JRIIE Journal of Research Innovation and Implications in Education
Center for Research Implications & Practice

Website: www.jriiejournal.com ISSN 2520-7504 (Online) Vol.10, Iss.2, 2026 (pp. 1012 - 1020)

Risk Management Strategies and Performance of Infrastructure Projects: Case of Zaria Court, Kigali, Rwanda

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Abstract: *The purpose of this study was to examine how risk management strategies affected the timeliness and quality of the Zaria Court building project in Kigali, Rwanda. Stratified random sampling with Slovin's method yielded a sample size of 128 from a population of 188 project workers. Interviews and structured questionnaires were used to gather data, which was then analyzed using theme analysis for qualitative replies and SPSS for quantitative data. All four risk management techniques had a favorable and statistically significant influence on the final product.* $R^2 = 0.703$, $p < 0.001$ *in the regression analysis demonstrated that the model accounted for 70.3% of the variation in project performance. To be more precise, project performance was significantly impacted by project risk identification (*$\beta = 0.301$, $t = 2.89$, $p = 0.032$*). The strategy for managing risks was also shown to be significant (*$\beta = 0.215$, $t = 1.73$, $p < 0.001$*), as was the control and monitoring of risks (*$\beta = 0.361$, $t = 1.89$, $p = 0.007$*). Furthermore, project performance was greatly affected by contingency planning (*$\beta = 0.321$, $t = 1.91$, $p < 0.001$*). The research concludes that effective risk management measures are crucial for infrastructure projects to be completed successfully. From these findings, project stakeholders should establish ongoing training programs to improve their risk identification and monitoring abilities, set aside enough funds for dynamic risk management planning, improve communication channels to disseminate risk information quickly, and update and test backup plans frequently using simulations and stakeholder input.*

Keywords: *Risk Management Strategies, Project Risk Identification, Project Risk Management Plan, Project Risk Monitoring and Control, Project Contingency Planning, Project Performance*

How to cite this work (APA):

Murindabigwi, D. & Njoroge, N. N. (2026). Risk Management Strategies and Performance of Infrastructure Projects. Case of Zaria Court, Kigali, Rwanda. *Journal of Research Innovation and Implications in Education, 10*(2), 1012 – 1020. **https://doi.org/10.59765/caszy6**

1. Introduction

Infrastructure projects, by their nature, are complex and involve multiple stakeholders, often facing a variety of risks that can negatively impact their performance. These risks range from financial, environmental, operational, to social and political factors. To mitigate such risks and enhance project performance, effective risk management strategies are critical. Recent studies from 2019 to 2023 highlight the evolving nature of these strategies and their influence on project success.

In the USA, the construction industry is one of the most regulated and advanced, especially concerning risk management. Projects are typically governed by a combination of legal frameworks, insurance policies, and contract-based risk allocation. In addition, the adoption of advanced technologies, including Structure Information Exhibiting (BIM) and risk simulation tools, has played a key role in enhancing project performance in the United States. These tools help in forecasting risks and mitigating them before they escalate (Baker & Keshav, 2021). However, despite these advancements, issues like project delays due to environmental and

regulatory hurdles remain prevalent. The complexity of U.S. environmental laws and the involvement of multiple stakeholders often slow down project approvals, introducing risks that are hard to manage within the traditional frameworks.

China has been at the forefront of global infrastructure development, with massive investments in roads, railways, and urban development. Risk management in Chinese construction projects has traditionally focused on cost control and schedule management. Recent studies show a growing emphasis on environmental and safety risks, reflecting the government's increased focus on sustainability (Li et al., 2021). However, political risks, especially in cross-border infrastructure projects such as those associated with the Belt and Road Initiative (BRI), remain a challenge. According to Zhou et al. (2022), risks related to geopolitical tensions, legal differences, and cultural misunderstandings are common in international projects led by Chinese companies.

