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Strategic Control And Foresight: Risk Identification And Monitoring As Levers Of Project Performance In Embu County, Kenya

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Abstract

The purpose of this study was to evaluate how risk identification affected construction project performance and how risk monitoring affected construction project performance in Embu County, Kenya. A sample of 288 construction project professionals was used. Descriptive design was used. Findings from correlation analysis show that risk identification had a significant and a positive correlation on construction projects' performance (r=0.798, p= 0.001<0.05), as well as risk monitoring (r=0.798, p= 0.001<0.05). Regression analysis indicated a statistically significant predictive impact on construction projects' performance of Embu County - Risk monitoring (β = 0.389, p=0.000 < 0.05); Risk Identification (β = 0.243in Embu County, p= 0.0001 < 0.05). The Study recommended that as a risk monitoring strategy, project teams in Embu County should create digital dashboards and perform regular evaluations for monitoring risks which emerge during the projects' lifespan. The study contributes to the strategic management and project risk literatures by empirically demonstrating the importance of risk identification and risk monitoring as dynamic capabilities of business environments that influence construction projects performance in developing environment. In contrast to earlier research, which tended to treat the issue of risk management in generic and broad forms, the study decomposes risk management process and gives a clear statistical

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indication of the variable effect of particular risk management strategies. Moreover, it provides a geographically specific knowledge and situates its findings on a unique context of Embu County thereby filling the gap between international theories of risk management and local realities of a project in the sub-Saharan Africa.

Keywords: Strategic Control, Strategy, Risk Monitoring, Risk Identification, Strategic Management

INTRODUCTION

Projects' performance has consistently attracted attention with the emphasis shifting towards construction approaches that include cost, quality and time (Ingle & Mahesh, 2022; Khadim et al., 2023). Given the abrupt shifts, it is imperative that the construction industry becomes one of the key sectors covering a wide range of dependent industries in order for a firm or organization to retain development and survival (Walker; 2015). 'Risk management strategies' (RMS) e.g. risk identification (RI) and risk monitoring (RMT) have now become an intricate topic in management theories with various authors coming up with different viewpoints to explain its importance in performance of construction projects (PCPs) across the globe (Bahamid et al., 2016).

A Report on analysis of construction projects across the globe by McKinsey showed that construction projects suffer cost increases of up to 80% and delay in completion that can extend to 20 months, thus pointing at the continuous performance challenges in the construction industry (McKinsey Global Institute, 2017; Daoud *et* al, 2023; Abdelalim *et* al, 2025). Wanyonyi (2015) notes that lack of a measuring method for evaluating and managing project risk can lead to cost and schedule overruns.

Project managers need to use strategies for risk management (RM) because they reduce project failures, efficiently allocate resources, facilitate better decision-making, increase stakeholder communication, and keep costs and timelines under control. Project managers may enhance productivity, lower uncertainty, boost the likelihood of success, and exert more influence over the future by effectively managing risks (Risk Management Toolkit, n.d.) Risk management strategies cover overall risk identification, evaluation and planning to minimize adverse risks, corporate hedging included, that help attain organizational financial security and reliability together with efficient and informed decision-making (Suraj et al., 2023).

In Africa RMS reduce excessive demands and delays in the construction industry. Machu and Nkado (2021) used 300 construction experts in evaluating the industry

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challenges. The study employed a regression model to study the variables' relationships, and thematic analysis examining the themes of the qualitative component. RM's failure was demonstrated by the fact that 70% of construction projects in Sub-Saharan Africa are delayed.

Risk Management Strategies

Risk management strategies in construction have been applied in various scopes like in budgeting, scheduling projects, managing the environment and organizing the work of different stakeholders. For example, in projects connected to infrastructure, risk strategies help to avoid delays and extra costs because risk identification and management are carried out at every project phase (Nawi et al., 2018). Because of regulations and sustainability, environmental risk assessments and preparing for changes receive the highest importance in green building projects (Wuni & Shen, 2020). In addition, public-private partnerships (PPPs) make use of detailed risk transfer and oversight systems to control legal and economic risks (Zou et al., 2021). Risk management Strategies (RMS) like risk monitoring and risk identification have developed from simple, backward-looking, and isolated practices to complex, forward- thinking, and collaborative practices in the last few decades (Power, 2021). RMSs are established as structured processes that include identification of possible events or conditions that are likely to pose threats to realization of objectives by an organization. They comprise a set of activities that are aimed at risk prevention, risk & risk avoidance. This study uses "Risk Identification" and "Risk Monitoring" as variables of RMS as suggested by Hillson and Simon, (2020) and Kinyua et al, (2015). As recommended by Hillson and Simon (2020) and Kinyua et al. (2015), this study employs "Risk Identification" and "Risk Monitoring" as RMS variables.

