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Research Article

Evaluation of Risk Management in Road Construction Projects in Nigeria: A Case Study of FERMA Projects in the Federal Capital Territory (FCT), Nigeria

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Abstract

Road construction in Nigeria drives economic growth but faces risks such as delays and substandard quality, requiring context-specific risk management. This study assesses risk management practices in urban road projects within the Federal Capital Territory (FCT) under the Federal Roads Maintenance Agency (FERMA). Key risks were identified, their impacts analyzed, and mitigation strategies proposed. Using a survey of project managers, engineers, and contractors, data was analyzed via the Relative Importance Index (RII), highlighting price fluctuations and market uncertainties as the top risks, alongside critical technical, financial, and legal issues. Pearson's correlation revealed that poor soil recognition and misaligned construction choices were the most significant technical risks, while inadequate cost planning and failure to control costs were major financial risks. The findings emphasize early risk identification and targeted mitigation to enhance project efficiency, reduce delays, and limit cost overruns. This study advances understanding of construction risk management in Nigeria, offering actionable insights for FERMA and other stakeholders to improve decision-making and project delivery.

Keywords

Risk Identification, Risk Assessment, Risk Handling Actions, Road Construction Projects, Risk Management

1. Introduction

Road construction is vital to Nigeria's socio-economic development, supporting connectivity and growth. However, these projects face risks like environmental challenges, cost fluctuations, political instability, and stakeholder coordination issues, impacting timeline, budgets, and quality. Effective Risk Management (RM) is crucial to ensure successful project completion. RM identifies, assesses, and mitigates risks to reduce delays and optimize resources [5]. Given Nigeria's complex construction landscape, especially in Federal Roads Maintenance Agency (FERMA) projects, RM becomes essential. FERMA projects often experience delays, cost overruns, and quality issues due to poor RM (Nigerian Bureau of Statistics, 2019), affecting Nigeria's economic growth and infrastructure goals.

Effective RM requires assigning risks to stakeholders best

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positioned to manage them, enhancing efficiency and reducing disputes [10]. Clear risk allocation improves communication, decision-making, and accountability [33]. Comprehensive risk assessments, combining qualitative and quantitative approaches, better capture tangible (cost, schedule) and intangible (political, environmental) risks [17]. This approach ensures proactive, holistic risk mitigation, improving project outcomes. Addressing Nigeria's road construction inefficiencies is crucial, as over 60% of major road projects face delays and cost overruns due to inadequate RM [24]. Poorly managed risks delay projects and inflate costs, with broader economic impacts on trade, transport, and competitiveness. This study focuses on FERMA's Federal Capital Territory (FCT) projects, identifying critical risks, assessing mitigation strategies, and proposing improvements to reduce inefficiencies, delays, and cost overruns.

While RM has been studied globally, specific risks in Nigerian road construction remain under-researched. Most studies generalize RM across construction projects, overlooking sector-specific challenges [1, 15] This study addresses this gap, focusing on FERMA projects and proposing targeted solutions. Improved RM can enhance delivery timelines, control budgets, and improve infrastructure quality, supporting Nigeria's economic development goals. Policymakers, project managers, and stakeholders will benefit from its insights.

Risk management is an essential component of construction project management due to the complexities, uncertainties, and external factors that influence project success [29]. Construction projects are characterized by their multifaceted nature, involving diverse stakeholders, high costs, extended timelines, and vulnerability to various risks. As such, effective risk management practices are crucial to ensuring that construction projects are delivered on time, within budget, and to the required quality standards [26]. The need for efficient risk management has grown significantly in recent years, particularly as the construction industry faces increasing uncertainty due to factors such as economic fluctuations, political instability, and environmental challenges [7].

The first step in managing risk is risk identification, which involves recognizing potential risks that could affect a project. This process often relies on a combination of historical data, expert judgment, and brainstorming sessions [34]. Identifying risks early enables the project team to develop proactive strategies to mitigate these risks [41]. Recent studies have focused on risk identification techniques such as checklists, expert interviews, and risk breakdown structures (RBS), all of which help categorize and prioritize risks effectively [2]. Risk identification remains a challenge, especially in developing countries like Nigeria, where construction firms often rely on reactive rather than proactive risk management, leading to cost overruns and delays [7]. In road construction, key risks during the construction phase include labor disputes, weather, safety hazards, and logistical delays [10]. The design phase, though less exposed to external factors, is prone to design errors and scope creep, which escalate costs and delay timelines [43]. Effective risk management in both phases is essential for successful project delivery.

