

**EFFECTS OF PROJECT RISK MANAGEMENT ON DELIVERY OF
CONSTRUCTION ENGINEERING PROJECTS IN KENYA. A CASE STUDY OF
KENYA NATIONAL HIGHWAYS AUTHORITY (KENHA)**

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DECLARATION

This project is my original work and has not been presented for a degree in any other University

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This project has been submitted for examination with my approval as University Supervisor

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DEDICATION

This project is dedicated to my loving husband, Jonner Selei, and my wonderful children, Andrew and Karl.

ACKNOWLEDGMENT

I would want to convey my appreciation to the all-powerful God for his extraordinary grace and kindness. I would especially want to convey my thanks to Mr. David Kanyanjua, my supervisor, for his advice and support both before and throughout the composition of my research. Also, I take this occasion to praise the Management University of Africa's personnel and instructors for the assistance during my academic journey. I sincerely acknowledge my workplace supervisor, George Okal, whose helpful advice and mentorship have been essential to my academic journey. I appreciate your steadfast support, everyone.

ABSTRACT

The main objective of this study was to examine the effects of project risk management on delivery of construction engineering projects in Kenya, a case study of Kenya National Highways Authority (KeNHA). Specific objectives were; To assess the effect of risk identification on the delivery of construction engineering projects at KeNHA, to evaluate how risk assessment influence project delivery in KeNHA's construction projects, to examine the effect of risk mitigation strategies on the delivery of construction engineering projects at KeNHA and to analyze the effect of risk monitoring on the delivery of construction engineering projects at KeNHA. The research employed descriptive research design. The target population was 141 employees of Kenya National Highways Authority, Headquarters. The census approach was employed in the investigation to determine sample size. A survey was employed by the investigator in order to gather data. The study employed descriptive analysis for data analysis. Microsoft Excel aided in data analysis. According to the report, risk identification is a crucial aspect of project delivery at KeNHA, integrating stakeholder contributions and capturing information on risks. Structured frameworks for risk assessment and review cycles ensure adequate skills and strategic risk management. The study concluded that KeNHA's risk management techniques are effective, but there is room for improvement in training and resource allocation. Additionally, the study discovered that risk monitoring procedures are active and integrated during project execution, with systems for tracking risks and monitoring progress of mitigation activities. Proper monitoring helps achieve control during project execution and improves project delivery results. The study recommends that KeNHA improve its risk identification processes by expanding the tools and techniques used, including early stakeholder inclusion. Regularly reviewing and updating evaluation frameworks and providing ongoing training for assessors can enhance risk management. Reporting on project decisions based on assessments can strengthen project management. Allocating training resources on mitigation measures can enable a more proactive approach. Defining boundaries for modifying protocols can strengthen organizational agility. Integrating real-time data streams into risk monitoring can enhance risk tracking, reporting, and response. Streamlined collaboration among stakeholders can accelerate responses to new risks. Additional investigation may examine the impact of organizational culture, risk management practices, leadership style, and technological adoption on risk management efficacy.

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ACRONYMS AND ABBREVIATIONS

CDF	: Constituency Development Fund
ERM	: Enterprise Risk Management
IT	: Information Technology
KeNHA	: Kenya National Highways Authority
MPT	: Modern Portfolio Theory

OPERATIONAL DEFINITION OF TERMS

Project Risk Management: refers to the systematic process for identifying, assessing, and mitigating project hazards in order to lower adverse effects and maximize favorable ones. ensuring project objectives are achieved efficiently.

Risk Assessment : is a method for determining potential threats and analyzing the possible outcomes of a hazard or disaster.

Risk Identification : Risk identification is the act of noting any hazards that might impede an organization or program from accomplishing its purpose.

Risk Mitigation : is a fundamental element in the control of risks procedure, refers to the approach of planning and executing choices to lessen dangers encountered by firms.

Risk Monitoring : Risk monitoring is a vital phase where firms assess and review the efficiency of their risk strategy.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter discussed a the study's background, problem statement, study objectives, research questions, importance, and scope of the study.

1.1 Background of the Study

Project management involves the application of abilities, techniques, and tools to achieve project objectives and goals. Projects are prone to risks, such as delays, overrun costs, and poor performance. Cost, client changes, time, health, customer happiness, and business performance safety are some of the aspects that affect project success (Pinto, 2020). Just 32% of projects are completed on schedule, 44% are hampered by financial limitations, and 24% are likely to fail and be canceled (Burtonshaw-Gunn, 2017). Tools and methods for risk management have been created to assist project teams in meeting client quality standards, staying under budget, and completing projects on schedule. Project failure results from most project managers' inability to use these procedures, which are not common. Risk analysis and management are crucial features of project management, because they enable project managers to successfully manage risks and uncertainties in order to realize the project's goal (Ondiek, 2020). According to research, the inability to establish formal control of risks techniques when designing an endeavor, with the participation of the endeavor teams, experts, and final consumers, frequently results in project delays. Project completion is favorably impacted by risk avoidance, risk reduction, risk sharing, and risk retention strategies. Not meeting the budget, deadline, and quality in construction projects results in poor performance and resource waste (Kerzner, 2017).

Globally, risk management is a difficulty for road construction projects. Every year, car accidents in areas where highway construction is underway claim the lives of around 900 individuals in the US. Furthermore, 52,000 vehicles suffer property damage and 40,000 drivers are injured in crashes that occur in highway construction zones (Abhinaya & Nidhu, 2017). Tang et al. (2020) assert that improper risk distribution increases the costs of conflict resolution which impacts the efficiency of the project. As well, Viswanathan and Jha (2020) pointed out

certain critical risks like financial and economic instability, as well as regulatory ones, that render international projects incomplete within the set deadlines. On the other hand, Shaktawat and Vadhera (2021) make an argument regarding the management of risks on a hydroelectric project, noting that sustainability would be at risk due to insufficient risk allocation. Thus, achieving global infrastructure development spans from the efficient detection and reduction of hazards to the oversight of targeted project deadlines (Shaktawat & Vadhera, 2021).

In Africa, risks are distributed among the parties in the road building schemes is primarily influenced by the choice for purchasing selected. Leo-Olagbaye and Odeyinka (2020) assert that the undertakings involving the development of roads ongoing in Osun State Nigeria suffer delays as well as overshooting of the defined budgets due to insufficient risk management. Boateng et al.(2022) note that advanced systematic risk administration is known to enhance the efficiency of the building construction industry in Ghana, but this approach is scantily practiced. In Africa, Adu Gyamfi et al.(2024) document that ineffective risk resources management in public and private partnership projects are responsible for the failures. As with other continents, Africa needs to enhance risk mitigation, assessment, and monitoring for the improvement of infrastructural development and sustainability of the projects undertaken.

Kenya's road building projects face high risks of budget overruns and late delivery. Although subpar time schedule efficiency and cost deduction are unavoidable, solid risk management measures can improve overall project performance. Kenya's road construction industry is one of the riskiest, leading to increased interest in risk analysis and management. KeNHA, responsible for managing national trunk highways, aims to maintain excellent service, openness, productivity, efficacy, openness, and sound management of business. The organization designs, administers, repairs, and maintains national trunk roads considering these factors. Mongina and Moronge (2021) argue that lack effective project management is a primary contributory contribute to overruns and delays in costs in infrastructural projects touching roads in Nairobi. Mbugua and Otuya (2020) argue that failure to perform accurate risk management of investment in commercial real estate suffers from significant losses as well as poor performance of the project. Ondiek (2020) highlights weak project planning as a key cause of inefficiency in road development projects in Uasin Gishu County. Strengthening risk assessment, mitigation, and monitoring is necessary to enhance the project efficiency and infrastructure sustainability in Kenya.