Performance of Construction projects

The building industry forms a very crucial aspect of the economy of Kenya. This industry is about 7 percent of the GDP (KNBS, 2023). It, however, has limitations to dealing with the construction projects, and particularly when handling construction in a rural region such as Embu. As seen in a 2023 NCA report, 60 percent of construction developments have been delayed or dropped because of poor risk management in Embu County.

The report examined the characteristics of construction projects in Embu County, focusing on the reasons for delays and abandonment, and other factors. The main goals

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of risk management are to identify, assess, and reduce risks deterring project completion. The report found that risk assessment strategies were inadequate. As a result, new challenges emerged but were not handled properly.

Problem statement

The construction sector is important in Kenya's economic growth, contributing around 7% to the GDP and employing approximately 1.5 million people annually (KNBS, 2020). Despite these economic indications, the construction industry's performance both in Embu County and in the Kenya has experience project failure, caused by extended delays, and high inflationary costs leading to stalling or abandonment. A study by the Kenya's NCA revealed that above 70% of constructions in Kenya are said to have delayed while more than 40% of them failing as a result of both prolonged delays and huge rise in budgeted costs, both of which are blamed on inefficient risk management strategies (NCA, 2020; KNBS, 2020). Another comparative study done by Mwangi (2022) on project performance in Embu County and contrasted to the national performance indicated that Embu has a lower project compliance rate with 45% of her projects meeting their timelines against a national average of 65%. The efficiency and effectiveness of construction projects, as well as their performance, are negatively impacted when different stakeholders fail to implement sufficient measures to address the issues that arise during the project's initiation, execution, and completion (Akinsola & Potts, 2015). "Embu County" has not been the subject of any of the earlier research on the connection between RMS and performance in the Kenyan construction sector. In order to determine how RMS impacted Kenyan road development projects' performance, Otaalo et al. (2019) directed research.

Despite the construction industry's substantial economic contribution to Kenya, Embu County's construction projects frequently experience budget overruns, delays, and low compliance rates—issues that are primarily attributable to inadequate risk management techniques. However, little empirical research has explicitly looked at how risk identification and monitoring affect project performance in this area. Therefore, study tries to fill this knowledge gap by examining how Risk identification and Risk Monitoring influences the performance of construction projects within Embu County.

Research objectives

i. To examine the influence of "risk identification" on performance of construction projects in Embu County.

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ii. To analyse the influence of "risk monitoring" on performance of construction projects in Embu County.

Research questions

i. How does risk identification affect performance of construction projects in Embu County?
ii. How does risk monitoring influence construction projects' performance in Embu County, Kenya?

LITERATURE REVIEW

This section explores the empirical and theoretical foundations underpinning the study. It also examines relevant theories, a theoretical framework, reviews empirical evidence, and presents the conceptual framework.

Theoretical Literature

The study draws upon two key theories: Contingency and Agency Theories

Contingency Theory (CT)

Proposed by Joan Woodward in 1965, CT states that there is no universal method of managing; instead, the organization's success depends on appropriate factors both from within and outside (Woodward, 1965). It also highlights the fact that risk management needs to be tailored to the characteristics of the project rather than a general approach or indiscriminate application. The contingency theory, therefore, could be said to suggest that organizations must, from time to time, change their strategies owing to the situational variable of "size", "technology" and "environment" which will help them to adapt their strategic methods in keeping with the situation's demands. One of its pitfalls, however, has been failure on its part to provide prescriptive guidance and sometimes quite ambiguous in application across different types of scenarios. The theory's relevance is that it underlines the need for tailored approaches to handle unique risks associated with various projects. In recognition of the contextual factors that influence risk exposure and response capabilities, stakeholders can better their processes of "decision making" for better outcomes (Hillson& Murray-Webster, 2017)

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Agency Theory

First introduced in 1976 by Jensen & Meckling, the theory explores the relationship between the principals-for instance, the project owners-and the agents-for instance, the contractors along with possible conflicts raised due to differing objectives (Jensen & Meckling, 1976). In such a case, they contradict each other and result in inefficiencies because of conflicting interest arising between them. This theory hence has its basis in considering parties to be in their self-interest, which, in turn leads to them facing agency costs due to goal misalignment. The criticism about the theory is that the theory overly simplifies interdependent relationships and lacks the reflective implications of factors like trust and cooperation. This theory underscores the positioning of RI and RMT to be able to align the interests of stakeholders with reduced project risks, agency problem, as well as enhancing construction projects' performance (Eisenhardt, 1989)