Once risks are identified, they must be assessed in terms of their potential impact and likelihood. Risk analysis involves both qualitative and quantitative approaches [3, 39]. Qualitative risk analysis focuses on the severity and impact of risks based on expert judgment and historical data, while quantitative risk analysis uses numerical methods, such as probability distributions and Monte Carlo simulations, to estimate the likelihood of risk events occurring and their potential financial or schedule impacts [2, 40]. Recent advancements in risk assessment tools have led to the development of more accurate predictive models for assessing risk in construction projects [4].

The importance of stakeholder involvement in managing risks effectively was underscored by [23] and [30], who found that proper risk allocation among stakeholders such as contractors, government agencies, and subcontractors ensures that each party handles the risks that are within their control. This allocation helps reduce the likelihood of disputes and mismanagement, which can otherwise hinder project progress [11]. Finally, recent studies have recognized the emergence of new risk categories, particularly those related to sustainability and environmental concerns [28]. As construction projects increasingly focus on green building practices and climate resilience, risks such as environmental compliance issues**,** supply chain disruptions, and resource shortages have become critical factors that influence the successful completion of projects [26].

Despite the growing body of research on risk management in construction, significant gaps remain, particularly concerning road construction projects in developing countries like Nigeria. While studies have been conducted on risk management in construction projects in general [23], there is limited research focusing specifically on the risks associated with road construction projects managed by agencies like FERMA in Nigeria. The existing literature often overlooks the unique socio-political, economic, and environmental challenges that shape the risk landscape in developing countries [12, 13, 38]. Moreover, there is a lack of detailed studies that assess the effectiveness of risk management strategies employed in these contexts. Although various risk management frameworks have been proposed, there is insufficient evidence regarding their practical application and success in mitigating risks in Nigerian road construction project [7]. Furthermore, the role of stakeholders, particularly in risk identification, allocation, and management, remains underexplored in the Nigerian context [37]. This study aims to address these gaps by focusing on FERMA-managed road construction projects in Nigeria, evaluating their risk management practices, and offering recommendations to enhance risk mitigation strategies. The study's objectives are fourfold: (1) Identify key risks in FERMA's FCT road projects, including environmental, finan-

cial, and operational factors. (2) Evaluate existing RM strategies to assess their effectiveness. (3) Examine stakeholder roles in risk identification, assessment, and management. (4) Propose recommendations for improved RM practices. By achieving these objectives, the study aims to enhance Nigeria's RM framework, improve project outcomes, and reduce delays, cost overruns, and inefficiencies. The findings will contribute to the development of more robust risk management frameworks tailored to the specific challenges faced by the Nigerian construction industry [25].

2. Methodology

2.1. Research Design

The research adopts a descriptive research design, utilizing both a quantitative survey and qualitative analysis to gather data. The survey method allows for the collection of primary data on the perceived risks in road construction projects, while the qualitative analysis aids in exploring the relationships between different variables and understanding the reasons behind risk perceptions. The mixed-methods approach is chosen to provide a comprehensive assessment of the risk landscape in road construction projects in Nigeria.

2.2. Pilot Study

To ensure the reliability and validity of the survey instrument, a pilot study was conducted prior to the main data collection. The pilot study aimed to test the clarity of the questionnaire, the appropriateness of the questions, and the ability to capture meaningful data. A small sample of project managers, site engineers, and contractors were selected to participate in the pilot study. Feedback from the pilot study participants was used to refine the survey instrument and ensure that the questions were understandable and relevant to the construction industry context in Nigeria. Citations: According to Creswell in 2014, pilot studies are essential for refining survey instruments and improving the overall quality of the research process [6]. This step ensures that the data collection process accurately reflects the study's objectives and that participants are able to provide reliable responses [6, 35].

2.3. Data Collection Method

The primary data for this study was collected through a survey questionnaire administered to key stakeholders in road construction projects. These stakeholders included project managers, site engineers, and contractors involved in FERMA projects within the Federal Capital Territory (FCT). The respondents were selected using purposive sampling, which is suitable for targeting individuals with specific knowledge or expertise on the subject matter [36]. A total of 35 participants were purposefully surveyed, providing a robust dataset for analysis. The questionnaire included questions designed to identify various risk factors that could potentially affect the success of road construction projects. The risks were categorized into internal and external categories, as defined in the literature [9]. The questionnaire also assessed the probability and impact of each risk factor based on the participants' experiences and perceptions.