1.1.1 Risk Identification

Risk identification is the process of recognizing and documenting any project hazards (IOS, 2018). Risk identification refers to the portion of project management that aims for net positive impact in every conceivable way (Kirira et al., 2020). According to Hopkin (2018), Risk management is the coordinated activities undertaken by an organization to direct and control risks that could affect the achievement of its strategic and operational goals. By searching through all the goals and purposes of an engineering venture, one needs to check how the scope, planning, scheduling, costs, resources, and the legal context impact surrounding elements in terms of the expected risk. Indicators such as number of risks detected, frequency of risk identification meetings, and comprehensiveness of risk registers show if an adequate level of effort was put in these net positive efforts. In order to assess all possible scopes of construction projects, use tools like brainstorming sessions, expert consultations, and data from previous projects (Kirira et al., 2020).

1.1.2 Risk Assessment

As per ISO 31000 (2018), the process of identifying, analyzing, and evaluating risks is known as risk assessment, aimed at understanding potential threats and their impact on achieving objectives. Risk assessment is the application of numerical and qualitative techniques to measure and prioritize risks, allowing organizations to allocate resources effectively to manage uncertainty (Hubbard, 2009). Risk assessment includes the analysis of how relevant the determined risk is and how much damage may stem from it (Javed et al. 2020). It includes the possibility that the risk may materialize as well as the resulting repercussions. Tools that are outcome-based, including risk matrices and Failure Mode and Effect Analysis provide a common understanding of the level of the impact a certain risk can have which makes it easier to categorize based on the urgency and effect they would have. Also, the amount of risk probability ratings collected, severity of impact scores of the risk, and risk bias scores give an understanding of the level of preparedness in identifying relevant risks. Having a balance across all these would support better strategic decision-making and project control (Javed et al. 2020).

1.1.3 Risk Mitigation

According to Hillson & Simon (2012), Risk mitigation refers to the process of creating and putting into practice plans to lessen the probability or effect of potential risks, ensuring they do not hinder the achievement of objectives. Risk mitigation involves taking actions to lessen the

possibility or consequences of a risk event by putting into practice preventive measures and contingency plans (Project Management Institute, 2017). Risk mitigation is the term that involves the efforts made to eliminate the negative impacts identified on construction projects (Arantes & Ferreira, 2021). Formulating resource allocation plans, and developing contingency plans and preventive measures are keywords to this step. Useful steps taken towards the goals of risk mitigation are: effectiveness towards set goals, response time towards arising risks, and percentage of zero uncovered risks. The strategies are defined further as using insurance, adjustment to contracts and training programs. More specifically, successful mitigation focuses measures on almost project failure disruptions, striving to achieve efficient undertakings, and mitigating cost delays and over expenditure within the projects (Arantes & Ferreira, 2021).

1.1.4 Risk Monitoring

According to NIST (2018), it maintains awareness of an organization's risk environment to support decision-making. Harvard Business School (2023) emphasizes continuous oversight of risks and mitigation strategies. ISO 31000 (2018) defines it as supervising and observing risk treatment measures. Effective risk monitoring ensures organizations adapt to evolving threats and maintain stability in operations. Risk monitoring is crucial for efficient building project management. It involves tracking current risks, detecting new threats, and providing strategies to manage them at every project level. This includes tracking systems, risk audits, and reviews of progress. Strategies can be set through systematic risk dashboards, key risks, and compliance reports. Regular reviews for risk and goal substitutes can improve adoption, timely dispute resolution, and reduce project deadlines. Regular reviews can also help in reducing budget allocations and ensuring timely project completion (Boateng, Ameyaw, & Mensah, 2022).

1.1.5 Delivery of Construction Engineering Projects

In line with the Design-Build Institute of America (DBIA), project delivery encompasses all phases from planning to completion. The Construction Management Association of America (CMAA) defines it as the process of taking a project from conception to handover. Gordian (2021) emphasizes that selecting the right delivery method, such as design-build or integrated project delivery, is essential for managing risks, timelines, and stakeholder collaboration effectively. Delivery of construction engineering projects implies an accurate procurement of the project scope within the predefined time, cost and quality parameters (Elghaish, Abrishami, & Hosseini, 2020). Performance indicators on delivery of projects include adherence to completion timelines, cost variances, compliance quality rates, stakeholder satisfaction, and

even safety incidents. Efficient delivery of the projects relies on good planning, adequate manpower, and streamlined risk factors. If projects are delivered timely, on budget and on quality, they enhance the infrastructure and economy (Elghaish, Abrishami, & Hosseini, 2020).

1.1.6 Kenya National Highways Authority (KeNHA)

The Kenya National Highways Authority (KeNHA) plays a crucial part in the growth, upkeep and supervision of national highways across Kenya. created in accordance with the 2007 Kenya Roads Act, KeNHA is responsible for ensuring that the country's road network meets the highest standards of safety, efficiency, and sustainability. The authority oversees the construction of new highways, rehabilitation of existing roads, and periodic maintenance to enhance connectivity and promote economic growth. KeNHA also collaborates with other government agencies, development partners, and private sector players to implement road infrastructure projects. Additionally, KeNHA conducts feasibility studies and applies modern construction technologies to ensure durable and cost-effective road networks. Through its mandate, the authority contributes significantly to national and regional trade by improving transport corridors that link Kenya to neighboring countries.

To effectively manage risks associated with road infrastructure projects, KeNHA has implemented several measures aimed at mitigating financial, environmental, and operational risks. The authority adopts a robust project management framework that includes comprehensive planning, stakeholder engagement, and continuous monitoring of project progress. KeNHA also enforces strict quality control measures to prevent substandard construction and reduce long-term maintenance costs. To address financial risks, the authority ensures prudent budget utilization and accountability in the procurement of contractors and materials. Environmental risks are managed through adherence to environmental impact assessment (EIA) regulations, ensuring that road construction does not negatively affect ecosystems or displace communities. Additionally, KeNHA incorporates road safety measures such as signage, pedestrian crossings, and enforcement of axle load limits to minimize accidents and improve overall road safety. Through these risk management strategies, KeNHA enhances the sustainability and efficiency of Kenya's road infrastructure.

1.2 Statement of the Problem

Despite KeNHA's attempts to improve Kenya's road structures, many construction projects continue to experience delays, budget overruns, and quality concerns. In the 2022/2023 fiscal

year, KeNHA completed 13 major projects, yet 26 others exceeded their budgets by over Ksh 20 billion (Shaktawat & Vadhera, 2021). Additionally, the rehabilitation of the Westlands–Athi River highway has faced significant delays, causing disruptions. These inefficiencies highlight a gap in project risk management, particularly in risk identification, assessment, mitigation, and monitoring (Mongina & Moronge, 2021). Without effective risk management strategies, project delays and financial losses persist. This research seeks to examine how risk management procedures affect the delivery of construction engineering projects within KeNHA, providing insights into improving efficiency, cost control, and timely project completion (Ondiek, 2020).

Multiple reports have been published about construction project delivery around the world, and their interdependence with project management risks. Tang et al. (2020) state that increased contention due to poorly allocated resources affects overall productivity. On the other hand, Shaktawat and Vadhera (2021) argue that failing to manage risk as a project sustains is a barrier to sustaining hydropower projects in India. Leo-Olagbaye and Odeyinka (2020) note that ineffective management of project risks is a primary contributor to the alarming rate of road construction project failures in Nigeria. Adu Gyamfi et al. (2024), on the other hand, observe lack of proper risk resource management in Tanzanian public private partnerships. In Kenya, Mongina and Moronge (2021) and Ondiek (2020) assert that ineffective project planning and risk management strategies obvious resulted to project time and cost overruns which calls for better risk management адаптации practices.