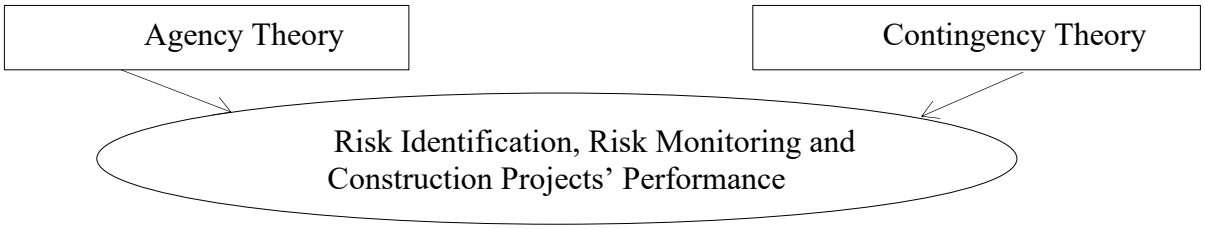


Figure 1: Theoretical Framework
Source: Researcher (2025)

Empirical Literature

Risk Identification and Construction Projects' Performance

RI in construction projects involves the detection of sources that may affect the quality, time, and cost. It is a paramount component of the RM process throughout the entire lifecycle (Raj & Wadsamudrakar, 2018). The first stage in RM - risk identification- is crucial to detecting any dangers to building projects in a timely manner. It helps find risks that might impact the project's performance, both clear and hidden. To reduce uncertainty and improve project resilience in construction projects in Embu County, it is essential to use different identification techniques and conduct assessments regularly (Early & Smith 2023.

Fikadu and Kant (2023) sought to determine whether the procedures that entailed identifying the risk affected the overall project success. Majorities of the 233 respondents included in the research were project managers, risk officers as well as other stakeholders

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who had the responsibility of identifying risks that may occur in their projects. The study found RI to have moderately positive effect on project performance (r=0.638).But the 233 sample was insufficient for drawing generalizations.

The goal of Denny & Myneni (2025) was to provide a clear manual for identifying, assessing, and organizing the risks related to the building of data centres in Kerala. Through literature reviews and interviews with three project management consultants, the study was able to thoroughly investigate the risks related to constructing data centres in the region. Three consultants were included in the study, which allowed for a discussion of the risks identified. A risk matrix model was created in accordance with ISO 31000:2018. According to the findings, unexpected regulatory compliance requirements impacted project timelines by 80%. However, findings could not be generalized for Embu County.

Risk Monitoring and Construction Projects' Performance

Boehm (2022) posits that "activities must be monitored and controlled in order to adequately handle risks and their negative impacts on project success". Obongi (2020) conducted a study with the goal of examining the association between construction projects' success and project risk monitoring practices. There were fifty construction project managers present. Effective monitoring of risk techniques must be implemented to increase the project's chances of success, according to the findings, which showed a positive and significant correlation between monitoring risk techniques and construction project success. However, a smaller sample size was employed, and regions like Embu County and other nations like Kenya are not given any weight.

Priya and Kothai (2014) assessed readiness, knowledge level and risk controls used by construction professionals. Fifty participates - contractors, project engineers, and site supervisors – were used. Risks identified most frequently were going over budget (32%), a lack of workers (28%), and scheduling problems caused by poor management on the construction site (25%).

According to the study, most participants knew what risk management was, but few of them applied formal risk analysis techniques like risk mapping or built-in modelling. Common risk management techniques included establishing frequent progress reviews, drafting explicit contracts, and improving communication between all parties. However, because a large portion of the planning is based on experience rather than appropriate education and training, the report found that these management approaches are applied inconsistently.

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The study was nevertheless not well suited to the Kenyan setting of Embu County. Furthermore, the study focused less on key rudiments that contribute considerably to Kenya's problems, such as labour market dynamics, local governance, and laws governing the purchase of goods and services.

Conceptual Framework

The conceptual framework was developed by the researcher based on the reviewed literature. The (predictor) independent variable is Risk Management Strategies, which includes risk identification and Risk Monitoring and Control. The outcome variable was Project Performance, whose indicators were Cost Efficiency, Project Completion Time, and Stakeholder Satisfaction. Other variables like Project Size and type of construction will were controlled by looking at the project time delays and budget overruns in terms of percentages against the expectations, and not just in terms of days hence excluded in the study.

