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Influence of Risk Assessment and Risk Mitigation Strategies on the Performance of National Government Road Construction Projects in Nairobi City County, Kenya

Nicholas Mulinge Musuni[1*] and Dr. Noor Ismail (PhD) [2]

[1*]Scholar, Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya

[2]Lecturer, Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya

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Abstract

Road infrastructure is central to economic productivity, yet many national government road construction projects in Kenya continue to experience schedule delays, cost overruns, and quality non-compliance. This study examined the influence of risk assessment strategies and risk mitigation strategies on the performance of national government road construction projects in Nairobi City County, Kenya. Anchored on Prospect Theory and Agency Theory, the study adopted a descriptive cross-sectional survey design. The target population comprised 120 national government road construction projects in Nairobi City County, and a sample of 92 projects was selected through simple random sampling. Structured questionnaires were administered to project managers, yielding 77 usable responses representing an 83.7% response rate. Data were analysed using descriptive statistics, Pearson correlation analysis, and multiple regression analysis with SPSS version 29. Correlation results established that risk assessment strategies ($r = 0.718$, $p < 0.001$) and risk mitigation strategies ($r = 0.776$, $p < 0.001$) were both positively and significantly associated with project performance. Multiple regression results confirmed that risk assessment strategies (Beta = 0.251, $p = 0.001$) and risk mitigation strategies (Beta = 0.344, $p < 0.001$) each had a statistically significant positive effect on project performance, with risk mitigation strategies emerging as the stronger predictor. The combined model explained 65.8% of the variation in project performance ($R^2 = 0.658$). The study concludes that structured implementation of both risk assessment and risk mitigation practices significantly enhances performance outcomes in national government road construction projects. Implementing agencies should institutionalise probability–impact scoring frameworks, strengthen contingency budget allocations, and embed contractual risk controls within procurement governance systems to improve schedule adherence, cost control, and quality compliance.

Keywords: *Risk Assessment Strategies, Risk Mitigation Strategies, Project Performance, Road Construction Projects, Nairobi City County, Kenya*

INTRODUCTION

Road infrastructure underpins economic productivity by improving accessibility, reducing transport costs, and integrating markets and supply chains (Tighe et al., 2020; Amoatey & Adaku, 2020), yet road construction projects are inherently complex undertakings characterised by long implementation timelines, technical interdependencies, multi-agency coordination, and

significant financial and contractual exposure (Eizakshiri et al., 2020). Globally, transport infrastructure projects frequently suffer cost overruns, schedule delays, and disputes arising from inaccurate planning, design variations, contractor limitations, and weak early-stage risk identification (Amoatey & Adaku, 2020; Safapour et al., 2021). In response, risk management—comprising risk identification, assessment, mitigation, and monitoring—has become a central governance mechanism for improving project delivery (Kiral & Gündüz, 2025; Famiyeh et al., 2020). However, the mere existence of risk management frameworks does not guarantee improved outcomes; where risk processes are treated as compliance documentation rather than active control systems, and where monitoring and corrective action are weak, projects tend to become reactive, leading to escalating costs and delays (Safapour et al., 2021; Osei-Kyei & Chan, 2020), problems that are further intensified in dense urban environments (Eizakshiri et al., 2020).

Evidence from the United Kingdom, United States, Australia, and other developed economies shows that even mature governance systems experience cost growth and schedule variability due to optimism bias and inadequate risk reassessment during implementation as well as weak integration of monitoring mechanisms, despite the use of structured probability-impact assessment tools and contractual risk-allocation frameworks (Tighe et al., 2020; Osei-Kyei & Chan, 2020). Even within advanced public-private governance models, misalignment of risk ownership and weak monitoring of contractual obligations can lead to claims escalation (Rybnicek & Alon, 2020). These cases demonstrate that institutional sophistication alone is insufficient; what matters is the consistent operationalisation of risk identification, assessment, mitigation, and monitoring throughout the project lifecycle (Kiral & Gündüz, 2025; Safapour et al., 2021), since well-embedded systems produce stronger schedule adherence, cost control, and quality outcomes (Osei-Kyei & Chan, 2020).

Regionally, evidence from South Africa, Ghana, Nigeria, and Ethiopia reveals that financial instability, procurement governance weaknesses, contractor capability limitations, and stakeholder-related conflicts persistently undermine road project performance across Sub-Saharan Africa, even where formal public-private partnership structures or risk allocation frameworks exist (Osei-Kyei & Chan, 2020; Safapour et al., 2021). Common challenges include unclear risk allocation and delayed payments affecting contractor liquidity (Amoatey & Adaku, 2020; Famiyeh et al., 2020), weak contract supervision enabling opportunistic behaviour (Rybnicek & Alon, 2020), and land or community disputes that disrupt schedules (Osei-Kyei & Chan, 2020; Kiral & Gündüz, 2025).