Project risk management's impacts on economic construction project delivery in Kenya are yet to be explored especially within the Kenyan context, despite all these studies. There is concern that while existing literature seems to be comprehensive in risk management allocation, construction project undertaken in Kenya, with an emphasis on road projects seems to receive less attention. This is the gap that was addressed by the researcher In the investigation on how project risk management affects the economic delivery of construction engineering projects with specific reference to the Kenya National Highways Authority (KeNHA).

1.3 Objectives of the Study

The main objective of this study was to examine the effects of project risk management on delivery of construction engineering projects in Kenya, a case study of Kenya National Highways Authority (KeNHA)

1.3.1 Specific Objectives

- i. To assess the effect of risk identification on the delivery of construction engineering projects at KeNHA.
- ii. To evaluate how risk assessment influence project delivery in KeNHA's construction projects.
- iii. To examine the effect of risk mitigation strategies on the delivery of construction engineering projects at KeNHA.
- iv. To analyze the effect of risk monitoring on the delivery of construction engineering projects at KeNHA.

1.4 Research Questions

- i. What is the effect of risk identification on the delivery of construction engineering projects at KeNHA?
- ii. How does risk assessment influence project delivery in KeNHA's construction projects?
- iii. What is the effect of risk mitigation strategies on the delivery of construction engineering projects at KeNHA?
- iv. What is the effect of risk monitoring on the delivery of construction engineering projects at KeNHA?

1.5 Significance of Study

1.5.1 Kenya National Highways Authority (KeNHA)

KeNHA's responsibility comprises the building, maintenance, and administration of highway networks inside Kenya. Through the proper control of hazards within KeNHA, construction engineering project objectives in relation to time, money, and quality will be reached. This research aids KeNHA in enhancing their risk management methods, resource allocation, and project interruptions. This research narrows down on difficulties and presents ideas which would aid KeNA's aim of creating safe, effective, and sustainable road networks throughout the nation.

1.5.2 Project Managers

Construction engineering project managers will have to contend a great deal with risk including but not limited to financial, legal, and technical issues. Different project managers in engineering will have new concepts about ways of risk identification, assessment, and

mitigation from this research. Knowing risk management will help them make better decisions, improve project undertaking, and most importantly eliminate unnecessary project delays. Proactive risk management is crucial and this study will assist project managers in risk management to ensure that construction work can be done in a timely, safe and orderly manner.

1.5.3 Policy Makers

The role of regulators in the construct of policy is critical regarding the regulation of risk in construction engineering projects. This study will provide evidence-based recommendations towards policy strengthening in project risk administration in the Kenyan context. Knowing the risk parameters will determine how a framework is set to deliver a policy framework that aims for prudent infrastructure project development. The study will enhance the decision-making process for the project which will strengthen regulatory policies, contract management, increase public sector project monitoring and facilitate economic and sustainable development.

1.5.4 Researchers

For researchers, this study will help broaden the scope of construction engineering project risk management phenomena. It will offer them empirical, theoretical and practical bases for their new studies. Researchers will base the findings to new risk management models to broaden the debate and pioneer theory. Also, the study will aid in probing existing research literature with the view of developing new risk strategies and their effects on construction projects.

1.6 Scope of the Study

The study examined the effects of project risk management on delivery of construction engineering projects in Kenya, a case study of Kenya National Highways Authority (KeNHA). This research targeted 32 Project Managers, 43 Engineers, 36 Risk Management Officers, and 30 Site Supervisors at KeNHA . The headquarters of KeNHA are located off Airport South Road along Mazao Road at Barabara Plaza, Blocks A & C, Jomo Kenyatta International Airport (JKIA). The investigation was carried out between February and May of 2025. The research was conducted in KeNHA offices.

1.7 Chapter Summary

This chapter provided an extensive background for the study, including the problem statement, study objectives, research questions, and importance of the study. Furthermore, it defined the study's scope, emphasising its focus and limits. Together, these features provided a robust

foundation for understanding the the effects of project risk management on delivery of construction engineering projects in Kenya.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presented theoretical review, conceptual framework, empirical review, research gaps and operationalization of variables.

2.1 Theoretical Literature Review

The study was anchored by Modern Portfolio Theory. Also, the research was supported by The Agency theory and Enterprise Risk Management Theory.

2.2.1 Modern Portfolio Theory

Modern Portfolio Theory (MPT) was first presented by Harry Markowitz in 1952. MPT is an investment theory that carefully selects various assets in an effort to optimize return and reduce risk. Choosing a group of financial assets that are less risky overall than any one property alone is the aim of MPT, a quantified articulation of the idea of diversification in investing. Since the values of several asset classes sometimes move in opposing directions, this is theoretically possible. For example, when the stock market decreases, bond prices usually increase, and vice versa (Aziz, Manab & Othman, 2015).

As a result, a team comprising both types of assets could be less hazardous than just one by itself. The investor must do this by determining the potential risks connected to the investment. Because it made clear how risk, recognition, and project performance are related, this hypothesis was pertinent to this investigation. According to MPT theory, identifying risks necessitates both a continuous procedure and an ongoing search for new risks. This theory goes on to describe how risk assessment and identification assist management in developing a risk management strategy for efficient resource distribution. By evaluating risks, the business may look at operations and areas where its resources are susceptible to dangers (Wijelathike & Lama, 2019).

2.2.2 The Agency theory

The Agency theory was first put forth by Michael C. Jensen and William Meckling in 1976. The theory focuses on the ubiquitous agency connection, wherein one team, the principle, gives

a task to someone else, the agent, who carries it out. Clients and contractors define this connection in construction projects. Resolving two problems with agency partnerships are the focus of agency theory. According to Obade (2019), the first is the agency problem, which arises when (a) the agent and principal have conflicting interests or aims and (b) it is difficult or costly for the principle to verify what the agent is actually doing.

This theory is pertinent to risk mitigation strategies in construction projects as it addresses conflicts between project owners (principals) and contractors (agents). Effective mitigation ensures agents act in principals' best interests, minimizing risks and enhancing scheme delivery.

2.2.3 Enterprise Risk Management Theory

Enterprise Risk Management theory was proposed by James Lam, 2003. Enterprise Risk Management (ERM) is a risk management philosophy that, according to Nocco and Stulz (2006), proposes assessing and controlling major risks that an organization confronts collectively as opposed to handling each risk alone. Its primary goal is to integrate a company's risk control silos within a single, comprehensive architecture. According to the ERM risk management framework, senior corporate leaders and employees should actively engage in the risk management process of evaluating and reacting to a range of business risks (Hallowell, Molenaar, & Fortunato, 2018).

All employees of a company are encouraged to participate in risk management by the Enterprise Risk Management (ERM) concept, it draws attention to the significance of well-defined procedures and guidelines. As stated by Olson and Wu (2010), risk management capability can be enhanced by explicit regulations that outline tolerance, strategic objectives, risk appetite, and methodical procedures. Additionally, the idea emphasizes establishing a risk monitoring culture where every interested party are held accountable and empowered. According to Cormican (2015), ERM procedures boost stakeholder confidence, competitive advantage, and long-term organizational survivability (Njom, 2023).