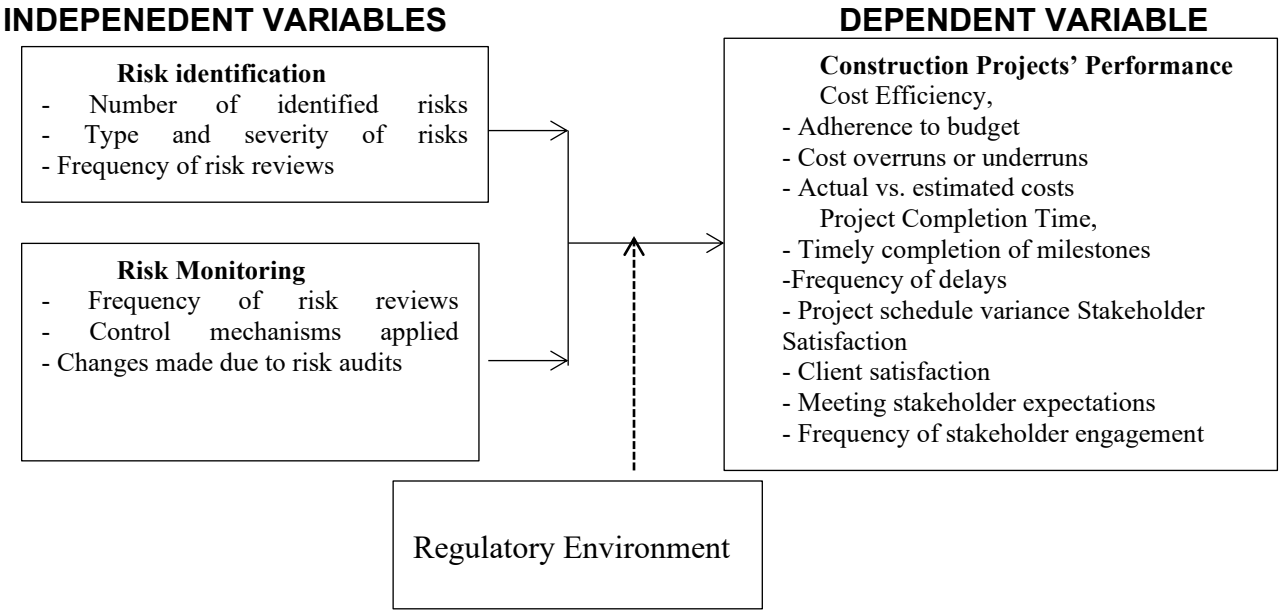


Figure 2: Conceptual Framework
Source: Author (2025)

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Research Gap

The critical section of the literature identifies gaps within the conducted research. For instance, the available literature explains the effects of project outcomes concerning risk management, but there is minimal research specifically available for construction projects in Embu County.

Obongi (2020) conducted a study to find project success' association with project risk monitoring and control practices, in construction projects. While the research involved construction projects in USA, specifically Dallas-Fort Worth, Texas, it only entails a smaller sample and does not represent other countries like Kenya and regions like Embu County

Despite the available numerous literatures on managing risks in construction, there is still a huge research gap in Embu County, Kenya. Most studies have focused on urban settings or other geographical locations, and this has brought forth not knowing the situation of rural areas regarding unique difficulties and the effectiveness of Risk identification and risk monitoring and control. The few studies done on Embu have used a small sample size that cannot be generalized with confidence. This study sought to provide insight into RMSs' influence on construction projects in Embu County, with the potential to improve better practices and contribute to the academic discourse thus filling the gap.

RESEARCH METHODOLOGY

The study uses a mixed-method approach by using a semi- structured to give full elaboration on the impact of RMS on construction projects. Such approaches enhance the understanding of phenomena under study (Creswell & Plano Clark, 2018).

Research Design

A descriptive design - a fitting one in this regard for identifying the prevailing state of the practices applied to RM in construction projects was applied. Descriptive research enables the systematic description of characteristics of the population or the phenomenon being investigated (Kothari, 2004).

Target Population

The research targeted key stakeholders in construction projects within Embu County, which included project managers, consultants (both architects and engineers), contractors, developers and site workers and supervisors in the construction projects as

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they had insights into challenges and successes to be derived in managing risks. According to NCA Embu county site inspection report for the financial year 2023-2024, active projects were 200, with approximately 1,020 players -projects managers, developers, site construction workers and professionals across the 200 projects.