2.4. Likert Scale and Data Analysis

The responses collected through the questionnaire were analyzed using the Relative Importance Index (RII), a widely used technique for prioritizing risks based on their perceived severity [8]. The RII was calculated by applying the Likert scale, which ranged from 1 ("strongly disagree") to 5 ("strongly agree"). This scale was used to assess the probability and impact of each identified risk, with respondents asked to rate the significance of each risk factor in terms of its likelihood of occurrence and its potential impact on the project's success. The formula for calculating the RII is given in Equation (1).

$$RII = \Sigma(f_i \times w_i) / (N \times A) \quad (1)$$

Where:

f_i = frequency of responses for each risk factor

w_i = weight assigned to each response (ranging from 1 to 5)

N = total number of responses

A = maximum weight (5 in this case)

Using SPSS software, the mean RII values were computed for both the probability and impact of the risk factors. This allowed for the ranking of risks based on their importance, helping to prioritize the risks that require the most attention in road construction projects. Citations: RII is commonly used in construction risk management studies, as it provides a clear and quantifiable measure of risk importance [43].

2.5. Qualitative Analysis

Qualitative analysis complemented quantitative analysis to explore relationships between variables and respondents' risk perceptions. Pearson's correlation measured the strength and direction of the link between risk probability and impact. The correlation coefficient (r), ranging from -1 to +1, signifies the degree of association, with values near +1 indicating strong positive relationships which is widely used in risk analysis [42]. this method identifies co-occurring risk factors, supporting effective risk management.

2.6. Data Analysis Tools

All data analyses were carried out using SPSS software (version 22), a statistical software package widely used for data analysis in social science and construction research [27]. SPSS was used to calculate the Relative Importance Index

(RII), mean, and standard deviation of the risk factors. In addition to SPSS, Microsoft Excel was used to create charts and tables that visually represent the data, aiding in the interpretation and presentation of the findings. The data were also analyzed in terms of response frequency and percentages to understand the distribution of opinions regarding the risk factors. This helped to identify which risk factors were most commonly perceived as significant by the respondents.

2.7. Validation and Reliability

In order to ensure the reliability and validity of the results, several measures were taken. The Cronbach's alpha coefficient was calculated to assess the internal consistency of the survey instrument [16]. A value of 0.70 or higher is considered acceptable for ensuring that the questions in the survey reliably measure the intended constructs [36]. Additionally, triangulation was employed to enhance the validity of the findings by cross-checking the results from the survey with insights gained from literature reviews and expert opinions. This multi-source approach ensures that the findings are robust and that the conclusions drawn from the analysis are well-supported.

3. Results and Discussion

The study achieved a 97% response rate, collecting 34 of the targeted 35 responses. Analysis of 25 potential risk factors using the Relative Importance Index (RII) revealed the 10 most significant risks in FERMA-managed road construction projects in Nigeria's Federal Capital Territory (FCT). The most critical risk was price fluctuation and market uncertainty related to materials and labor. This was followed by the failure to complete projects as scheduled, delays in mobilization, poor work organization and scope extension, and the use of low-quality construction materials [14]. Other key risks included the failure to maintain project progress within budget, delays in material supply, equipment breakdown, inefficient planning, and poor management of personnel, supplies, and resources.

A mean value analysis highlighted price fluctuation and market uncertainty as the most severe cost-related risk, with a mean score of 4.21. Other significant cost-related risks included budget overruns due to unforeseen site conditions, improper cost planning, and delays in maintaining project progress. These findings emphasize the financial and operational challenges faced in FERMA-managed road projects, affecting budgets, timelines, and overall project performance, as summarized in Table 1.

Table 1. *RII Ranking of Risk Factors and Mean.*

	(%)	Rank	Mean
Technical Risks			
Improper design and preparation of Bills	14.71	24	2.68
Improper selection of the types of construction	26.47	20	2.76
Equipment failure/breakdown	76.47	8	3.46
Badly recognized soil structure	52.94	14	3.21
Delay in project due to unforeseen site conditions	64.71	11	2.74
Delay in mobilization	88.24	2	3.93
Construction materials quality	82.35	5	3.73
Inefficient planning	76.47	8	3.42
Financial Risks			
Underestimating the costs of the project	64.71	11	2.79
Overestimating the costs of the project	32.35	18	3.09
Delay of material supply by suppliers	79.41	6	3.65
Failure to maintain project progress within the estimated cost	79.41	6	3.70
Improper cost plan	26.47	20	3.12
Environmental Risks			
Price fluctuation and market uncertainty related to materials and labors	97.06	1	4.21
Social Risk			