The ERM theory, originally designed to manage business risks, has grown in acceptance in the context of project managing domain, specifically in industries where failure rates are high, like as construction, where risk management is crucial for overall success. This theory is pertinent to risk monitoring in construction projects because it stresses a methodical approach to risk identification, evaluation, and mitigation. Continuous monitoring improves judgment, ensuring project stability and successful delivery.

2.2 Empirical Literature Review

2.2.1 Risk Identification and Delivery of Projects

Nyarangi, Ogolla, and Kitheka (2021) examined the impact of managing risks for projects practices on water project outcomes in Mombasa County, Kenya. The research used a descriptive design. The research, which examined 146 borehole endeavors in Mombasa County, between 2013 and 2018, had 182 respondents. The research used stratified random sampling methods and structured questionnaires for gathering primary information. The numerical information was evaluated applying both descriptive and inferential data using SPSS version 25. The study's goal was to ascertain the impact of borehole efforts on end users. The research found a favorable and substantial correlation among risk for the project assessment and borehole. project success in Mombasa County.

According to the findings of a research by Pimchangthong and Boonjing (2017) on the influence of risk management strategies on IT project success, risk identification significantly improved product performance. Data from 200 leaders in IT, IT experts, and project directors employed by IT organizations was gathered via questionnaires. Analysis methods included the t-test, and Linear Regression. The results of the multiple linear regression analysis showed that risk identification had an effect on IT project achievement. The results also demonstrated that risk identification was the most accurate indicator of product success.

In Nairobi City County, Kenya, Njuguna (2019) examined project success as well as risk methods for leadership. The study used a descriptive methodology to ascertain the connection amongst risk management techniques and the four independent variables and their effects on project performance in Nairobi City County, Kenya: risk avoidance, risk retention, and transferring risk, and risk control. The research included semistructured questionnaires to gather relevant data from 135 administrators, managers for projects, risk coordinators, finance directors, and construction-related businesses. The results of the study were displayed in graphs, tables, and pie charts following data collection and analysis using SPSS. The research showed that risk identification has a beneficial impact on the performance of the project.

2.2.2 Risk Assessment and Delivery of Projects

Mbuva, Rambo, and Oketch's 2018 research sought to determine the degree to which risk assessment impacted the success of SME initiatives in Machakos County. The research used a regression model based on an observation size of 265 people selected by a simple and stratified

selection process from a group of 5311 SMEs business projects in Machakos County. Participants gave their affirmative approval to most of the risk assessment categories, according to the study's findings. Financial performance was significantly impacted by risk assessment, prioritizing, and change management, per inferential statistics. Furthermore, non-financial performance was significantly impacted by these characteristics.

Muthoni and Ogolla (2018) set out to examine the factors influencing project risk management in state-owned enterprises. The study sought to investigate the effects of technical competence, communication, and project scheduling on project risk management in state businesses, with a focus on three specific objectives. A descriptive study approach was used for this inquiry. The investigation was conducted at the Kenya Pipeline Company. For the research, 202 respondents were selected as a sample from KPC's diverse demographic groupings. Participants were chosen for this research use basic sampling methods. The research found a extremely substantial relationship between risk assessment and project delivery.

The elements impacting the Coastal Water Services Board's implementation of such water projects were specifically investigated in Mohammed and Ogolla's (2018) study. Four goals based on risk management served as the foundation for this study: investigate how the project mission affects project implementation; investigate how resources affect project implementation; investigate how effective management affects project implementation; and investigate how budget allocation affects project implementation. 134 respondents were randomly chosen from the target population of 203 respondents using stratified random selection. Based on the results of the investigation, the Coast Water Services Board's implementation of water projects is significantly influenced by aspects related to risk management, including risk assessments.

2.2.3 Risk Mitigation Strategies and Delivery of Projects

Obade (2019) investigated how risk management techniques affected the quality, cost, and construction of roads development projects, in Nairobi City County, Kenya. Using a cross-sectional design, this research examined 75 road construction companies and risk managers from 208 registered companies in Nairobi County. Four additional enterprises with both local and international features were chosen, in addition to 57 local and 14 foreign firms, using stratified sampling. Utilizing structured surveys, interview risk managers for each organization. Data study showed that timely completion of road improvements was highly

correlated with risk mitigation. Completing the project within budget was also strongly correlated with risk mitigation.

Ali, Stewart, and Qureshi (2017) investigated risk management strategies in Pakistan's construction industry. Construction managers, construction practitioners, and construction project teams were among the investigation's goal participants. The research design that was employed was descriptive. Forty responders successfully filled out provided survey forms, and inference as well as descriptive statistics were used for assessing the data. According to the research's findings, the construction company's risk-reduction tactics—like getting insurance and making a backup plan—have an effect on how well a project is completed. The results of the research show that risk reduction techniques greatly enhance project performance.

A research by Ogollah and Mburu (2015) examined how risk management strategies affected the project performance of small and medium-sized ICT companies in Nairobi, Kenya. The results of the SME ICT project were the factor that was dependent, whereas the risk management techniques were the independent factors. Nairobi, Kenya's 48 ICT SMEs were the intended audience. The research used the random sampling approach in order to calculate an object size of project personnel from the intended demographic. Regarding ICT initiatives for Kenyan SMEs, the study discovered that risk mitigation strategies improved project performance and that, at the 0.05 level, this connection was highly probable.

2.2.4 Risk Monitoring and Delivery of Projects

Ubani et al. (2015) looked at the impact of risk control strategies on Nigeria's construction sector. The research used a particular case scenario methodology and focused on customers, consultants, and contractors in the construction industry. There were 84 responses in the sample overall. To collect data, questionnaires were sent to 15 construction companies. The findings demonstrated that these companies employed risk management strategies, recognizing, quantifying, and responding to risks in line with their control of risks policies. According to the study's findings, all construction organizations should adjust their task boundaries and objectives in regards to assess risk, make quick decisions, and keep project management informed about possible dangers.

In Makueni County, Kenya, Rwingo (2021) investigated the way construction projects are carried out and risk governance. The survey included 72 respondents and examined 24 building projects in Makueni County that were finished in 2018–2019. An informal survey was used to

gather information. Although the majority of respondents disagreed with the availability of sufficient financial resources for project operations, they did agree with resource risk management claims. Additionally, they concurred with the assertions on lawsuit risk control, risk control, and budget control. In line with the report, Makueni County construction projects' performance was greatly impacted by risk monitoring.

Research on an efficient framework for risk management in National Government CDF building projects in Nairobi County was conducted by Njom (2023). This research examined 170 active CDF projects across 17 constituencies with an emphasis on construction project managers in Nairobi County. Using a survey approach, 118 ward managers were chosen as a sample. Primary data was collected by questionnaires, evaluated using descriptive statistical techniques, and shown in tables and figures. The research found that risk management techniques were essential to achieving these objectives and demonstrated Nairobi County's NG-CDF infrastructure projects' success was greatly impacted by resource risk administration. The research found that project delivery was enhanced by risk monitoring.