Within Kenya, and particularly Nairobi City County, road construction performance is shaped by financial instability and delayed fund disbursement (Office of the Auditor-General, 2025; Famiyeh et al., 2020), weak procurement governance and contract administration (Osei-Kyei & Chan, 2020), stakeholder-related risks such as land acquisition disputes and political pressure (Amoatey & Adaku, 2020; Safapour et al., 2021), and inconsistent monitoring and control systems, as reflected in recurring audit findings from the Office of the Auditor-General (2025; Kiral & Gündüz, 2025). Nairobi's status as Kenya's commercial and logistics hub adds further complexity through utility relocation challenges, traffic management constraints, and right-of-way limitations (Tighe et al., 2020; Eizakshiri et al., 2020), all of which heighten exposure to technical, financial, and social risks. Although formal risk management frameworks exist within implementing agencies, evidence suggests inconsistent institutionalisation and enforcement, creating a clear need to empirically examine how risk identification, assessment, mitigation, and

monitoring strategies influence the performance of national government road construction projects in Nairobi City County.

Statement of the Problem

Road infrastructure projects are critical to economic efficiency and urban productivity, as they lower transport costs, improve mobility of labour and goods, and strengthen market connectivity (Tighe et al., 2020), yet global evidence shows that transport infrastructure projects frequently experience schedule delays, cost overruns, quality non-conformance, claims escalation, and scope variations due to weak governance controls and ineffective risk management (Amoatey & Adaku, 2020). These challenges are amplified in urban settings where utility congestion, traffic management complexity, right-of-way limitations, and stakeholder disputes heighten both the likelihood and impact of risks (Eizakshiri et al., 2020). In Kenya, this underperformance is well documented: the Office of the Auditor-General's audit of 213 donor-funded projects for FY2023/24 identified delayed and stalled projects, procurement irregularities, contract non-compliance, and weak risk management systems, with pending bills rising by approximately 92% from Ksh 35.82 billion to Ksh 68.88 billion over four years (OAG, 2025), a pattern consistent with research linking delayed payments to cashflow constraints, work stoppages, and contractor claims (Famiyeh et al., 2020).

Audit evidence further reveals substantial disbursement and monitoring weaknesses, with seven donor-funded projects experiencing Ksh 2.067 billion in delayed disbursements due to late exchequer releases and partial payments (OAG, 2025), undermining contractors' ability to maintain predictable schedules and mitigation capacity (Osei-Kyei & Chan, 2020). Additionally, 151 projects had unresolved prior-year audit issues relating to governance, internal controls, and risk management, pointing to persistent weaknesses in monitoring and corrective action (OAG, 2025), which is concerning given that effective risk monitoring is consistently linked to improved construction project performance (Safapour et al., 2021). These problems are particularly acute in Nairobi City County, where national road projects serving high-value industrial, logistics, and residential corridors face heightened exposure from utility relocation, traffic disruption, and right-of-way constraints, factors shown to increase coordination failures, design variations, and cost escalation where control systems are weak (Eizakshiri et al., 2020), with poor early risk identification and weak monitoring further raising the likelihood of reactive decision-making, prolonged completion periods, and higher costs (Kiral & Gündüz, 2025).

Despite the wide advocacy for risk management, many public infrastructure projects continue to treat risk processes as compliance documentation rather than performance-driven control mechanisms, with effectiveness depending on embedding identification, assessment, mitigation, and monitoring into procurement, contract administration, and supervision systems (Safapour et al., 2021). In Kenya, recurring audit signals, rising pending bills, unresolved governance weaknesses, and procurement irregularities suggest that risk strategies are inconsistently implemented or weakly enforced in public infrastructure projects (OAG, 2025). This justifies the need to empirically examine how risk assessment and mitigation strategies influence the performance of national government road construction projects in Nairobi City County, to strengthen risk governance and improve performance outcomes.

Objectives of the Study

The general objective was to examine the influence of risk assessment and risk mitigation strategies on the performance of National Government Road Construction Projects in Nairobi City County, Kenya.

The specific objectives were;

i. To assess the influence of risk assessment strategies on performance of national government road construction projects in Nairobi City County, Kenya.
ii. To examine the influence of risk mitigation strategies on performance of national government road construction projects in Nairobi City County, Kenya.

LITERATURE REVIEW

Theoretical Framework

This study is grounded in Prospect Theory and Agency Theory. Prospect Theory, developed by Kahneman and Tversky (1979), posits that decision-makers do not behave in fully rational, probability-consistent ways when evaluating uncertain outcomes. Instead, they evaluate potential outcomes relative to a reference point and exhibit systematic biases including loss aversion and overconfidence. In construction environments, risk assessment relies heavily on human judgment; project managers must estimate probabilities and impacts of uncertain events such as cost escalation, design variations, and contractual disputes. Safapour et al. (2021) observe that subjective risk evaluation without structured assessment tools increases inconsistency in prioritising high-impact threats. Prospect Theory therefore provides theoretical justification for the adoption of standardised, data-driven probability–impact assessment frameworks that counteract cognitive biases and improve the accuracy of risk prioritisation decisions.

