation as noted below in Table (3). This Literature provides limited insights on the adoption and implementation of ERM to address transportation risk management based on Nigeria's context as noted in Table 2 which leads to the gaps identified. Some of the key challenges in ERM implementation are discussed in the following Sections.

5.4. Enterprise Risk Management (ERM) Practices in Nigeria

The practice of ERM is an evolving practice among public sector organisations globally. In Nigeria, the absence of adequate project management

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practices including compliance and risk management in the public sector has been a long-standing issue and it has cost the country a lot in various ways. It was noted that all highly ranked factors leading to project failure in Nigeria were project management related risk issues. ERM is mainly practiced in the private sector organisations with inadequate levels of implementation in the public sector. Some ERM practice evidence in Nigeria include: 1) A focus on the challenge of risk management in Nigerian banks in the post consolidation era; 2)-Risk Management and ERM in Nigeria: Implications for National Development and Growth etc. Most of these studies highlight the scenarios in the private sector. The absence of a specific legal framework for the establishment of project and program management practices in the public sector may be responsible. This research acknowledged that section 6.0 of the Code of Corporate Governance for Banks and Discount Houses in Nigeria (CBN 2014) provides for risk management, however, it was not very detailed on the risk management approach but rather encouraged clear roles and responsibilities for the Board, Board Risk Management Committee, Management and Internal Audit.

5.5. Resources Allocation and Support from Transport Organisation Executives

As emphasised by [24] top management should ensure that risk management is integrated into all organizational activities and should demonstrate leadership and commitment by issuing a policy that establishes a risk management approach, ensure that the necessary resources are allocated to managing risk and assign authority, responsibility and accountability at appropriate levels within the organization. Similarly, [23] posits that risk management structure and culture need to be understood and imbibed from the board of directors to all staff; top management must demonstrate commitment through actions, by exemplifying and embodying the values they espouse. Ultimate responsibility for ERM starts at the top. The guidelines argue that everyone who matters within an organization should participate in the ERM process. While several executives have significant responsibilities for ERM, including the Chief Risk Officer, Chief Financial Officer, Chief Legal Officer and Chief Audit Executive, the ERM process works best when all key managers of the organization contribute. [24] further states that managers of the organization support the entity's risk management philosophy, promote compliance with its risk appetite and manage risks within their respective spheres of responsibility consistent with risk tolerances. Therefore, identifying leaders throughout the organization and gaining their support is critical to successful implementation of ERM. The goal of ERM is to incorporate risk considerations into the organization's agenda and decision-making processes. ERM is integral to running and managing a business Organisations (Transport department included).

5.6. Risk Awareness Culture – Significant Component of ERM Implementation

A strong risk culture is a prerequisite for a sustainable ERM program [24]. The ERM cultural alignment establishes a new focus for risk-based decisions that is sustainable over time and influences management and all employees. It also allows effective ERM implementation and becomes a source of sustainable competitive advantage. It inspires staff to promote integrity, enhance share-holder value, meet regulatory compliance and generate long-term sustainability. In the context of ERM, culture is a value that impacts business decisions and determines the way the organization identifies, understands, discusses and acts on the risks it faces and the risks it takes. ERM culture affects the decisions of management and employees, regardless of whether they consciously weigh benefits and costs. In a sound risk culture, everyone not only knows and understands the policies, but also shares the values behind them. Employees and managers alike are aware of risk and adjust their behaviour accordingly. However, organizations that do not have an ERM culture fail to reap the benefits of a functional ERM program. When there is no ERM culture, business units work in silos and do not align themselves to manage risks and achieve strategic objectives. The result is low reliability and lack of consistency in executing risk management processes.

The ERM Practices in Nigeria [9] specifically noted that; no private or public organization in Nigeria has a risk-aware culture that drives the organization into proactive risk management, seeking to gain full advantage from its uncertain environment and no private or public organization in Nigeria has best-practice processes that are implemented at all levels of the business, with regular updating, active feedback, and learning. Various organisational and institutional challenges such as poor accident reporting and investigating culture; poor coordination with different stakeholders; poor policy and regulatory framework; lack of proper industry-specific guidance material; keeping up with the technology, integration with existing systems, budget constraints, lack of leadership commitment, etc. has been reported. The report emphasized that Nigeria is not exempted from the current volatility, uncertainty, complexity, and ambiguity in today's organisational business context. These statements underscore the need for a holistic and structured approach to running and managing

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public and private agencies and their projects. It highlights the urgent need to address and manage systemic global risks, by involving and creating synergies among all stakeholders. This is particularly relevant for organizations in the transport sector, especially, since the nature of operations is by default challenged by a diverse set of hazards and risks.

5.7. Consideration of Transport Organisations (Internal and External) Context

Standard guideline [24] emphasized that risk management framework and process need to be customized and proportionate to the organization's external and internal context related to its objectives. By establishing the context, the organisation articulates its objectives and defines the external and internal parameters to be considered when managing risk, and sets the scope and risk criteria for the remaining process. The guideline noted that examining the organization's external context may include, but is not limited to: the social, cultural, political, legal, regulatory, financial, technological, economic and environmental factors, whether international, national, regional or local; key drivers and trends affecting the objectives of the organization; external stakeholders' relationships, perceptions, values, needs and expectations; as well as the complexity of networks and dependencies. Examining the organization's internal context may include, but is not limited to: vision, mission and values; governance, organizational structure, roles and accountabilities; strategy, objectives and policies; the organization's culture; guidelines and models adopted by the organization; resource capabilities; data, information systems and information flows; relationships with internal stakeholders, taking into account their perceptions and values; contractual relationships and commitments as well as the interdependencies and interconnections.