Table 1: Target Population

Category	Target Population	Percentage
Developers	153	15.00
Project Managers	102	10.00
Consultants	306	30.00
Contractors	255	25.00
Site Supervisors	204	20.00
Total	**1,020**	**100.00**

Source: NCA Embu county site inspection report F/Y 2023-2024

Sample Size and Sampling Procedures and Techniques

The study used "stratified random sampling technique" to obtain a sample. The sample was distributed in to 4 regions forming the 4 strata. According to NCA, Embu County is divided in to 4 main regions, i.e. Embu North, Embu South, Embu West, and Mbeere North. Each of these regions will form strata in which elements of the samples will be drawn in randomly and proportionately to eventually make come up with the total desired sample of 288

The sample includes project developers, contractors, project consultants, foremen, and safety officers. Sample determination was by use of Taro Yamane's formula of as shown below

$n= N/ (1+N (e)^2)$

Where n = "Sample size",

N = "estimated population size"

e = standard error of estimate.

$n= 1,020/ (1+1,020 (0.05)^2) =287.32$, Say 288 respondents

A corresponding percentage of population composition was also used to draw the corresponding samples of the various stakeholders.

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Table 2: Sample Size Table

Category	Sample Population	Percentage
Developers	43	15
Project Managers	29	10
Consultants	86	30
Contractor	72	25
Site Supervisors	58	20
Total	**288**	**100**

Source: NCA Embu county site inspection report F/Y 2023-2024

Data collection Instruments

A semi structured questionnaire served as a data collection tool. The questionnaire was created using established scales. In order to "assess the various strategies involved in the risk management applied in projects, whether it is in the areas identification, or monitoring and control," the Zwikael and Sadeh (2007) risk management practice scale was adopted. Pinto and Slevin's (1987) project performance scale - which captured “cost, time, quality, client satisfaction, and business impact” - served as the model for the factors measuring performance.

Validity of the Questionnaire

Content, construct, and criterion validity were examined. Expert judgement determined the concepts, criteria's, and content's validity in relation to the study's objectives, research questions, and variables. Four experts were invited to review the questionnaire (Developer, manager, consultant and supervisor). These were preferred as they had expertise in the construction sector. According to the experts invited, the questionnaire items were relevant and captured all aspects relating to the objectives.

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Reliability of research Instrument

Cronbach’s α was used as it is widely regarded a good test of reliability as it provides internal consistency’s measure within a scale or questionnaire. It measures how similar items are to one another as a group. If items achieve a Cronbach's Alpha >0.7 then they measure the same underlying concept or construct, and thus can be termed reliable (Creswell & Creswell, 2017).

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Table 3: Reliability Statistics of Specific Constructs

Scale	Cronbach's Alpha	No. of items
Risk Identification	0.821	5
Risk monitoring	0.855	4

Source: Field data (2025)

For of RI, α = 0.821 ≥ 0.7 and for RMT, α. = 0.855≥ 0.7 hence the scale for the individual construct was reliable.

Table 4 below shows the scale's overall reliability. The Cronbach showed alpha of 0.962 ≥ 0.7 hence the overall scale is reliable (Creswell & Creswell, 2017).

Table 4: Overall scale reliability

Reliability Statistics	
Cronbach's Alpha	N of Items
.940	15

Source: Field data (2025)

Data Collection Methods and Procedures

Secondary and Primary data were used. A semi-structured questionnaire aided collection of primary data. Secondary data was from existing literature, reports, and other documents relating to construction projects in Embu County. Data collection was systematic with precise instructions given on what responses to use to attain efficient and consistent responses.

Prior to the actual study, a sample of respondents with identical characteristics must be given a research instrument as part of the pilot testing criteria (Sekaran & Bougie, 2016). According to Saunders et al. (2014), at least 10% of the research sample should undergo pilot testing. In this study the researcher obtained 29 respondents representing 10% of the study sample and drew them for pilot study. These respondents did not undertake the actual study. The researcher then enquired on how well they understood the questions and made possible recommendations and modifications to enhance its clarity and acceptability.

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Data Analyses Techniques

The association between any two variables was analysed using the Pearson product-moment correlation coefficient (r). It measures the relationship between the autonomous and dependent variables, applying coefficients of determination (r^2) which calculates the influence exerted by the predictor(s) on the outcome variable. Multiple regression analysis measured the connection between multiple predictor variables and the outcome variable.

Multiple Regression Model

Multiple regression analysis assessed the link between RMS and construction projects' performance as per the equation below.