Agency Theory, developed by Jensen and Meckling (1976), explains governance challenges arising from information asymmetry and divergence of interests between principals and agents. In national government road construction projects, implementing agencies function as principals while contractors, consultants, and supervising engineers operate as agents. This delegation structure inherently introduces risks of opportunistic behaviour, inflated claims, and strategic underbidding. Eisenhardt (1989) argues that structured contractual mechanisms, including performance bonds, milestone-based payments, retention clauses, and penalty provisions, function as tools that reduce moral hazard and align agent behaviour with principal objectives. Agency Theory therefore, directly supports the study's proposition that risk mitigation strategies, operationalised through contractual governance instruments, significantly enhance project performance outcomes.

Empirical Literature

Risk Assessment Strategies and Project Performance

Risk assessment strategies refer to structured processes used to evaluate the likelihood and potential impact of identified risks in order to determine their relative significance and prioritise management attention. According to PMI (2021), risk assessment involves both qualitative and quantitative techniques aimed at ranking risks by severity and urgency. Kiral and Gündüz (2025) emphasise that systematic assessment transforms unstructured risk lists into actionable decision-making inputs.

Canesi and Gallo (2023) examined the use of formal risk assessment in anticipating and reducing cost overruns in public road works in Italy. Their analysis showed that when risk is assessed early and translated into prioritised controls, projects demonstrate improved cost discipline because escalation risks are flagged sooner and corrective actions can be implemented before overruns crystallise. Antoniou (2021) developed delay risk assessment models for road projects in Greece, demonstrating that a small set of dominant delay drivers can be isolated through formal decision tools and used to strengthen planning and monitoring decisions in road project delivery.

Mngale, Mgeni, and Lucas (2025), investigating road maintenance projects in Tanzania, found that formalising risk assessment improves performance logic by strengthening anticipatory

budgeting, reducing the surprise element in variations, and improving the discipline of cost control decisions. Jackson and Shanmuga Priya (2024) similarly demonstrated how risk factors can be empirically grouped and prioritised in Ghanaian construction projects, supporting risk assessment as a performance pathway because it improves consistency in what gets flagged as critical and therefore what gets funded, monitored, and escalated.

In Kenya, Onwong'a (2025) examined road construction projects in Nairobi City County and found that systematic risk assessment procedures, including updating risk registers and prioritising risks by likelihood and impact, exerted a measurable positive influence on project performance. Ngigi and Kwasira (2024) further demonstrated that strengthened risk management practices, including risk assessment, are positively associated with performance outcomes in road projects managed by the Kenya Rural Roads Authority.

Risk Mitigation Strategies and Project Performance

Risk mitigation strategies refer to structured actions and governance mechanisms designed to reduce the likelihood of risk occurrence or minimise the severity of their impact on project objectives. PMI (2021) defines mitigation as proactive action taken to decrease risk exposure through avoidance, reduction, transfer, or acceptance strategies supported by contingency planning. Agency Theory suggests that mitigation mechanisms function to align incentives and reduce opportunistic behaviour between principals and agents (Eisenhardt, 1989).

Safapour et al. (2021) demonstrated in the United States that projects incorporating formal mitigation action plans and structured contingency allocations exhibited significantly lower schedule variance and cost escalation. Osei-Kyei and Chan (2020) examined public–private partnership infrastructure projects across Ghana and South Africa and established that balanced risk transfer arrangements and well-defined mitigation clauses significantly reduced dispute frequency and improved cost control.

At the regional level, Akinradewo and Aigbavboa (2021) found in Nigeria that projects implementing structured mitigation plans and contractual penalty provisions reported fewer implementation delays and reduced claim escalation. In Kenya, Mutua and Ochieng (2022) established that contingency budgeting and enforcement of contractual clauses were significantly associated with improved cost performance and reduced implementation delays in public infrastructure projects. Wambua and Ombui (2023) further found that the implementation of mitigation action plans and clear contractual risk allocation significantly reduced delay frequency in Kenya Urban Roads Authority projects.