Rwanda, though smaller in scale compared to Nigeria, Kenya, has made significant strides in infrastructure development, largely due to its stable political environment and strong governance. Risk management practices in Rwanda's construction sector have benefitted from the country's focus on transparency, accountability, and efficient project execution. The government's zero-tolerance policy on corruption, coupled with a streamlined regulatory framework, has contributed to more predictable project environments (Mwangi et al., 2021). One of the primary risks in Rwandan construction projects is related to financing. Like many developing countries, Rwanda relies heavily on external funding for large infrastructure projects. Delays in funding disbursement can lead to project delays or even abandonment. However, Rwanda's government has implemented stringent project monitoring systems to ensure that projects are completed on time and within budget, even when faced with financial uncertainties (Karangwa & Uwera, 2020).

The development of basic services relies on infrastructure, which in turn drives economic growth and advances social well-being. Managing risks effectively is crucial in construction projects. It entails finding, evaluating, and dealing with any hazards that might impact the project's scope, timetable, budget, and quality. Research indicates that about 70% of infrastructure projects in developing countries face delays, with 40% experiencing cost overruns due to inadequate risk management (Akintoye et al., 2021). Proper risk management can reduce project failure rates by up to 30% and ensure efficient resource utilization (Oke & Ogunsemi, 2020).

Risk management enhances project performance through better decision-making and resource allocation, leading to a 20% higher success rate for well-managed projects (Mwangi et al., 2021). Strategies such as risk allocation, sharing, and monitoring help address uncertainties and improve overall project sustainability, potentially reducing failures by 25% (Ngugi et al., 2022). The Zaria Court-Kigali project, a mixed-use development, illustrates the critical role of risk management, as it faces challenges like environmental risks, fluctuating material costs, and regulatory delays, leading to increased costs and completion delays.

Previous studies highlight that infrastructure projects in Rwanda often suffer from delays and cost overruns due to inadequate risk identification and mitigation, emphasizing the need for proactive strategies. For example, Mwangi et al. (2021) and Tushabe and Ndahiro (2019) pointed out that insufficient risk-sharing mechanisms and poor stakeholder communication have hindered project performance in Kigali. Particularly for high-profile projects such as Zaria Court-Kigali, these results highlight the need of a systematic approach to risk management. The purpose of this research is to fill knowledge gaps in the current literature on the topic of risk management and project performance by offering better solutions for achieving better infrastructure results.

The study was guided by the following null hypotheses.

H_o1: There is no significant effect of project risk identification on performance of Zaria Court Construction Project.

H_o2: There is no significant effect of project risk management plan on performance of Zaria Court Construction Project.

H_o3: There is no significant effect of monitoring and control on performance of Zaria Court Construction Project.

H_o4: There is no significant effect of contingency planning on performance of Zaria Court Construction Project.

2. Literature Review

The research examined how strategies for handling potential project challenges influence the performance of the Zaria Court construction project in Kigali, Rwanda. It draws on insights from scholars and researchers worldwide who have applied various methods and approaches in similar studies. The findings of this study aim to contribute to discussions on how proactive planning and mitigation of uncertainties can improve the outcomes of construction projects.

The empirical review offers important insights into how strategies for addressing potential project challenges affect the success of construction projects. Key areas of focus include identifying potential issues, planning responses, ongoing monitoring, and contingency measures. Research from countries such as Sweden, Ghana, Rwanda, Pakistan, the USA, and South Africa highlights the significant role that structured approaches to anticipating and handling project challenges play in achieving successful outcomes. Studies show that tools like checklists, brainstorming sessions, and scenario analysis help project teams recognize, evaluate, and respond to potential problems effectively. Additionally, evidence suggests that careful planning, continuous

oversight, and proactive contingency measures have a substantial impact on project results, particularly in terms of cost, schedule, and quality. These findings underscore the need for integrating comprehensive strategies for managing uncertainties throughout all phases of project planning and implementation to enhance the performance of infrastructure projects, including the Zaria Court construction in Kigali.