	(%)	Rank	Mean
Lack of leadership quality of project manager, Engineer or contractor	23.53	22	3.06
Insufficient control of site workers (insufficient engineers at the site)	44.12	15	3.09
Poor work organization and extending the scope of work	85.29	4	3.90
Accidents on site resulting in physical injury	29.41	19	3.03
Employees' absence (illness, strike, etc.)	41.18	16	2.91
Legal Risks			
Conflicts in contract documents	35.29	17	3.24
Criminal Acts/ Theft	61.76	13	3.02
Lack of effective monitoring and feedback by project manager	20.59	23	3.15
Inadequate/unclear definition of project scope	14.71	24	2.88
Failure in completing the project as planned and within estimated time	85.29	2	3.94
Poor management of personnel, supplies and material resources	73.53	10	3.41

Table 1 shows the RII ranking of the risk factors projects faced by Project Managers, Engineers and Contractors in Nigeria (FERMA, F.C.T, Nigeria). The top ten (10) most impactful risks are:

1) Price fluctuation and market uncertainty related to materials and labors (environmental risk)
2) Failure in completing the project as planned and within estimated time (legal risk)
3) Delay in mobilization (technical risk)
4) Poor work organization and extending the scope of work (social risk)
5) Construction materials quality (technical risk)
6) Failure to maintain project progress within the estimated cost (financial risk)
7) Delay of material supply by suppliers (financial risk)
8) Equipment failure/breakdown (technical risk)
9) Inefficient planning (technical risk)
10) Poor management of personnel, supplies and material resources (legal risk)

Table 2. *The results of the Pearson correlation coefficient (Pcc.) among Technical Risk Factors.*

	Badly recognized soil structure	Delay in mobilization	Inefficient planning
Improper design and preparation of Bills	0.142	0.265	.493** (0.003)
Improper selection of the types of construction	.690** (0.000)	-0.075	0.163
Delay in mobilization	-0.235	1	.551** (0.000)
Inefficient planning	-0.001	.551** (0.001)	1

Note: P-values are shown in parenthesis

Table 2 shows the summary of the *Pearson Correlation test among the technical risk factors.* It can be inferred from the results that the combination of badly recognized soil structure & improper selection of construction type is the most challenging and significant technical risk that could hinder the successful execution of FERMA road projects in Nigeria with a Pearson correlation coefficient (Pcc) value of 69% at a P-value of 0.0000. Another significant damaging combination of technical risk factors are delay in mobilization & insufficient planning. These two have a moderately positive Pcc. of 55.1% at a P-value of 0.001. The last pair of significantly detrimental technical risk factors are inefficient planning & improper design and preparation of bills. The pair have a moderately positive Pcc. of 49.3% and a P-value of 0.003. All other pairs of technical risk factors demonstrated insignificant levels of Pcc These results highlight the interaction of key technical risk factors that should be prevented from occurring by

all stakeholder for the success of road construction projects in Nigeria.

Table 3. *The results of the Pearson correlation among the financial risks.*

	Overestimating the costs of the project	Underestimating the costs of the project	Delay of material supply by suppliers	Failure to maintain project progress within the estimated cost
Overestimating the costs of the project	1	0.172	0.257	0.204
Underestimating the costs of the project	0.172	1	0.253	0.218
Delay of material supply by suppliers	0.257	0.253	1	0.13
Failure to maintain project progress within the estimated cost	0.204	0.218	0.13	1
Improper cost plan	0.021	0.28	0.128	.441**(0.009)

The data in Table 3 shows the effect of interaction among the five (5) identified financial risk factors. It can be seen that on the pair of improper cost plan & failure to maintain project progress within the estimated cost is statistically significant. The pair has a low positive Pcc of 0.441.