Conceptual Framework

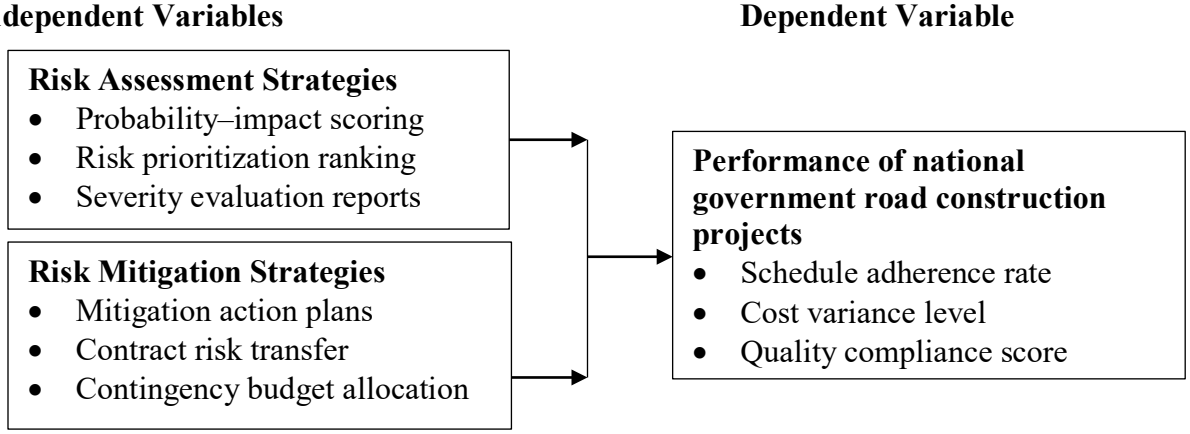

Figure 1: Conceptual Framework

METHODOLOGY

The study adopted a descriptive cross-sectional survey design, which enabled collection of quantitative evidence on the relationship between risk management strategies and project performance as they exist in real project settings without manipulation of variables. The target population comprised 120 national government road construction projects in Nairobi City County, Kenya, implemented by agencies such as the Kenya National Highways Authority and the Kenya Urban Roads Authority. The unit of analysis was the individual road construction project, with project managers serving as the unit of observation by virtue of their direct responsibility for coordinating risk management processes and monitoring performance indicators.

A sample of 92 projects was determined using Yamane's (1967) formula at a 95% confidence level and a 5% precision level. Simple random sampling was applied to select projects, while purposive selection was used to identify one project manager per sampled project as the most appropriate and informed respondent. Structured questionnaires containing closed-ended items measured on a five-point Likert scale were administered using the drop-and-pick method, with electronic delivery offered where necessary to improve accessibility among busy project professionals.

Pilot testing was conducted on nine project managers from adjacent counties to assess instrument reliability and validity before the main study. Cronbach's alpha coefficients of 0.811 and 0.817 were obtained for the risk assessment and risk mitigation constructs respectively, both exceeding the recommended threshold of 0.70. Face validity ratings ranged from 4.3 to 4.6 out of 5, while principal component analysis confirmed average factor loadings above 0.60 and average variance extracted values above 0.50 for all constructs.

Data from 77 returned questionnaires, representing a response rate of 83.7%, were analysed using SPSS version 29. Descriptive statistics including means and standard deviations summarised respondent perceptions. Pearson product-moment correlation analysis established the direction and magnitude of relationships between risk management strategies and project performance, while multiple regression analysis determined the individual and combined predictive effects of the independent variables on project performance, controlling for the contribution of other variables in the model.

FINDINGS AND DISCUSSION

Response Rate

The study targeted 92 project managers drawn from national government road construction projects in Nairobi City County. Out of the 92 questionnaires administered, 77 were duly completed and returned, representing a response rate of 83.7%. According to Mugenda and Mugenda (2019), a response rate above 70% is considered adequate for statistical analysis and generalization of findings. Table 1 shows the distribution of the response rate for the pilot study.

Descriptive Analysis of Risk Assessment Strategies

Table 1: Descriptive Statistics for Risk Assessment Strategies

Statement	Mean	Std. Dev.
Identified risks are systematically evaluated using structured probability and impact scoring methods before mitigation resources are allocated.	4.417	0.691
The project team applies risk prioritization techniques to rank risks based on severity and potential consequences to project objectives.	4.286	0.814

Statement	Mean	Std. Dev.
Quantitative methods such as cost impact estimation or schedule impact analysis are used to assess high-exposure risks in the project.	3.623	1.137
Risk severity evaluation reports are prepared and communicated to key decision-makers to support informed allocation of contingency resources.	3.909	0.998
The assessment process distinguishes between minor operational risks and critical risks that could significantly derail project timelines or budgets.	4.221	0.772
Risk assessment decisions are supported by documented data rather than relying solely on individual intuition or experience.	3.805	1.049
Effective risk assessment enhances decision-making accuracy and reduces misallocation of time and financial resources within the project.	4.558	0.642
Composite	4.117	0.872

Source: Research Data (2026)

The findings indicate that respondents agreed that risk assessment strategies were implemented across national government road construction projects in Nairobi City County. The statement that recorded the highest mean score was that effective risk assessment enhances decision-making accuracy and reduces misallocation of time and financial resources within the project (Mean = 4.558; SD = 0.642). This finding suggests that respondents strongly perceived risk assessment as a critical management tool that improves resource utilization and supports informed project decision-making. The relatively low standard deviation further indicates a high level of consensus among respondents regarding the importance of risk assessment in enhancing project performance.