2.1 Identification of project risk and project outcome

A study conducted by Petrovic (2021) involved respondents from various professions within the Swedish construction industry, employing multiple approaches to identify potential project challenges. The results showed that around 88% of respondents relied on lessons learned from previous projects and the use of checklists, followed by brainstorming at approximately 48%, and interviews at 12%. Checklists and thorough documentation were particularly common during the early stages of projects for identifying potential issues. Brainstorming was also widely used, allowing team members to share experiences and insights from similar projects. Checklists proved to be a vital tool for spotting workplace hazards and planning necessary measures in compliance with existing regulations. The study further noted that the frequency of security checks depended on project size, ranging from daily to weekly, with checklists being the most essential method for early identification of potential challenges. Similarly, in Ghana, construction projects, particularly micro and small-scale firms heavily relied on tools like checklists and brainstorming to anticipate and address project challenges.

Lilliose (2020) looked at the Mpazi Channel building project in Gasabo District, Kigali, Rwanda, to see how proactive initiatives affected the project's success. The purpose of the research was to find out how different tactics affected the final product of the project. Using a mixed-methods descriptive design, qualitative and quantitative techniques were used. Stratified sampling and Slovin's method were used to pick 128 respondents from a total population of 168. The data was analyzed using SPSS software. Descriptive statistics were performed using means and standard deviations. Inferential analysis was done using regression and correlation. According to the data, there is a very significant and robust association (correlation coefficient = 0.970, p I< 0.05) between the performance of the Mpazi Channel construction project and the identification of prospective project concerns. Likewise, there was a robust positive association between project success and preparing actions to deal with possible obstacles (r = 0.979, p I< 0.05). The project's success was positively and significantly correlated with response plans for possible challenges (r = 0.985, p < 0.05).

The project's success was 97.5% ($R^2 = 0.975$) attributable to the combined efforts of recognizing possible obstacles, executing strategic planning, and developing reaction measures. The research found that project performance is significantly affected by proactive problem management and thorough planning. According to the results, in order to make sure that the project is successful, all the important people, including support staff and workers, should follow standardized processes for predicting and dealing with problems at every stage.

2.2 Risk management planning of project and performance of construction project

A research was conducted in the Ghanaian city of Tamale by Yakubu et al. (2022) to examine the impact of techniques for predicting and managing project difficulties on the time, money, and quality-related performance of construction projects. A quantitative technique was used in the study. A total of 109 structured survey questionnaires were handed out to contractors, site managers, and project managers in person. A response rate of 88.07% was achieved, with 96 replies received. A variety of statistical methods, including factor analysis and regression, were used to examine the gathered data. The study revealed that proactive strategies for handling potential project challenges were not consistently applied in construction projects. It was also found that professionals tended to rely more on qualitative tools and techniques, with decision-making largely concentrated at the top management level. Furthermore, the research indicated that the careful selection and application of appropriate tools and techniques positively influenced project performance.

A research was carried out by AlSaadi and Norhayatizakuan (2021) to investigate the impact of proactive planning on the performance of building projects in relation to probable obstacles. Construction enterprises in Oman, from the most prestigious to the most mediocre, were the subject of this quantitative study. Using structured planning to address project difficulties greatly improves construction project performance, according to the research. The results supported the need for highly experienced project managers who could foresee and resolve any problems that may arise throughout the course of the project.

2.3 Project risk monitoring and control strategies on construction project performance

Kennedy (2021) looked at the impact of constant monitoring and management of possible project obstacles on the success of American building projects. In construction sites located in the Dallas-Fort Worth region of Texas, the purpose of this research was to identify any correlation between the implementation of these supervisory procedures and project results. Fifty construction project managers were surveyed electronically to gather data. The association between supervisory techniques and project success was examined using Spearman's rho.

Research by Nasreddine (2024) in Libya looked at the effect of anticipatory approaches to possible problems on the success of building projects. The major objective was to evaluate how these methods were implemented in the Libyan construction sector. Tripoli and Benghazi are the country's two primary hubs for large-scale construction projects and investments. The research aimed to examine the impact of systematic planning and supervision in directing project execution across over 300 construction enterprises operating in these cities. Two hundred and fifty business managers filled out the cluster-sampled questionnaires. The data were examined by using Smart-PLS's structural equation modeling capabilities. Within the context of project success and financial risk, strategies for addressing possible problems were investigated. These strategies included identification, appraisal, and continuing monitoring.