"Y" = "$\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$"…… Equation

Where:

Y – "Performance of construction project"

X_1 – "Risk Identification"

X_2 – "Risk Monitoring and control"

β_0 – "intercept of the dependent variables". i.e. constant term.

β_1, β_2, are various intercepts of the respective variables

"ε" is the error term

Data Analysis and Interpretation

Questionnaire Response Rate

The questionnaire return rate is presented below.

Table 5: Response rate

Response rate	Frequency	Percentage
Responses	284	98.61
Non responses	4	1.39
Total sample size	**288**	**100**

Source: Field data (2025)

A sample consisted of 288 participants comprised of developers, project managers, Consultants (who include engineers and architects), contractors and site supervisors. A total of 284 (98.61%) respondents out of 288 who had the questionnaire

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administered to returned the duly filled questionnaire. Babbie (2010) asserts that a 70% response-rate is very good for a study.

Descriptive statistics

The unit of focus was the "Mean" (M) and "Standard deviation" (SD). The interpretation was based on the range of value in the above statistics fall. The scale is divided into about equal width bands of 0.80 units by the mean intervals. The social sciences generally embrace this approach. The mean ranges interpretations were "1.00 -1.80" = "Strongly Disagree", "1.81-2.60" =" Disagree", "2.61-3.40" = "Neutral", "3.41-4.20" = "Agree" and finally "4.21-5.00" =" Strongly agree". The standard deviation ranges and interpretations used were 0.00-0.50 = "Very low variability", 0.51-1.00 = "Moderate variability" i.e. responses are somewhat spread, >1 = diverse opinions amongst respondents i.e. "High variability". Respondents rated their level of disagreement or agreement on a Likert scale with 1 = "Strongly Disagree", 2 = "Disagree", 3 = "Neutral", 4 = "Agree", 5 = "Strongly Agree".

Risk identification and construction projects' performance

The study evaluated of RI's influence on construction projects' performance. The results were displayed in table 6 below

Table 6: Risk identification and construction projects' performance

Statement	N	Mean	Std. Deviation
Identification of risks in my construction projects is effective	284	3.27	.955
The number of risks identified at the start of the project is sufficient	284	3.21	.864
Risks identified are comprehensive and cover all potential problem areas	284	3.26	.914
The frequency of risk identification reviews is adequate throughout the project	284	3.25	.897
Project stakeholders are actively involved in identifying risks	284	3.46	.956
Overall	284	3.29	.700

Source: Field data (2025)

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The findings indicated respondents agreed with moderate variability that stakeholders participated actively in identifying risks with highest mean score (M = 3.46, SD = 0.96). This implies stakeholder's engagement in risk identification is strong.

In terms of whether the number of risks identified at the beginning of the project was adequate (M=3.21, SD=0.864), whether risk identification in construction projects was effective (M=3.27, SD=0.955), and whether the risks identified were comprehensive and covered all potential problem areas (M=3.26, SD=0.914), respondents were neutral with moderate variability. This raises concerns that the risks identified were insufficient, suggesting that some projects were moving forward without properly identifying the risks and taking potential threats into account, which could have a detrimental impact on performance (Hillson & Murray-Webster, 2017). Additional responses regarding the effectiveness of risk identification in construction projects were a little dispersed and neutral (M=3.27, SD=0.955).

A moderately effective perception was indicated by the participants' moderately variable (SD = 0.70) rating of the risk identification procedures at M = 3.29. The results show that while risk identification techniques adhere to standard operating procedures, there is a lack of information about the completeness of risks.

Risk monitoring and control, and construction projects' performance

In this section, the second goal—risk monitoring—was covered.

Table 7: Risk monitoring and construction projects' performance

Statement	N	Mean	Std. Deviation
Risk monitoring is done regularly to detect emerging risks promptly	284	3.27	.978
Corrective actions are taken quickly when risks escalate	284	3.54	.891
Control mechanisms are in place to minimize the occurrence of risks	284	3.55	.890
Risk audits provide useful feedback for improving future projects	284	3.37	.999
Overall	284	3.43	.786

Source: Field data (2025)

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In table 7, “respondents agree that control mechanism were in place to minimize occurrence of risks” with moderate variability (Mean = 3.55, SD = 0.890), “respondents also agreed that with moderate variability that corrective actions are taken when risks escalate” (Mean =3.54, SD =0.891). However, “respondents were neutral on whether risk monitoring was done regularly to detect emerging risks promptly” with moderate variability across the responses (Mean=3.27, SD=0.978). Further, “respondents were indecisive on whether risk audits provided useful feedback for improving future projects” with almost diverging opinions (Mean = 3.37, SD =0.999). The overall (M=3.43, SD=0.786) suggests that respondents agree with variability across their responses that the stated risk identification practices are in place.