The findings further revealed that identified risks are systematically evaluated using structured probability and impact scoring methods before mitigation resources are allocated (Mean = 4.417; SD = 0.691). This suggests that project teams employ formal and structured approaches to assess the likelihood and consequences of risks before selecting appropriate mitigation measures. Similarly, respondents agreed that the project team applies risk prioritization techniques to rank risks based on severity and potential consequences to project objectives (Mean = 4.286; SD = 0.814). These findings imply that project managers recognize the need to focus attention and resources on risks that pose the greatest threat to project success.

The study also established that respondents agreed that the assessment process distinguishes between minor operational risks and critical risks that could significantly derail project timelines or budgets (Mean = 4.221; SD = 0.772). This finding indicates that project teams are capable of categorizing risks according to their potential impact, thereby facilitating appropriate response planning and allocation of mitigation resources.

However, moderate levels of agreement were reported regarding the preparation and communication of risk severity evaluation reports to support informed allocation of contingency resources (Mean = 3.909; SD = 0.998) and the use of documented data to support risk assessment decisions rather than relying solely on individual intuition or experience (Mean = 3.805; SD = 1.049). The relatively higher standard deviations for these statements suggest variations in risk assessment practices across projects. This may indicate that while some projects employ formal and evidence-based assessment procedures, others continue to rely on managerial judgment and experiential knowledge when evaluating project risks.

The lowest mean score was recorded on the statement that quantitative methods such as cost impact estimation or schedule impact analysis are used to assess high-exposure risks in the project (Mean = 3.623; SD = 1.137). Although respondents generally agreed with the statement, the comparatively lower mean and higher standard deviation suggest that advanced quantitative risk assessment techniques are not consistently applied across all road construction projects. This variation may be attributed to differences in technical expertise, project complexity, availability of risk analysis tools, and organizational capacity to undertake sophisticated risk modeling.

Overall, the composite mean of 4.117 indicates that risk assessment strategies were generally practiced within national government road construction projects. The composite standard deviation of 0.872 suggests moderate variation in responses, implying that the extent of implementation of specific risk assessment practices differed across projects. The findings therefore indicate that while fundamental risk assessment processes such as probability-impact analysis and risk prioritization were widely adopted, more advanced analytical techniques and evidence-based assessment approaches are not uniformly implemented.

The findings were consistent with those of Antoniou (2021), who established that structured risk assessment models significantly improve the evaluation and prioritization of delay-related risks in road construction projects. Similarly, Canesi and Gallo (2023) found that formal risk evaluation approaches based on likelihood and impact assessment enhance cost control by enabling project teams to identify high-risk activities and implement corrective measures before cost overruns occur. The findings also agree with Safapour et al. (2021), who reported that projects employing systematic risk assessment frameworks demonstrate greater effectiveness in resource allocation and risk prioritization than projects relying solely on intuitive judgment. Furthermore, Amoatey and Adaku (2020) observed that inadequate assessment of contractor capability risks and financial risks often contributes to project delays and cost escalations in infrastructure projects.

The study concluded that findings indicated that risk assessment strategies contribute significantly to the performance of national government road construction projects by facilitating systematic evaluation of project risks, supporting prioritization of critical threats, improving resource allocation decisions, and enhancing the ability of project teams to anticipate and manage uncertainties before they adversely affect project outcomes.

Descriptive Analysis of Risk Mitigation Strategies

Table 2: Descriptive Statistics for Risk Mitigation Strategies

Statement	Mean	Std. Dev.
The project develops structured mitigation action plans outlining specific preventive and corrective measures for high-priority risks.	4.481	0.664
Clear contractual provisions such as performance securities, penalty clauses, and milestone-based payments are used to manage contractor-related risks.	4.169	0.893
Risks are allocated to parties best positioned to manage them through clearly defined contractual risk-sharing arrangements.	3.831	1.074
Adequate contingency budgets are allocated to absorb unforeseen cost escalations during project implementation.	3.649	1.183
Mitigation measures are implemented promptly once high-severity risks are identified and assessed.	4.338	0.721
Risk mitigation strategies are integrated into procurement planning and contract	4.091	0.917

administration processes.		
Structured mitigation mechanisms significantly reduce cost overruns, disputes, and implementation delays in the project.	4.571	0.613
Composite	4.161	0.866

Source: Research Data (2026)

The findings above showed that respondents agreed that risk mitigation strategies were implemented across national government road construction projects in Nairobi City County. The statement that recorded the highest mean score was that structured mitigation mechanisms significantly reduce cost overruns, disputes, and implementation delays in the project (Mean = 4.571; SD = 0.613). This suggests that respondents strongly perceived risk mitigation as an effective mechanism for improving project outcomes and minimizing the adverse effects of project risks. The relatively low standard deviation further indicates strong consensus among respondents regarding the effectiveness of mitigation measures in enhancing project performance.