Table 4. *The results of the Pearson correlation coefficient (2-tailed) among the Legal Risks.*

	Conflicts in contract document	Criminal Acts/ Theft	Lack of effective monitoring and feedback by project manager	Failure in completing the project as per design planned and within estimated time duration
Conflicts in contract document	1	.542** (0.001)	.495** (0.003)	0.215
Criminal Acts/ Theft	.542** (0.001)	1	0.193	.448** (0.008)
Lack of effective monitoring and feedback by project manager	.495** (0.003)	0.193	1	-0.005
Failure in completing the project as per design planned and within estimated time duration	0.215	.448** (0.008)	-0.005	1

Table 4 shows the level of correlation among the six (6) factors identified as legal risk. The results show that three of the pairs are statistically significant. The pair of 'conflicts in contract document & criminal acts/theft' gave a moderately positive Pcc of 54.2%, while the pair 'lack of effective monitoring and feedback by project manager & conflicts in contract document' had a Pcc of 49.5%. The last of the significant pair is 'failure in completing a project as per design & criminal acts/theft' showed a low positive Pcc of 44.8%. These results highlight the interrelationship among key legal risk factor in road project management. Stakeholders should strive to prevent the formation of these identified pairs of risks to reduce the uncertainties in managing road projects.

The Pearson correlation analysis for the five (5) factors identified and ranked as social risks showed no significant correlation at 5% level of significant (P- value less than 0.05) as depicted in Table 5.

Table 5. The results of the Pearson correlation coefficient (2-tailed) among the Social Risks.

	Lack of leadership quality of project manager, Engineer or contractor	Insufficient control of site workers (insufficient engineers at the site)	Extending the scope of work and poor work organization	Accidents on site resulting in physical injury	Employees' absence (illness, strike, etc.)
Lack of leadership quality of project manager, Engineer or contractor	1	0.056	0.199	-0.021	-0.039
Insufficient control of site workers (insufficient engineers at the site)	0.056	1	0.326	0.274	0.135
Extending the scope of work and poor work organization	0.199	0.326	1	0.148	-0.14
Accidents on site resulting in physical injury	-0.021	0.274	0.148	1	.409* (0.016)
Employees' absence (illness, strike, etc.)	-0.039	0.135	-0.14	.409* (0.016)	1

4. Risk Handling Actions

Through RII analysis, it became evident that certain risks were less significant or relevant to the specific cases being studied. This observation stemmed from the recognition that construction work is heavily influenced by diverse environments and locations, thereby exposing projects to various risks throughout and after the construction process. Therefore, early identification of risks and their proper handling will help reduce these risks and also mitigate them when encountered in the future. Table 6 shows the Identified Risks in Road Construction Projects by FERMA in F.C.T, Nigeria and suggested risk handling actions.

Table 6. Risk Handling Actions.

s/n	Risk	Risk Handling Action
1	Price fluctuation and market uncertainty related to materials and labors	Contractual Adjustments: Use cost escalation clauses in contracts to account for price changes Market Analysis & Supplier Agreements: Monitor market trends and secure long-term contracts with suppliers to stabilize prices Hedging & Alternative Sourcing: Utilize commodity futures and maintain a list of alternative suppliers for flexibility Contingency Budget: Allocate reserves for unforeseen cost increases Collaborative Partnerships & Insurance: Build partnerships with suppliers and secure insurance to mitigate financial risks
2	Failure in completing the project as planned and within estimated time	Comprehensive Planning & Stakeholder Engagement: Conduct detailed planning, engage stakeholders, and review designs to prevent flaws Quality Assurance & Monitoring: Apply QA/QC measures and use real-time tracking to detect and address deviations Change Management & Contingency Planning: Establish change tracking systems and allocate time buffers for unplanned issues