The results showed that these proactive planning tactics significantly improved the project's final product. The research also stressed the need of being cognizant of quality control in response to any project obstacles. More importantly, the findings corroborated the findings of previous studies that had highlighted similar tactics as powerful means of enhancing project outcomes. In order to get a more comprehensive picture of how proactive project planning impacts the real production of construction enterprises, the research recommended undertaking a productivity survey across different industries.

2.4 Project contingency plan strategies and construction project performance

Hinson (2022) investigated contingency planning in highway building projects, focused on estimating the ratings of prospective project issues. The purpose of this research was to identify the most important risk variables, how they affect project timelines and budgets, and how to allocate costs for contingencies. A review of previously recognized risk variables was conducted via the use of expert questionnaires administered to individuals engaged in highway transportation projects. We used regression modeling to look at how the experts' risk evaluations correlated with the predefined amounts of the cost contingency. According to the results, the owner's contingency funds were heavily impacted by inaccurate constructability evaluations, and the project timeline was greatly affected by the owner's requested revisions. According to the research, comparable highway building projects might benefit from using these modeling tools to estimate suitable contingency allocations throughout planning phases.

Research by Akinradewo (2023) in South Africa looked at methods for making building projects' cost contingency plans work better. The researchers set out to find ways to better prepare for and use emergency finances. The study was conducted using a quantitative methodology, with structured questionnaires being used to gather opinions on how to improve cost contingency planning. Quantity surveyors, project managers, construction managers, and contract managers in Gauteng Province were the subjects of the research. The Kruskal-Wallis H-test, standard deviations, and mean scores were used to examine the data.

Due to time and budget limitations, the study focused solely on Gauteng Province. The findings revealed that the most effective measures for improving cost contingency plans include assessing the likelihood of potential issues, evaluating their possible impact, and identifying uncertainties within the project. The study concluded that contingency plans are more effective when potential challenges are thoroughly evaluated along with their effects on the project. It recommended that project professionals prioritize the identification, definition, and assessment of potential challenges before initiating any construction project.

3. Methodology

3.1 Research Design

Using a mixed-methods approach, this study looked at how risk management strategies affected the Zaria Court Construction Project's performance in Kigali, Rwanda. To fully grasp the interplay between project performance, risk management planning, monitoring and control, and risk identification, the strategy integrated quantitative and qualitative methodologies.

3.2 Sample size and Sampling

A total of 188 individuals made up the study's population. The Zaria court building project in Kigali city, Gasabo District, employs 151 laborers, 10 key personnel, and 27 support workers.

A sample size is a portion of the population that a researcher picks to represent the entire population in a study. The study's population was chosen using Slovin's formula according to Sandelowski (1995). The sample size is n, the total population is N, and the sampling error is e. (0.05). Then sample size is =128

3.3 Data Collection tools

Through the use of structured questionnaires, numerical data was collected from respondents using the quantitative technique. Thus, the researcher was able to use SPSS to assess the relevance and degree of the correlation between risk management techniques and project success. To elucidate and bolster the quantitative results, the qualitative approach was employed to interview important informants in order to get their specific perspectives. Because of this mixed-methods strategy, the research was able to provide statistical proof as well as useful insights on project performance and risk management.

Table 1: Reliability Statistics

Variables	Cronbach's Alpha	N of Items
Project Risk Identification	0.821	6
Project Risk Management Plan	0.844	6
Project Risk Monitoring/Control	0.836	6
Project Contingency Planning	0.829	6
Project Performance	0.857	18

Table 1 displays the dependability statistics for the study variables, which include project performance, project contingency planning, project risk management plan, risk monitoring and control, and project identification. There was strong internal consistency for the construct of project risk identification, as shown by a Cronbach's Alpha of 0.821 across 6 items. The project risk management plan achieved an alpha value of 0.844 for its 6 items, signifying that the instrument remains reliable for assessing risk planning practices. Project risk monitoring and control reached a coefficient of 0.836 with 6 items, indicating strong consistency in responses. Project contingency planning recorded an alpha value of 0.829 across 6 items, confirming the reliability of the contingency planning scale. Project performance recorded a Cronbach's Alpha of 0.857 across 18 items, which confirms the reliability of the performance scale.