2.3 Summary of Knowledge Gaps

Table 1: Summary of Knowledge Gaps

Author (years)	Research Topic	Methodology	Findings	Research Gaps	Focus of the study
Nyarangi, Ogolla & Kitheka (2021)	Project risk management and borehole project performance in Mombasa	Descriptive; stratified sampling; structured questionnaires; SPSS	Risk identification positively influenced project performance	Focused only on borehole projects; lacked risk assessment, mitigation, and monitoring	The study applied risk management to construction engineering projects at KeNHA
Pimchangthong & Boonjing (2017)	Risk management and IT project success	Questionnaires; t-test, ANOVA, regression	Risk identification had the highest impact on IT project success	Focused on IT projects, not infrastructure	The study extended risk management to construction engineering projects
Mbuva, Rambo & Oketch (2018)	Risk assessment and SME project performance in Machakos	Multiple regression; stratified & convenience sampling	Risk identification, prioritization, and managing change influenced performance	Did not assess risk management in large-scale projects	The study examined risk assessment in KeNHA projects

Author (years)	Research Topic	Methodology	Findings	Research Gaps	Focus of the study
Obade (2019)	Risk management and road project completion in Nairobi	Cross-sectional; structured questionnaires; stratified sampling	Risk mitigation improved project completion and budget control	Focused on mitigation, not risk identification or monitoring	The study incorporated risk identification, assessment, and monitoring in KeNHA projects
Rwingo (2021)	Risk governance and construction project performance in Makueni	Semi-structured questionnaires; 24 projects	Risk monitoring significantly affected performance	Focused on risk governance, not assessment or mitigation	The study analyzed risk assessment, mitigation, and monitoring at KeNHA

2.4 Conceptual Framework

A conceptual framework is a theoretical structure used in research to describe significant ideas, variables, linkages, and assumptions. It provides as the basis for understanding and interpreting study findings, as well as directing the development of hypotheses, gathering of data methods, and evaluation. It promotes mental organizing and situates research within recognized theoretical frameworks.

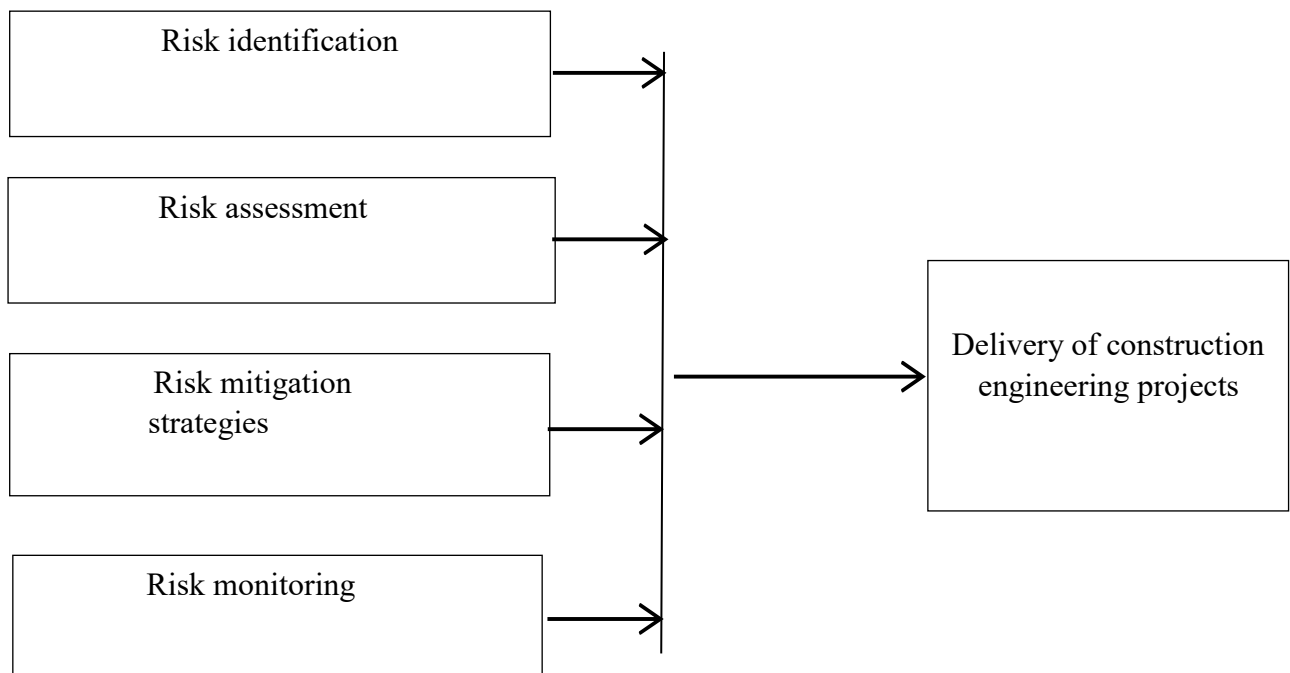


Figure 1: Conceptual Framework

2.5 Operationalization of Variables

Table 2: Operationalization of Variables

Variable	Indicators	Measurement Scale	
Risk identification	<ul style="list-style-type: none"> • Risk identification frequency • Identification techniques • Stakeholder involvement • Risk documentation • Planning integration 	Likert Scale of 1 to 5	<ul style="list-style-type: none"> • Mean • Standard Deviation • Regression
Risk assessment	<ul style="list-style-type: none"> • Assessment framework use • Risk impact accuracy • Review frequency • Assessor expertise • Decision-making integration 	Likert Scale of 1 to 5	<ul style="list-style-type: none"> • Mean • Standard Deviation • Regression
Risk mitigation strategies	<ul style="list-style-type: none"> • Mitigation effectiveness • Response timeliness • Resource allocation • Training adequacy • Strategy adaptability 	Likert Scale of 1 to 5	<ul style="list-style-type: none"> • Mean • Standard Deviation • Regression
Risk monitoring	<ul style="list-style-type: none"> • Monitoring frequency • Tracking system use • Risk response speed • Real-time data access • Communication effectiveness 	Likert Scale of 1 to 5	<ul style="list-style-type: none"> • Mean • Standard Deviation • Regression
Delivery of construction engineering projects	<ul style="list-style-type: none"> • Project completion time • Budget adherence 	Likert Scale of 1 to 5	<ul style="list-style-type: none"> • Mean • Standard Deviation

Variable	Indicators	Measurement Scale
	<ul style="list-style-type: none"> • Project quality • Stakeholder satisfaction • Project disruptions 	Regression

2.6 Chapter Summary

This section supplied an in-depth examination of theoretical and empirical literature, summarizing key findings and identifying research gaps. It also presented the conceptual framework and operationalization of variables, establishing the research's foundation. The review critically analyzed existing studies to highlight gaps and justify the need for further research.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.0 Introduction

The study approach applied for this research is the main topic of this section. The study design, population, sampling strategy, data collecting technique, pilot test, data analysis, and ethical concerns in research were all covered.

3.1 Research Design

The research design provides an outline for collecting, calculating, and interpreting data in accordance with the project's research objectives (Kazdin, 2021). The descriptive research design was used in this investigation. A descriptive design is the act of obtaining data to test a hypothesis or answer state-specific questions (Dannels, 2018). This study took a descriptive approach to evaluate how project risk management influences the delivery of construction engineering projects in Kenya.

3.2 Target Population

According to Stratton (2021), a population is a precisely defined group of people or objects that are the subject of statistical analysis. This research targeted 32 Project Managers, 43 Engineers, 36 Risk Management Officers, and 30 Site Supervisors at KeNHA. Thus, the study targeted 141 individuals.

Table 3: Target Population

Category	Frequency	Percentage
Project Managers	32	23%
Engineers	43	30%
Risk Management Officers	36	26%
Site Supervisors	30	21%
Total	141	100%

3.3 Sample and Sampling Technique

The process of choosing individuals to reflect the target population or group as a whole is known as sampling (Levitt, 2021). Sampling produces almost flawless duplicates of the sample population, lowers expenses, streamlines administration, increases accuracy, and speeds up research completion. The examiner employed the census sample approach because the target population is approachable.