Similarly, respondents agreed that projects develop structured mitigation action plans outlining specific preventive and corrective measures for high-priority risks (Mean = 4.481; SD = 0.664). This finding implies that project teams proactively established response mechanisms aimed at minimizing the likelihood and impact of identified risks. Respondents also agreed that mitigation measures are implemented promptly once high-severity risks are identified and assessed (Mean = 4.338; SD = 0.721), indicating that project managers recognize the importance of timely intervention in preventing risk escalation.

The results further revealed that clear contractual provisions such as performance securities, penalty clauses, and milestone-based payments are used to manage contractor-related risks (Mean = 4.169; SD = 0.893). In addition, respondents agreed that risk mitigation strategies are integrated into procurement planning and contract administration processes (Mean = 4.091; SD = 0.917). These findings suggest that contractual and procurement mechanisms are commonly employed to manage project risks and enhance accountability among project stakeholders.

However, comparatively lower mean scores were recorded for the allocation of risks to parties best positioned to manage them through clearly defined contractual risk-sharing arrangements (Mean = 3.831; SD = 1.074) and the allocation of adequate contingency budgets to absorb unforeseen cost escalations during project implementation (Mean = 3.649; SD = 1.183). The relatively high standard deviations associated with these statements indicate considerable variation in practice across projects. This may suggest that while some projects established effective contractual risk-sharing mechanisms and contingency reserves, others experienced resource limitations or contractual challenges that hinder effective implementation of these mitigation measures.

In conclusion, the composite mean of 4.161 indicates that risk mitigation strategies are generally practiced within national government road construction projects. The composite standard deviation of 0.866 suggests moderate variation in respondents' perceptions regarding the implementation of specific mitigation practices. The findings therefore imply that while action planning, prompt implementation of mitigation measures, and contractual controls are widely adopted, there is room for improvement in contingency budgeting and risk-sharing arrangements. These findings support those of Osei-Kyei and Chan (2020), who found that proactive risk mitigation planning significantly improves project delivery by reducing the likelihood of cost overruns, schedule delays, and contractual disputes. Similarly, Amoatey and Adaku (2020) established that effective mitigation measures, particularly contractual safeguards and

contingency planning, play a critical role in enhancing construction project performance. The findings also concur with El-Sayegh and Mansour (2015), who reported that projects that implement structured risk response plans experience fewer implementation disruptions and achieve better project outcomes than projects that rely on reactive risk management approaches.

The study therefore demonstrates that effective risk mitigation strategies contribute significantly to the performance of national government road construction projects by reducing project vulnerabilities, strengthening implementation controls, and enhancing the ability of project teams to manage uncertainties throughout the project lifecycle.

Descriptive Statistics for Performance of National Government Road Construction Projects

Table 3: Descriptive Statistics for Performance of National Government Road Construction Projects

Statement	Mean	Std. Dev.
The project has consistently adhered to its approved implementation schedule without significant unplanned delays.	4.026	0.983
Actual project costs have remained within the approved budget estimates and contingency provisions.	3.792	1.147
The project has met required technical specifications and engineering quality standards without significant rework.	4.429	0.721
Major milestones have been achieved within the planned timeframe outlined in the contract schedule.	4.117	0.884
Cost variations have been effectively controlled and have not significantly disrupted financial projections.	3.701	1.188
Quality compliance inspections have consistently confirmed adherence to contractual performance standards.	4.481	0.668
Overall, the project performance can be considered successful in terms of time, cost, and quality outcomes.	4.338	0.753
Composite	4.126	0.906

Source: Research Data (2026)

The findings presented in Table 3 indicate that respondents generally agreed that national government road construction projects in Nairobi City County had achieved satisfactory performance outcomes. The overall composite mean of 4.126 suggests that the projects performed relatively well in terms of schedule achievement, cost management, and quality compliance. The composite standard deviation of 0.906 indicates moderate variation in respondents' perceptions regarding project performance outcomes across different projects.

The study observed that quality compliance inspections had consistently confirmed adherence to contractual performance standards (Mean = 4.481; SD = 0.668). This finding suggested that respondents strongly believed that most road construction projects consistently met the required quality standards and specifications. The low standard deviation further indicates substantial agreement among respondents regarding the effectiveness of quality assurance mechanisms in project implementation.

Furthermore, respondents agreed that projects met required technical specifications and engineering quality standards without significant rework (Mean = 4.429; SD = 0.721). This

finding demonstrates that quality management practices within the projects were generally effective in ensuring compliance with established engineering standards and contractual requirements. Furthermore, respondents agreed that overall project performance could be considered successful in terms of time, cost, and quality outcomes (Mean = 4.338; SD = 0.753), suggesting a generally positive assessment of project performance among the respondents.