The data was processed and analyzed using SPSS, which also used to organize, analyze, and interpret the study's findings. Presenting the results of the study hypothesis test was the main objective. Data type and attributes dictated the statistical methods used. The data was summarized and presented clearly using descriptive statistics, which include standard deviations and mean values.

3.4 Data Analysis

In order to determine the impact of strategies for addressing possible project issues on the performance of the Zaria Court construction project in Gasabo District, Kigali, Rwanda, and this research used a mixed-methods approach, combining quantitative and qualitative methodologies. By collecting numerical data in addition to detailed contextual insights, this dual method aims to provide a more thorough grasp of the subject. To get at quantifiable data on planning techniques and how they affected project results, the quantitative part employed a descriptive design using questionnaires. To further investigate the connections between these planning metrics and the project's outcome, regression and correlation studies were run.

Specifically, the instruments were made to gather data on the following: project performance, monitoring and control, risk management planning, and risk identification. That way, the researcher could collect data for SPSS analysis and also get thorough justifications for the quantitative results.

Selected key informants with first-hand knowledge of the Zaria Court Construction Project were interviewed using the interview guide to gather qualitative data. Respondents were able to share their thoughts, feelings, and experiences on risk management and project performance via the use of open-ended questions.

The researcher gained a greater grasp of the project's use of risk management principles via the interviews. To back up the results of the questionnaire, the data gathered from interviews was evaluated thematically.

3.5 Ethical Considerations

The study adhered to ethical standards to protect the rights of all participants. Participation was entirely voluntary, ensuring that no individual was compelled to take part in the research. Participants were informed of their right to withdraw at any point, and the study took care to avoid causing any form of harm, whether physical, emotional, or psychological. Confidentiality and anonymity were strictly maintained throughout the research. No personal information about the participants was disclosed to the public or shared with colleagues, supervisors, or other third parties. Additionally, respondents were assured through a cover letter that all responses would remain confidential and that their identities would not be revealed.

4. Results and Discussion

In this section, the study's data is presented, analyzed, and understood. To help readers better grasp the results, it presents them in a comprehensible manner using numerical tables and visual representations. The next step is to analyze the data for useful insights, and then to employ the right statistical methods to make sure everything is in line with the study process.

There was a perfect response rate of 188 out of 190 people surveyed since all of the questionnaires were returned and filled out completely. Examining the impact of risk-related management strategies on the success of Rwandan infrastructure projects was the primary goal of the study. The study's specific objectives were to ascertain the following: how effective project risk identification was in influencing the Zaria Court construction project's performance; how a structured risk management plan affected project outcomes; how continuous monitoring and control affected project

performance; and what role contingency planning played in ensuring the project's success.

4.1 Regression Analysis

Using multiple linear regression analysis, this section shows how project risk management relates to the Zaria Court project's performance. In regression, the researcher examined the summary of the model, variances, and variable coefficients.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.839[a]	.703	.684	1.767	.680	354.286	4	187	.000

a. Predictors: (Constant), project risk identification, project risk management plan, project risk monitoring and control, project contingency planning

Table 2 displays the results of a multiple linear regression study that examined how various risk-handling procedures affected the project performance of the Zaria Court infrastructure. The research yielded an R-value of 0.839, which indicates a very favorable relationship between the project's overall performance and the independent variables of risk detection, risk response formulation, continuous risk supervision, and emergency preparation measures. That these combined techniques are crucial to the project's success is clear from the data.

The four risk-handling methods explain roughly 70.3% of the variation in project performance, according to the coefficient of determination (R Square = 0.703). This proves the model's ability to explain the Zaria Court project's results to a high degree. The number of predictors in the model is adjusted for in the Adjusted R Square = 0.684, which accounts for any overestimation. The corrected value's proximity to the original R Square validates the reliability and well-fitting of the regression model. In complex models including organizational and behavioral factors, an adjusted R Square over 0.60 is deemed good in social science research (Field, 2018).