3.4 Instruments

A questionnaire was used in the study to gather primary data. According to Sukmawati (2023), a questionnaire is a structured data collection tool that consists of questions designed to systematically acquire information from respondents. Its effectiveness in reaching a large number of participants, guaranteeing consistency in responses, and enabling both quantitative and qualitative analysis make it suitable for research (Sukmawati, 2023). Researcher only asked closed-ended questions. Respondents utilized a range of keys to indicate how they differ from the statements that are presented. Using a 5-point Likert scale, participants were asked to rate their views on each descriptive statement. The survey was split into two sections: one for the variables under study and another for the background information of the respondents.

3.5 Pilot Study

A pilot study is a preliminary investigation that precedes a larger, more thorough examination (Kunselman, 2024). A pilot study was done to develop and evaluate a research instrument, enhancing its relevance, identifying potential issues, and validating its validity and reliability with participants from the target group (Kothari, 2017). According to Mugenda and Mugenda (2019), the pretesting sample should account for 1% to 10% of the total sample size. Thus, indicates that 14 employees of KURA participated in the pilot research and were not included on final analysis.

3.5.1 Validity of Research Instruments

According to Teresi et al. (2022), the validity of research techniques will be increased to ensure that study results accurately reflect the phenomenon under examination. This study looked at analytical validity, content validity, and instrument validity. The investigator conducted a thorough literature review to increase content validity. The opinions were collected from supervisors' viewpoints in order to develop and strengthen the instrument's anticipatory and

reliable structures. The researcher sought opinions from experts on project management to ensure the questionnaire is valid.

3.5.2 Reliability of Research Instruments

Tests were conducted to confirm the dependability of the research tools. Concerns regarding dependability focused on the extent to which the research instruments consistently delivered trustworthy results over several trials. According to O'Neill (2022), significant findings must not only justify research equipment, but also be entirely reproducible. Cronbach's Alpha Reliability Assessment was employed in the study to determine the tool's internal reliability. In social science research, a reliability coefficient greater than 0.70 demonstrates instrument dependability (Pentang, 2023).

3.6 Data Collection Procedure

The investigator received approval from the Management University of Africa and met with respondent representatives to confirm their commitment. To build trust, respondents were informed, and a letter outlining the study's objectives were sent with the surveys. The researchers distributed the surveys in person. After ten working days, the surveys were collected from the respondents. Following then, data was collected and archived for analysis.

3.7 Data Analysis and Presentation

Data preparation involved ensuring data quality and transforming it from its initial state into more straightforward, categorized forms suitable for analysis (Muhamad, 2023). Quantitative data from survey replies was edited, encoded and input by the researcher. Each response was assigned a number through data coding, enabling analysis and storage. Trends, means, proportions, and frequencies were evaluated using descriptive statistics with the use of Microsoft Excel, and tables and charts displayed the outcomes.

3.8 Ethical Considerations

The investigator observed the following ethical issues in this investigation:

3.8.1 Informed Consent

The investigator ensured that those participating understood the study's procedures, potential dangers, rewards, and rights before inviting them to take part. In addition to provide

participants a comprehensive a document detailing the results of the research's objectives, procedures, advantages, and disadvantages, the researcher guaranteed their right to withdraw from the research whenever they choose without being charged.

3.8.2 Voluntary Participation

Those who took part in the investigation were entirely voluntary, at the researcher's discretion. Clear and explicit information was provided to all prospective volunteers, emphasizing that participation is entirely voluntary. The researcher made sure that no incentives or pressures affected their judgment by abstaining from coercion or improper influence.

3.8.3 Confidentiality

All participant information was kept completely private during the whole research process. Instead of using their own identities, participants were assigned special codes or pseudonyms. All information was safely stored in password-protected folders or locked cabinets to which only authorized individuals can get access. In order to prevent identifying specific participants, data was made public in aggregated form.

3.8.4 Privacy

To ensure that participants feel comfortable submitting information while maintaining their right to privacy, the researcher administered surveys in private locations. Participants were informed of the steps taken to protect their privacy and the intended use of their data, and just the personal data required for the investigation was gathered by the investigator.

3.8.5 Anonymity

By designing data collection instruments that did not capture identifying information like names or addresses, the researcher protected the confidentiality of the participants. To ensure that answers cannot be connected to specific people, anonymous surveys was used. The researcher ensured that no identifiable information was included in the published findings, ensuring the anonymity of all participants.

3.9 Chapter Summary

This segment discussed research methods employed in research investigations, focusing on descriptive design as the primary approach for data analysis. It provides an in-depth

explanation of the analytical methods, target population, sample size, sampling strategy, and research tools used for information gathering.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.0 Introduction

The research findings, study limitations, and chapter summary are presented in this part.

4.2 Presentation of Research Findings

4.2.1 Response Rate

Table 4: Response Rate

Category	Frequency	Percentage (%)
Response	110	78%
Non-Response	31	22%
Total	141	100%

The investigation's response rate was 78%, which was deemed sufficient given the investigator's drop-and-pick method and some participants' neglect during the collecting period. This rate was allowed for statistical analysis since Kothari (2013) argues that a response rate of more than 60% of sample respondents is sufficient to draw inferences about the full sample.

4.2.2 Demographic Findings

4.2.2.1 Gender

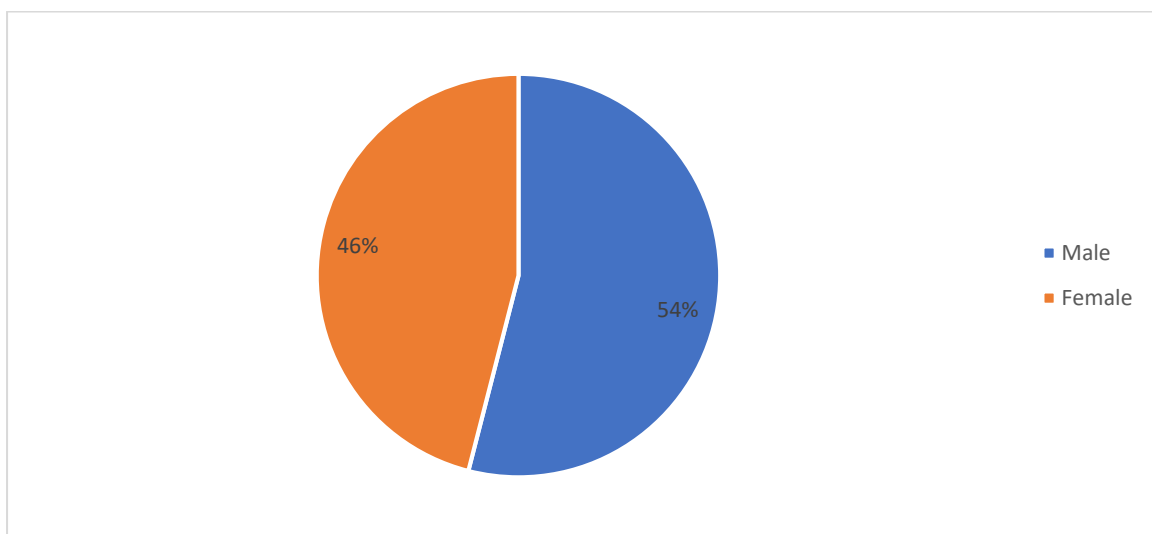


Figure 2: Gender

Male participants comprised 54% of the inquiry, while women participants made up 46%. These findings clearly demonstrated that there is little variance in the gender distribution of KENHA. It implies that the corporation is aware of gender equality requirements while employing county personnel. Figure 2 shows the findings.