5.8. ERM Alignment - Transport Organisational Strategies and Decision Making

Increasing complexity due to transport networks, shifts in technology and business cycles can produce more risks related to strategy than ever before. By establishing a close link between transport organisation's strategic planning and risk management processes, managers can help ensure that new strategic initiatives are connected to appropriate risk mitigation strategies, that changes in the organisation's strategic direction are accompanied by timely assessment of new or emerging risks, and that the organisations are better prepared to identify risk related competitive advantages. Integrating ERM practices throughout an organization improves decision-making in governance, strategy, objective-setting and day-to-day operations. Just as ERM requires customization to suit a company's unique objectives, culture and business model, the integration of risk management and strategic planning also requires a company to consider its objectives and culture before deciding the best way to align the two processes. The diligence required to integrate ERM provides an organisation with a clear path to creating, preserving and realizing value. While a company's strategy drives its value creation, it also entails risk-taking; when strategies change or new initiatives are implemented, new risks may be introduced, or existing risks could change. The greater the degree of integration between strategy and risk management, the more likely it is that an organisation will be able to successfully implement its strategy.

5.9. Implementation Guidelines and Direction on ERM framework

The literature on ERM generically addresses how ERM should be implemented. Too generic in their nature, existing risk management frameworks often have different structures, requirements and terminology that prevent their effective understanding and implementation [38]. Taking into consideration that in theory, organisations know how to deal with risks (due to guidelines, frameworks, scholarly literature, and legislation), the events of the last decade reflect that issues have only been partly resolved. Theoretical guidance of implementing ERM varies quite widely among industries. In the context of GS countries, Fragmented policy formulation and implementation, lack of proper industry-specific guidance material; keeping up with the technology, integration with existing systems, lack of leadership commitment, limited human resources and funding capacities, Over-regulation and duplicating legislation, managerial confidence in the existing practices of risk management and regardless of ERM benefits and resources, a lack of qualified in-house personnel to implement ERM and of internal knowledge are clear obstacles and an undesirable challenge.

5.10. Data Risk Integration in Nigeria Transport Organisations

Integrating risk data across the organisation can be made based on a flow of risk information down from top management. In the context of GS countries, Poor coordination with different stakeholders, Lack of collaboration among multiple ministries and transport agencies, Lack of political will to face up to the challenges of change,

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Fragmented policy formulation and implementation, Bureaucratic constraints on transport infrastructure project delivery couple with energy crisis means that lack of data risk integration across an organisation presents a great challenge. The flow of information about risk has, as a purpose, not only to sustain an operational side, but also to provide risk support for management and executive boards; useful in both, strategic planning and execution, and consequently enhances the decision-making capabilities.

6. Conclusion

In this paper, an investigation of ERM and sustainability practices was conducted through analysing the literature in the public domain with the aim of developing a sustainable ERM framework for transport sector in the Global South. It presents an overview of transportation roles/challenges, it discusses sustainable transport and associated sustainability risks, it identifies the key contributions of ERM and it was revealed from the literature review that transport organisations could benefit significantly from implementing ERM customised to fit the unique business environment of the transport sector. Previous research of management control systems in general, and of risk management systems in particular, recognised the need to consider the specificity of organisational context in the designs of risk management systems. A Systems Thinking/Systems Dynamics paradigm was proposed to compliment ERM paradigm as a way of simplifying the inherent complexities, feedback, non-linearity and delays in the GS transport sector. Secondary data from public domain compliments the primary data via survey and interview to validate and improve understanding of the proposed sustainable ERM framework. Analysis of key ERM implementation challenges in the transport organisations revealed the following: Limited resources allocation and Support from top management; Consideration of Transport organisations Internal/External context; Risk Awareness Culture; ERM alignment with core organisational strategies and key objectives etc. Literature also confirm that current risk management approach (ERM) hardly assesses the emerging risks and other non-quantifiable risks arising from unforeseeable events. it was noted that sustainability issues are still not included in the ERM strategy and organizations find it challenging to integrate emerging sustainability (ESG) risks into existing risk management frameworks, which in practice means that organisations are exposed to a range of risks that are not being properly accounted for. It was suggested that sustainability should be integrated as a critical component of ERM. In addition, literatures from public domain have confirmed that many of the top risks are social or environmental, therefore a robust Sustainable Enterprise Risk Management (SERM) framework that includes social and environmental aspects could preserve value, reduce downside exposure, helps to connect risk, strategy and decision-making while enhancing Transport sector performance.

7. Contributions to Knowledge

The proposed contributions of this paper are to add to the existing body of knowledge in the application of ERM paradigm. Specifically, it will provide informed knowledge and understanding regarding ERM practical implementation guidance, which is intended to help policy makers with improved decision making, planning and prioritisation on sustainable transportation in the GS.

8. Future Work

Further work will include deeper experiences and insight into the identified research gaps. The evidence will rely on qualitative and quantitative data collected. Complemented with secondary data, analysis and evaluation of data will lead to the development of a sustainable ERM framework for the GS Transport sector. Next important steps include:

- Quantitative Analysis using SPSS software
- Interpreting the combined qualitative and quantitative datasets,
- Validating the sustainable ERM Framework developed and generating the final research findings.
- Further investigate how ST/SD could complement the sustainable framework to provide further understanding and insight into the role of sustainable ERM towards enhancing transport sector performance.

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