Embu County’s Construction Projects’ Performance

In this section, respondents indicated the degree of agreement with statement pertaining to PCPs.

Table 8: “Performance of construction projects” in Embu County

Statement	N	Mean	Std. Deviation
The project stays within its original cost estimates	284	3.09	.950
Budget adjustments are effectively managed when unexpected costs arise	284	3.39	.947
Project team meets its expected delivery for primary project deliverables	284	3.52	.923
Time overruns are minimized and do not affect project delivery	284	3.46	.883
Stakeholder issues are resolved within a short duration with a lot of efficiency	284	3.55	.894
Project team is proactive in seeking stakeholder views at certain phases in the project	284	3.65	.922
Overall	284	3.44	.746

Source: Field data (2025)

Project team was agreed to be proactive in seeking stakeholder views at certain phases in the project with moderate variability in the responses (Mean = 3.65, SD=9.22). Respondents also agreed that stakeholder issues were resolved within a short duration

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with a lot of efficiency with responses somewhat spread (Mean = 3.55, SD=0.894). Respondents further agreed that project team meets its expected delivery for primary project deliverables with moderate variability in their responses (Mean = 3.52, SD=0.923), However respondents were neutral with moderate variability in their responses on whether project stayed within its original cost estimates (M=3.09, SD =0.950) or whether budget adjustments were effectively managed when unexpected costs arise (M=3.39, SD=0.947). Generally, respondents agreed with the statement regarding Embu county's construction projects' performance with moderate variability (M=3.44, SD=0.746).

Inferential Statistics

Pearson Correlation Coefficient Analysis

To establish the nature of the connection between the predictor variables and help understand how strongly they were related to the outcome variable, Pearson correlation coefficient analysis was done. A positive coefficient (r) close to +1 indicates a strong positive relationship i.e. as risk management strategy effectiveness increases, so does project performance. A coefficient of 0 or close to 0 implies no linear relationship, or there is weak positive relationship respectively, while a negative value suggests an inverse relationship. The results were presented as shown in table 9.

Table 9: Pearson correlations coefficient analysis

		PROJECT_ PERFORMANCE	RISK_ IDENTIFICATION	RISK_ MONITORING
PROJECT _PERFORMANCE	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	284		
RISK_ IDENTIFICATION	Pearson Correlation	.735**	1	
	Sig. (2-tailed)	.000		
	N	284	284	
RISK_ MONITORING	Pearson Correlation	.798**	.764**	1
	Sig. (2-tailed)	.000	.000	
	N	284	284	284
**. Correlation is significant at the 0.01 level (2-tailed).				

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Table 9 above shows that there exists the strongest and a positive relationship between RMT and PCPs (r=0.798, p = 0.001). This means that RM could be the most influential construct in the database. A correlation coefficient or (r=0.735, p=0.001) also exist between RI and performance. This implies that there exists a strong positive relationship between the independent and the depended variable.

Table 10: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.821[a]	.674	.672	.42774
a. Predictors: (Constant), RISK_MONITORING, RISK_IDENTIFICATION				

Table 10 shows and R value of 0.821 is the correlation signifying a strong relationship between RI and RM - predictor variables - and PCPs - outcome variable. The "coefficient of determination"- (adjusted R square) - is 0.672. This implies that the predictor variables (Risk monitoring and Risk Identification) explained 67.2% of the construction projects' performance. The remaining percentage is explained by other risk management strategies not included in this study e.g. risk assessment, risk transfer etc.

Table 11: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	**Regression**	106.263	2	53.131	290.396	.000b
	Residual	51.412	281	.183		
	Total	157.675	283			

a. Dependent Variable: PROJECT_PERFORMANCE
b. Predictors: (Constant), RISK_MONITORING, RISK_IDENTIFICATION

The ANOVA analysis evaluated if the regression model correctly predicts project performance by utilizing the two RMS: risk identification and risk monitoring. The ANOVA results in the table above shows an F-Value (F=290.396) that is significant at p=0.000 (p<0.001) implying that the predictor variables have a significance impact on the predictor construction projects' performance.