4.2.2.2 Age Bracket

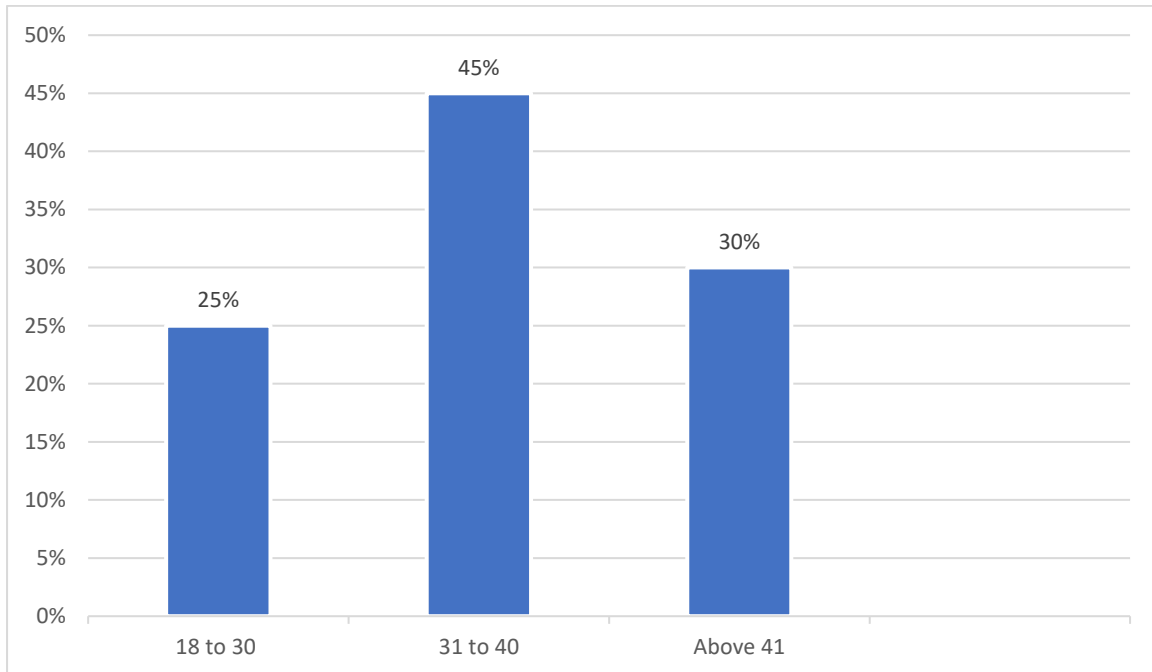


Figure 3: Age Bracket

The participant's range of ages was determined by the inquiry, and the results of the study are shown in Figure 3. According to the results, 45% of those surveyed were between the ages of 31 and 40. Of them, 25% were in the 18–30 age range, and 30% were 40 years of age or older. This implies that respondents are more likely to display high degrees of maturity, leading to mature responses.

4.2.2.3 Highest Level of Education

Table 5: Highest Level of Education

Category	Frequency	Percentage (%)
Certificate	6	5%
Diploma	14	13%
Undergraduate	57	52%
Postgraduate	33	30%
Total	110	100%

According to the results, the majority of participants (52%) said that their greatest educational achievement a bachelor's degree. Thirteen percent had diplomas, five percent had certificates, and thirty percent had postgraduate degrees. It was noted that every responder had completed post-secondary training. This indicated that, in terms of teaching, the majority of respondents fulfilled the requirements for the different tasks they were undertaking. The results are shown in Table 5.

4.2.2.4 Experience Level

Table 6: Experience Level

Category	Frequency	Percentage (%)
0 to5 years	22	20%
6 to 10 years	34	31%
11 to 15 years	25	23%
16 years and above	29	26%
Total	110	100%

The findings showed that most of them (31%) had been in their current positions for six to 10 years. 20% had been there for less than five years, 23% had been there for eleven to fifteen years, and 26% had been there for sixteen years or more. The respondents' length of time in their present positions served as the basis for this data. Table 6 presents the findings.

4.2.3 Descriptive Analysis

4.2.3.1 Risk identification

Table 7: Risk identification

Statement	Mean	Std. Deviation
Risk identification is conducted frequently throughout the project lifecycle.	3.743	1.278
A variety of methods are employed to determine potential hazards in projects.	3.953	1.121
Stakeholders are actively involved in the risk identification process.	4.070	1.032
Identified risks are well-documented and accessible for future reference.	3.898	1.268
Risk identification is effectively integrated into project planning activities.	4.115	1.241

The results in Table 7 show that risk identification is being practiced at KeNHA throughout the project lifecycle. The respondents agreed to risk identification being performed on a frequent

basis (Mean=3.743, STD=1.278), along with a variety of other methods being undertaken to identify risks (Mean=3.953, STD=1.121). Stakeholder participation garnered strong agreement for participation (Mean=4.070, STD=1.032), and identified risks were documented and accessible as well (Mean=3.898, STD=1.268). Respondents also confirmed that risk identification efforts are incorporated into project plans, and noted comprehensive practices within the framework (Mean=4.115, STD=1.241).

4.2.3.2 Risk assessment

Table 8: Risk assessment

Statement	Mean	Std. Deviation
A structured risk assessment framework is consistently applied in projects.	4.073	1.017
The possible effects of each identified risk is accurately evaluated.	3.905	1.164
Risk assessments are reviewed regularly throughout the project.	3.885	.905
Risk assessors have the required expertise and training.	4.169	1.168
Assessment outcomes are used to support project decision-making.	4.055	1.008

Structured risk assessment frameworks are consistently applied in KeNHA projects as shown in Table 8 (Mean=4.073, STD=1.017). Moderately strong affirmation was noted for accurate assessment of potential risk impacts (Mean=3.905, STD=1.164), and regular review of risk assessments demonstrated consistent application as well (Mean=3.885, STD=0.905). Respondents strongly agreed to the assessors being well-trained and experienced (Mean=4.169, STD=1.168). In addition, there was strong agreement that the outcomes of risk assessment greatly influenced the overall project decisions (Mean=4.055, STD=1.008), which indicates a knowledgeable and a responsive evaluation system.

4.2.3.3 Risk mitigation strategies

Table 9: Risk mitigation strategies

Statement	Mean	Std. Deviation
The impact of hazards can be lessened with the use of risk mitigation techniques.	4.092	.951
Risks are promptly addressed by the project team.	3.968	.9467
Sufficient resources are allocated for implementing mitigation plans.	3.935	1.142
Staff are adequately trained on how to execute mitigation measures.	3.8551	1.010

Strategies for mitigation can be easily adjusted to meet changing project requirements.	4.1226	1.003
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The observation from Table 9 shows that KeNHA has incorporated effective risk management strategies. The measures are observed to reduce risk impacts effectively (Mean=4.092, STD=0.951), and there is general responsiveness of the project teams in risk situations (Mean=3.968, STD=0.9467). Resource allocation for mitigation plans was acknowledged to a moderate degree (Mean=3.935, STD=1.142) and training concerning proper mitigation procedures was supported, but at a lower level (Mean=3.8551, STD=1.010). High scores were given on flexibility and responsiveness of the mitigation strategies regarding emerging needs (Mean=4.1226, STD=1.003), showing a responsive agility to risk.