s/n	Risk	Risk Handling Action
		Design-Build Approach & Audits: Adopt a design-build method and conduct regular inspections to ensure timely completion [22]
3	Delay in mobilization	Mobilization Planning & Site Assessment: Develop mobilization plans with site-specific considerations and assess site conditions early Supplier Engagement & Contractual Clarity: Engage suppliers early and set clear mobilization timelines in contracts with penalties for delays. Resource Allocation & Contingency Plans: Allocate sufficient resources and prepare contingency plans for alternative suppliers and equipment. Monitoring & Weather Flexibility: Track mobilization progress using KPIs and account for weather-related risks in project schedules [19]
4	Poor work organization and extending the scope of work	Scope Definition & Change Management: Clearly define scope and establish formal change control procedures Communication & Documentation: Ensure stakeholders are informed of changes, with all agreements documented Contract Clarity & Dispute Resolution: Include scope-change provisions and dispute resolution mechanisms in contracts. Risk Assessment & Workforce Management: Identify risks linked to scope changes, allocate skilled labor, and use efficient resource allocation methods Monitoring & Periodic Reviews: Track project progress and conduct reviews to maintain alignment with project objectives [20]
5	Construction materials quality	Supplier Selection & Quality Testing: Use reputable suppliers and conduct pre-construction testing to ensure material quality QA/QC Plans & Audits: Implement quality assurance/control plans and conduct regular audits Material Handling & Storage: Ensure proper storage to prevent damage, and maintain documentation of test results and compliance records
6	Failure to maintain project progress within the estimated cost	Detailed Cost Estimation & Tracking: Conduct comprehensive project planning and track expenses against budgets Contingency Reserves & Value Engineering: Set aside contingency funds and apply value engineering to minimize costs Supplier & Contractor Management: Build strong supplier/contractor relationships to reduce delays and cost increases. [22] KPI Tracking & Regular Reviews: Measure cost efficiency using KPIs and review project progress regularly to identify issues
7	Delay of material supply by suppliers	Supplier Assessment & Contracts: Assess supplier reliability and include strict delivery schedules with penalty clauses in contracts Supply Chain Management & Alternative Suppliers: Maintain supply chain visibility and pre-qualify alternative suppliers Communication & Performance Monitoring: Maintain open communication with suppliers and track performance against timelines Risk Mitigation & Legal Remedies: Use contingency funds to absorb delays and pursue legal action for repeated supplier failures [31]
8	Equipment failure/breakdown	Proactive Maintenance & Inspection: Conduct scheduled maintenance and inspections to detect and prevent failures Spare Parts & Backup Equipment: Stock spare parts and secure supplier agreements for quick replacements Equipment Monitoring & Telematics: Use telematics for real-time equipment tracking and performance monitoring Operator Training & Certification: Train operators to improve equipment handling and prevent misuse Contingency Planning & Equipment Insurance: Develop response plans for equipment breakdowns and obtain equipment breakdown insurance [25]
9	Inefficient planning	Comprehensive Planning & WBS: Develop a work breakdown structure (WBS), schedules, and resource plans for efficient execution

s/n	Risk	Risk Handling Action
10	Poor management of personnel, supplies and material resources	Risk Assessment & Stakeholder Engagement: Identify risks early and engage stakeholders to align goals and execution plans Lean Construction & Change Management: Apply lean construction to minimize waste and establish a formal change management process Monitoring & Reporting: Track progress regularly using KPIs to detect issues early and apply corrective actions [18] Resource Planning & Supplier Management: Plan for material needs, supply chains, and personnel allocation; build strong supplier relationships for timely deliveries Inventory Control & Technology Adoption: Use inventory control systems to reduce overstocking and adopt construction technologies for better resource utilization [21] Training & Development: Train workers and project teams to enhance productivity and reduce inefficiencies QA/QC & Risk Management: Implement quality assurance/control procedures and establish a risk management framework for resource-related risks Performance Tracking & Continuous Improvement: Use KPIs to track resource utilization and review project progress for continuous improvement [32]

5. Conclusion

The following conclusions can be drawn from this study which assessed the risk management practices of the Federal Roads Maintenance Agency (FERMA) in road construction projects within Nigeria's Federal Capital Territory (FCT).

1) Price fluctuation and market uncertainty related to materials and labours is the topmost risk that affect road construction projects in Nigeria
2) Technical risk account for 40% of the ten (10) topmost ranked risk factors affecting construction projects in Nigeria
3) To address the risk of price fluctuations and market uncertainties, FERMA should adopt structured risk assessment methods and proactive strategies like post-project reviews would support continuous improvement. Early identification of financial, procurement, and environmental risks during project planning, combined with stakeholder engagement and a dynamic risk register, would further strengthen FERMA's risk management capacity.

Abbreviations

FERMA	Federal Roads Maintenance Agency
FCT	Federal Capital Territory
RM	Risk Management
RII	Relative Importance Index
Pcc.	Pearson Correlation Coefficient
SPSS	Statistical Package for the Social Sciences
QA	Quality Assurance
QC	Quality Control
QA/QC	Quality Assurance and Quality Control
KPI	Key Performance Indicator
RBS	Risk Breakdown Structure
WBS	Work Breakdown Structure
NBS	Nigerian Bureau of Statistics
P-value	Probability Value (Statistical Significance Level)

Author Contributions

Joy Hafsat Usman: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Resources, Validation, Writing – original draft, Writing – review & editing

Abdulmumin Akoredeley Alabi: Supervision, Validation

Conflicts of Interest

The authors declare no conflicts of interest.

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