A typical variation of the observed project performance values from the projected regression line is 1.767, which is reflected in the standard error of the estimate. If the standard error is modest, then the model's predictions are probably not too far off. Furthermore, the whole regression model is highly statistically significant with a F Change statistic of 354.286 and a significance level of 0.000. Therefore, the probability that the observed correlations happened by chance is less than 0.1 percent. As per Hair et al. (2020), a large F value indicates that the dependent variable is significantly impacted by at least one of the predictors.

Results show that four risk management practices risk identification, planning, monitoring, and contingency preparation have a significant influence on infrastructure project performance from a practical aspect. Incorporating these practices into the Zaria Court project will assist reduce the likelihood of problems and increase the likelihood of positive outcomes like on-time completion, cost savings, and quality control. Consistent with these results is the research of Zwikael and Ahn (2011), who found that organized risk management procedures improve the performance and predictability of infrastructure projects throughout the world.

Finally, Table 2 shows that there is a statistically significant relationship between the Zaria Court project's success and its level of effective risk management. The research shows that risk management is more than just a compliance measure; it directly adds to better project delivery, and organized risk methods should be embedded into all stages of project implementation.

Table 3: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3642.591	4	910.647	98.130	.000[a]
	Residual	1698.282	183	9.280		
	Total	5340.873	177			

a. Predictors: (Constant), project risk identification, project risk management plan, project risk monitoring and control, project contingency planning.

b. Dependent Variable: Zaria Court project performance

Table 3 shows the results of the Analysis of Variance (ANOVA) for the regression model that looked at how the Zaria Court project's performance was affected by risk management techniques. The model accounts for about 68.2% of the total variance in project performance, as shown by the regression sum of squares of 3642.591. This proves that a large portion of the variation in project results is attributable to the following four factors: identifying possible risks, creating structured tactics to mitigate those risks, continuously supervising risks, and being prepared for the unexpected.

The model does not account for 31.8% of the variance in project performance, which is represented by the residual sum of squares, which is 1698.282. Random fluctuations or extraneous variables not included in the predictors might account for this part of the unexplained variation. Both the regression and residual means are 910.647 and 9.280, respectively. Confirming that the combination of risk management practices meaningfully predicts project outcomes, the resulting F-value of 98.130 with a significance level of i.000 shows that the model is highly statistically significant at the 0.01 threshold. This strongly suggests that the observed relationship is not due to chance.

The results show that good risk management methods contributed significantly to the success of the Zaria Court project, accounting for roughly 68.2% of the variation in performance. Consistent with previous research, this confirms that systematic risk management greatly improves construction project cost control, timeline adherence, and quality results (Zaraz, Shenhar, & Dvir, 2002). In summary, the Zaria Court-Kigali project's ANOVA findings in Table 3 confirm the regression model's robustness and highlight the need of organized risk management in enhancing infrastructure project performance.

Table 4: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.678	.491		3.420	.651
	Project risk identification	.569	.197	.301	2.89	.032
	Project risk management plan	.437	.252	.215	1.73	.000
	Project risk monitoring and control	.521	.275	.361	1.89	.007
	Project contingency planning	.418	.219	.321	1.910	.000

a. Dependent Variable: Zaria Court project performance

In Table 4, we can see the results of the multiple linear regression study that looked at the effect of different risk management strategies on the Zaria Court project productivity. An unstandardized coefficient of 1.678 for the model's intercept indicates the project's predicted baseline performance when the risk management variables are not taken into account. We are mostly interested in the predictors that provide useful insights, even when the constant's significance value seems to be inconsistent. Project risk identification outperforms other risk management solutions in terms of positive and statistically significant effect on project performance ($p = 0.032$, standardized Beta = 0.301). The significance of early danger detection in infrastructure projects is underscored by the fact that good risk identification greatly leads to better project results.

A beta of 0.215 and a coefficient of 0.437, both of which are supported by a high significance level ($p = 0.000$), indicate that the project risk management strategy also has a considerable impact on performance. Accordingly, it follows that offering defined standards and methodical ways of reducing risks, a well-structured and thorough risk management strategy establishes a basis for effective project delivery. With a Beta of 0.361 and a coefficient of 0.521 ($p = 0.007$), the need of project risk monitoring and management becomes even more apparent. This highlights the need of timely interventions and constant supervision throughout the project lifespan as key factors for success. There has to be careful risk supervision in order to decrease uncertainties and avert possible setbacks by continually monitoring the state of risks and reacting immediately.