The results also reveal that major project milestones were achieved within the planned timeframe outlined in the contract schedule (Mean = 4.117; SD = 0.884), while projects generally adhered to their approved implementation schedules without significant unplanned delays (Mean = 4.026; SD = 0.983). These findings suggest that project teams were reasonably effective in managing project timelines and ensuring progress toward planned objectives.

However, relatively lower mean scores were recorded for financial performance indicators. Specifically, respondents reported moderate agreement that actual project costs remained within approved budget estimates and contingency provisions (Mean = 3.792; SD = 1.147). Similarly, the statement that cost variations were effectively controlled and did not significantly disrupt financial projections recorded the lowest mean score (Mean = 3.701; SD = 1.188). The relatively high standard deviations associated with these statements suggest notable differences in cost performance across projects. This may indicate that while some projects successfully controlled project costs, others experienced budget overruns arising from inflationary pressures, scope changes, delayed payments, contractor claims, or unforeseen implementation challenges.

In summary, the findings indicate that project performance was strongest in terms of quality outcomes, followed by schedule performance, while cost management emerged as the most challenging aspect of project performance. This pattern is consistent with the realities of many public infrastructure projects where maintaining quality standards is often prioritized despite budgetary and implementation challenges.

The findings are consistent with those of Muli and Omwenga (2021), who established that effective project management practices significantly improve schedule adherence and quality performance in public road construction projects in Kenya. Similarly, Wambua and Ombui (2023) found that projects characterized by strong risk management systems reported better performance in terms of quality compliance, milestone achievement, and overall project success. The findings also agree with Mutiso and Musyoka (2022), who observed that road infrastructure projects that effectively manage project risks are more likely to achieve planned project objectives and minimize implementation disruptions.

Further, Njoroge and Wanyoike (2022) reported that public infrastructure projects with effective monitoring, stakeholder coordination, and risk management mechanisms demonstrate higher levels of schedule adherence and quality compliance than projects with weak project control systems. Likewise, Mwangangi and Mbugua (2021) found that continuous project risk management contributes significantly to improved project performance by enhancing decision-making, reducing uncertainty, and supporting timely implementation of corrective actions.

Correlation Analysis

Pearson product-moment correlation analysis was conducted to examine the direction and magnitude of the relationships between risk assessment strategies, risk mitigation strategies, and project performance. The results are presented in Table 4.

Table 4: Correlation Analysis Results

Variables		PP	RAS	RMS
Project Performance (PP)	r	1	.718**	.776**

Variables		PP	RAS	RMS
	Sig.	—	.000	.000
	N	77	77	77
Risk Assessment Strategies (RAS)	r	.718**	1	.681**
	Sig.	.000	—	.000
	N	77	77	77
Risk Mitigation Strategies (RMS)	r	.776**	.681**	1
	Sig.	.000	.000	—
	N	77	77	77

*** Correlation is significant at the 0.01 level (2-tailed).*

Source: Research Data (2026)

The results in Table 4 show that both risk assessment strategies and risk mitigation strategies had positive and statistically significant relationships with project performance. Risk assessment strategies recorded a strong positive correlation with project performance ($r = 0.718$, $p < 0.001$), indicating that projects which systematically evaluate and prioritise risks are more likely to achieve favourable outcomes. This is consistent with Canesi and Gallo (2023) and Antoniou (2021), who demonstrated that structured probability–impact assessment frameworks significantly improve cost and schedule performance in road construction settings.

Risk mitigation strategies recorded the strongest relationship with project performance of all variables examined ($r = 0.776$, $p < 0.001$), suggesting that the ability to translate assessed risks into structured preventive and corrective measures is the most directly influential risk management activity in determining project outcomes. This finding aligns with Agency Theory's proposition that formal governance mechanisms, such as performance bonds, contractual incentives, and contingency planning, reduce information asymmetry and align contractor behaviour with project objectives (Jensen & Meckling, 1976; Eisenhardt, 1989). The correlation between risk assessment strategies and risk mitigation strategies ($r = 0.681$) is below the commonly accepted multicollinearity threshold of 0.80, confirming that the two constructs are sufficiently distinct for independent treatment in regression analysis.

Multiple Regression Analysis

Multiple regression analysis was conducted to determine the individual and combined influence of risk assessment strategies and risk mitigation strategies on project performance.

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.811[a]	.658	.639	.426

a. Predictors: (Constant), RAS, RMS

Source: Research Data (2026)

The results in Table 5 show that the correlation coefficient (R) was 0.811, indicating a strong positive relationship between the combined risk management strategies and project performance. The coefficient of determination (R^2) was 0.658, implying that 65.8% of the variation in the performance of national government road construction projects can be explained by risk assessment strategies and risk mitigation strategies.

The adjusted R^2 value of 0.639 indicates that after adjusting for the number of predictor variables in the model, approximately 63.9% of the variation in project performance remained explained by the study variables. This suggests that risk management strategies play a substantial role in determining project outcomes. The remaining 34.2% of the variation may be explained by other factors not included in the model. These findings are consistent with those of Mutiso and Musyoka (2022), who found that project risk management practices explained a significant proportion of the variation in the performance of public infrastructure projects in Kenya.