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Table 12: **Regression coefficients**

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.536	.126		4.255	.000
	RISK_IDENTIFICATION	.321	.056	.301	5.694	.000
	RISK_MONITORING	.540	.050	.568	10.754	.000
a. Dependent Variable: PROJECT_PERFORMANCE						

From the above table, a unit change in the predictor variables - RI and RMT results in β = 0.321, β = 0.540change in the performance respectively. Risk monitoring had the highest influence on Embu's construction projects' performance with coefficient of (β = 0.540, p=0.000 < 0.05) while by Risk Identification had (β = 0.321, p= 0.0001 < 0.05). The two predictors (risk identification and risk monitoring) were significant in prediction of construction project's performance (p<0.05).

Using the above coefficients, the regression model is therefore expressed as

$Y = \beta 0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$…… Equation

Where:

Y = PCPs

X_1 = RI

X_2 = RMT

B_0= constant =0.536, β_1 = 0.321, β_2 = 0.540, β_3 = 0.212 and β_4 = 0.389

Construction Projects' Performance = 0.536 +0.321*(Risk Identification) + 0.540 *(Risk Monitoring and control) +ε

Where the error term "ε" accounts for variability not included in the model

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary of Findings

Objective 1: To assess the influence of risk identification on construction projects' performance

The first objective was to examine the influence of risk identification on construction projects' performance. With the highest mean score (M = 3.46, SD = 0.96),

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the study found that respondents agreed with moderate variability that stakeholders actively participated in identifying risks. Respondents were neutral with moderate variability on the adequacy of identified risks (M=3.21, SD=0.864). Further respondents were a little dispersed but neutral on successfulness of identified projects (M=3.27, SD=0.955). A moderately effective perception was indicated by the participants' moderately variable (SD = 0.70, (M = 3.29). correlation was positive and significant between the PCPs and RI. Regression coefficient was β = 0.321, p = 0.0001 < 0.05 indicating strong positive impact. The person correlation coefficient revealed a strong, positive, and significant relationship between RI and the PCPs (r=0.735, p=0.0001<0.05).

Banerjee et al. (2021) used machine learning to demonstrate that identifying risks in a project supports predicting how it will be performed indicating a strong correlation between the two variables hence agreeing with the findings of this study. However this study's results differ with that of Charbel et al. (2023)

Objective 2: Influence of risk monitoring on construction projects' performance

The last objective was to determine the influence of risk monitoring on construction projects' performance. According to table 7's findings, respondents agreed that controls were in place to reduce the likelihood of risks with moderate variability (Mean = 3.55, SD = 0.890) and that corrective measures are taken when risks escalate (Mean = 3.54, SD = 0.891). With moderate variation across responses, respondents were ambivalent about whether risk monitoring was carried out on a regular basis to quickly identify new risks (Mean=3.27, SD=0.978). Additionally, respondents had nearly conflicting views on whether risk audits offered helpful input for enhancing upcoming projects (Mean = 3.37, SD = 0.999). Overall, respondents appear to agree with the stated risk identification practices being in place, with a range of responses (M=3.43, SD=0.786).

β = 0.540, p = 0.001<0.05 is the regression coefficient. This indicates that risk response had a powerful, noteworthy, and favourable influence on construction project performance prediction. Out of all the variables, risk monitoring had the highest Pearson correlation coefficient (r=0.798, p = 0.001). With a coefficient of (β = 0.540, p = 0.000 < 0.05), risk monitoring had the most statistically significant impact on the performance of Embu's construction projects out of the two variables that were examined. This supports Obongi's (2020) conclusion that improved risk monitoring raises a project's likelihood of success in the US.

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CONCLUSION

The research evaluated how risk identification, and risk monitoring strategies affect construction project achievements within Embu County of Kenya. Results showed that risk identification and monitoring directly had a positive and statistically significant influence on construction projects' performance.. Risk monitoring proved to have the most significant impact because it demonstrates the necessity of continuous oversight during risk management processes.

Recommendations

The study recommends that as a risk monitoring strategy, project teams in Embu County should create digital dashboards and perform regular evaluations for monitoring risks which emerge during the progression of projects. In order to provide construction professionals in Embu County with quarterly training sessions on risk identification and assessment, the study also suggests that Embu County collaborate with TVET institutions and professional associations (like the Institute of Quantity Surveyors of Kenya and NCA).

Recommendation for Future Research

Future studies could include different counties or regions as the study focused on Kiambu County only. This could bring comparisons on the results and inform a more generalizability. Since construction sector is dynamic, a longitudinal study is needed to explore the long term influence of the variables. Future studies could explore the 32.8% constructs not included in the study.

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