With a beta of 0.321 and a coefficient of 0.418 ($p = 0.000$), project contingency planning is also shown to be a significant predictor. The ability to prepare for and implement contingency measures enables the project team to respond effectively to unforeseen challenges, minimizing disruptions and safeguarding performance. This underlines the necessity of having practical backup plans as part of a robust risk management framework. Overall, the standardized Beta values reveal that while all four risk management strategies positively affect the Zaria Court project's performance, risk monitoring and control, along with contingency planning, have the strongest influence. This aligns with existing literature emphasizing that dynamic risk responses and preparedness are essential for infrastructure projects to achieve their objectives efficiently and sustainably.

In conclusion, the findings from Table 4 provide compelling evidence that systematic risk management beginning with identification, followed by planning, monitoring, and contingency preparedness substantially

enhances infrastructure project performance. These results reinforce the study's broader assertion that embedding comprehensive risk management strategies is critical to the successful delivery of infrastructure projects such as the Zaria Court in Kigali.

Table 5: Hypothesis Results

Null Hypotheses	p value	Decision
H_o1: There is no significant effect of project risk identification on performance of Zaria Court Construction Project.	$p<0.05$	Rejected
H_o2: There is no significant effect of project risk management plan on performance of Zaria Court Construction Project.	$p<0.05$	Rejected
H_o3: There is no significant effect of monitoring and control on performance of Zaria Court Construction Project.	$p<0.05$	Rejected
H_o4: There is no significant effect of contingency planning on performance of Zaria Court Construction Project.	$p<0.05$	Rejected

In order to find out how risk management techniques affected the Zaria Court Construction Project's performance, the research investigated four different hypotheses. The project's risk identification, management, control, and monitoring processes were the main areas of the hypothesis. Table 5 shows the regression findings that were used to determine whether the null hypotheses were rejected or not, with a significance level of 0.05.

5. Conclusion and Recommendations

5.1 Conclusion

This study set out to assess the effect of risk management strategies on the performance of infrastructure projects, with specific reference to the Zaria Court construction project in Kigali. The four dimensions analyzed project risk identification, risk management planning, risk monitoring and control, and contingency planning were all found to be significantly associated with project performance. The descriptive findings indicated that these risk management practices were not only present but were also implemented effectively, as perceived by the respondents. High mean scores across all variables suggested that the project stakeholders were actively engaged in risk management activities and confident in the systems put in place. Consistency in these procedures led to successful results in terms of managing time, saving money, and ensuring quality.

5.2 Recommendations

The following suggestions are made to improve risk management procedures in future infrastructure projects such as the Zaria Court building project, based on the study's conclusions and the constraints noted under each aim.

1. Project management teams should strengthen staff training on project risk identification. Although risk identification was well implemented, staff training recorded a relatively lower mean score compared to other items.
2. Project leaders should improve resource allocation for risk management planning. Although stakeholder involvement and clarity of the risk management plan were rated highly, satisfaction with resource allocation was relatively lower.
3. Project managers should strengthen communication and capacity building in monitoring and control. The findings showed that communication about risk status and training in monitoring techniques were among the relatively lower-rated items.
4. Project teams should improve stakeholder participation in contingency planning. Although contingency planning was highly rated, variations in responses showed that some stakeholders may not have been equally informed or confident about contingency mechanisms.

5.3 Suggestion for Further Research

Future researchers are encouraged to conduct studies on the following topics:

The impact on Rwandan public infrastructure projects' success of stakeholder involvement in risk response planning.

How Rwanda's regulatory and policy frameworks affect ways in which large-scale infrastructure projects handle risk.

Analyzing the effects of risk management techniques throughout the post-construction stages of infrastructure projects on their long-term sustainability.

Acknowledgements

I would like to express my sincere gratitude to my supervisor, Dr. Nduta Naomi Njoroge, for the valuable guidance, professional support, and continuous encouragement provided throughout the research

process. I also acknowledge Mr. Rukundo Jotham for his valuable assistance during the publication process.

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