Analysis of Variance (ANOVA)

The ANOVA results were used to determine whether the regression model was statistically significant in explaining project performance. The results are presented in Table 6.

Table 6: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	17.476	2	8.738	71.181	.000[b]
	Residual	9.084	74	0.123		
	Total	26.56	76			

a. Dependent Variable: Project performance (PP)

b. Predictors: (Constant), RAS, RMS

Source: Research data (2026)

The ANOVA results indicate that the regression model was statistically significant ($F = 71.181$, $p < 0.001$). This implies that the combined effect of risk assessment and risk mitigation strategies significantly influences project performance. The findings confirm that the model was suitable for explaining variations in the performance of national government road construction projects.

Table 7: Regression Coefficients for Risk Assessment and Risk Mitigation Strategies

Model	B	Std. Error	Beta (β)	t	Sig.
(Constant)	0.826	0.241	—	3.427	0.001
Risk Assessment Strategies (RAS)	0.246	0.074	0.251	3.324	0.001
Risk Mitigation Strategies (RMS)	0.331	0.067	0.344	4.940	0.000

Source: Research Data (2026)

The results in Table 7 confirm that both risk assessment strategies and risk mitigation strategies had positive and statistically significant individual effects on project performance when controlling for all other predictor variables in the model.

Risk assessment strategies had a positive and significant effect on project performance ($\beta = 0.251$, $p = 0.001$). This indicates that projects implementing structured probability–impact scoring, risk prioritisation frameworks, and severity evaluation processes are better positioned to allocate resources efficiently and make informed project decisions. The predictive strength of risk assessment ($\beta = 0.251$) reflects that a one-unit improvement in risk assessment practice corresponds to a 0.246 unit increase in project performance. These findings are consistent with Mngale et al. (2025), who demonstrated that formalising risk assessment improves cost control decisions in road construction by reducing the surprise element in variations, and with Onwong'a (2025), who found that systematic risk assessment procedures exerted a measurable positive influence on project performance in Nairobi road projects.

Risk mitigation strategies recorded the strongest individual effect on project performance among all the variables examined in the study ($\beta = 0.344$, $p < 0.001$). This finding suggests that the

implementation of mitigation measures — including structured action plans, contractual safeguards, timely corrective action, and contingency budget allocation — is the most decisive determinant of project success. A one-unit improvement in risk mitigation practice corresponds to a 0.331 unit increase in project performance. This result affirms Agency Theory's contention that structured contractual and governance mechanisms directly reduce opportunistic behaviour and improve accountability in public infrastructure delivery (Eisenhardt, 1989; Jensen & Meckling, 1976). The primacy of mitigation strategies over assessment strategies in predicting performance underscores that analytical risk evaluation is insufficient on its own; converting assessment outputs into enforceable governance controls is what ultimately drives measurable improvements in cost, time, and quality outcomes. These findings are consistent with Safapour et al. (2021), who reported that projects incorporating formal mitigation action plans and structured contingency allocations exhibit significantly lower schedule variance and cost escalation.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

The study concludes that risk assessment plays a significant role in enhancing project performance. By systematically evaluating and prioritizing risks, project teams are able to understand the potential impact of different threats and allocate resources more effectively. This improves decision-making and allows managers to focus their attention on risks that are most likely to affect project objectives.

The findings also lead to the conclusion that risk mitigation is the most influential risk management strategy in improving project performance. Projects that put in place practical mitigation measures, develop response plans, and take corrective action promptly are more likely to avoid delays, control costs, and maintain the required quality standards. The study therefore, confirms that identifying and assessing risks alone is not enough; project success largely depends on how effectively those risks are addressed.

Recommendations

The findings revealed that risk assessment positively influences project performance. However, the use of advanced risk assessment techniques was found to be relatively limited in some projects. The study therefore recommends that project implementing agencies adopt more structured and data-driven approaches to risk assessment.

Project managers should be encouraged to utilize quantitative techniques such as cost impact analysis, schedule risk analysis, and scenario planning when evaluating high-priority risks. In addition, continuous training should be provided to project personnel to strengthen their capacity to conduct comprehensive risk assessments and make informed project decisions.

Risk mitigation strategies emerged as the strongest predictor of project performance in this study. Based on this finding, project managers should place greater emphasis on the implementation of practical mitigation measures once risks have been identified and assessed.

Project implementing agencies should ensure that every major project has a well-developed risk mitigation plan outlining specific actions, responsibilities, timelines, and required resources. Greater attention should also be given to contingency planning and budgeting to enable projects to respond effectively to unexpected challenges. Further, contractual provisions such as performance guarantees, risk-sharing arrangements, and penalty clauses should be strengthened to reduce contractor-related risks and improve accountability.

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