4.2.3.4 Risk monitoring

Table 10: Risk monitoring

Statement	Mean	Std. Deviation
Project risks are monitored frequently throughout execution.	4.012	0.967
An effective system is in place to track risks and mitigation progress.	3.914	1.102
The team responds quickly when new risks or changes are detected.	4.074	1.106
Real-time data is available to support risk monitoring efforts.	3.565	1.017
Risk-related communication among project stakeholders is timely and effective.	4.051	0.970

The data from Table 10 suggest there is an active culture of risk monitoring within the KeNHA projects. During project execution, project risks are monitored periodically (Mean=4.012, STD=0.967), and there is a mechanism to monitor the progress of risk management activities (Mean=3.914, STD=1.102). The project team tends to respond quickly to new and changing risks (Mean=4.074, STD=1.106). Rating for the responsiveness of the stakeholders was low concerning the availability of real-time data to support monitoring (Mean=3.565, STD=1.017), but for communication concerning risk, stakeholders are prompt and very effective (Mean=4.051, STD=0.970).

4.2.3.5 Delivery of construction engineering projects

Table 11: Delivery of construction engineering projects

Statement	Mean	Std. Deviation
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The majority of projects are finished on time.	4.086	1.086
Projects adhere to the initially approved budget.	3.789	0.971
Delivered projects meet the expected quality standards.	3.898	0.982
Stakeholders' express satisfaction with project delivery outcomes.	3.788	0.980
Project delivery experiences minimal disruptions or delays.	3.965	1.066

Based on the findings in Table 11, project delivery at KeNHA is satisfactory. The score for completing projects within the scheduled time was high (Mean=4.086, STD=1.086). Compliance to budget received some agreement (Mean=3.789, STD=0.971). Delivered projects generally were of good quality (Mean=3.898, STD=0.982). Stakeholder acceptance of the delivery outcome was moderate (Mean=3.788, STD=0.980). Respondents agreed that there were minimal disruptions or delays on the delivery processes (Mean=3.965, STD=1.066) suggesting strong overall performance in project execution.

4.2 Limitations of the Study

The study faced limitations due to potential response biases due to the reliance on self-reported data. Secondly, the research was conducted solely within the KENHA in Nairobi, limiting the generalizability of the findings to other public sector organizations. The specific organizational culture, policies, and regional context of KENHA may differ significantly from those of other institutions. As a result, caution should be exercised when applying the results beyond the study's immediate setting. Future research could expand the sample to include multiple public sector institutions.

4.3 Chapter Summary

The results of the study are presented in Chapter 4. beginning with the response rate to highlight participant engagement. It then outlines demographic characteristics, providing context for the sample population. The chapter concludes with descriptive evaluations of key variables, offering insights into risk identification, assessment, mitigation, and monitoring, as well as their influence on the delivery of construction engineering projects at KeNHA.

CHAPTER FIVE

SUMMARY, RECOMMENDATIONS AND CONCLUSIONS

5.0 Introduction

This section covers summary of the findings, conclusions and study recommendations.

5.1 Summary of Findings

5.1.1 Risk Identification and Delivery of Construction Engineering Projects

The majority of respondents (approximately 70%) affirmed that risk identification is a regular practice at KeNHA, deeming it a crucial aspect of the project lifecycle. Most participants (around 80%) also agreed that a variety of techniques are employed to identify potential risks. Stakeholder involvement in the risk identification process was supported by the majority (approximately 85%) of those who responded. Additionally, the vast majority of those surveyed (around 75%) confirmed that risks are readily available and thoroughly recorded for future use, and that risk identification efforts are effectively integrated into project planning.

5.1.2 Risk Assessment and Delivery of Construction Engineering Projects

The results showed that most of those surveyed (about 80%) reported that structured risk assessment frameworks are consistently applied in KeNHA projects. A moderate percentage (approximately 60%) agreed that the potential impact of identified risks is accurately assessed. Most respondents (around 65%) affirmed that risk assessments are reviewed regularly throughout the project. Furthermore, an overwhelming majority (about 85%) agreed that assessors possess the necessary expertise and training. Most respondents (approximately 75%) noted that the outcomes of risk assessments significantly influence project decision-making, indicating a knowledgeable and responsive evaluation system.

5.1.3 Risk Mitigation Strategies and Delivery of Construction Engineering Projects

According to the research, most participants (approximately 80%) thought that risk-reduction techniques effectively lessen the effects of hazards. About 70% of those surveyed concurred that the project group responds to risks in a timely manner. Resource allocation for mitigation plans was moderately acknowledged by around 65% of respondents, while training on mitigation procedures was supported by 60%. The majority of respondents (about 80%) gave

high scores to the flexibility and adaptability of mitigation strategies to meet emerging project needs, demonstrating a strong responsiveness to risk.

5.1.4 Risk Monitoring and Delivery of Construction Engineering Projects

The findings indicate that there is an active culture of risk monitoring in KeNHA projects, with around 75% of respondents agreeing that project risks are monitored frequently during execution. Most respondents (about 70%) confirmed that an effective system is in place to track risks and mitigation progress. The project team's responsiveness to new risks was high, with approximately 80% affirming that they respond promptly to changes. However, real-time data availability for supporting risk monitoring efforts was rated lower, with only 50% of respondents agreeing that such data is readily available. Nevertheless, communication among project stakeholders regarding risks was reported as timely and effective by a majority of respondents (approximately 80%).

5.2 Conclusion

The analysis comes to the conclusion that risk identification is a well-established practice at KeNHA and serves as an essential driver in project delivery. It is considered as part of project planning and integrates stakeholder contributions. Several methods are used to capture information on risks, and filing systems guarantee retrieval of documented risks. All these approaches reflect the intent to optimally manage uncertainties and improve engineering construction project decision making while avoiding mitigation efforts during project execution.

The study concludes that the structured frameworks for assessing risk aligned with evaluating project specific risks within the organization confirms the reliability of the findings. The review cycles put in place to assess the evaluations in question ensure that adequate skills reside with the assessors. Assessing the risks strategically helps in managing risks at various levels during project implementation. This uniformity in appraisal of risk assures the advanced identification of threats while increasing the chances for successful achievement of project objectives regarding time, quality, and costs.

The study concludes that the risk management techniques used at KeNHA are effective. On the other hand, while some attempts have been made toward facilitating proper training and adequate resource allocation, there is still much that can be done in this regard. The noted

project responses suggest that there is some level of responsiveness to changes made. This kind of responsiveness enhances the ability of the project to deal with changing conditions which is critical during project implementation and helps in achieving project goals by reducing the impact of unplanned difficulties.

The study concludes that the risk monitoring practices at KeNHA are considered to be active and integrated during the execution phase of a project. There are established systems for tracking risks and monitoring the progress of mitigation activities. Everyone on the project teams is alert to new risks, while inter-staff and stakeholder communication serves to facilitate prompt action. Although there are limitations on incorporating real-time information, what already exists provides a solid basis for ongoing risk monitoring. Proper monitoring assists in achieving control during project management skills and the capacity to control hazards improves project delivery results.

5.3 Recommendations

The study suggests that KeNHA strengthen their risk identification processes by broadening the scope of tools and techniques used as well as early stakeholder inclusion. In addition to the initial considerations, the organization should increase the frequency of risk identification activities throughout the project lifecycle. Improving documentation along with the retrieval of identified risks can further institutional learning and knowledge sharing. Enhanced proactive management of possible threats will support the accomplished realization of building engineering projects.

The study suggests that KeNHA improve its risk management practices by reviewing and updating the evaluation frameworks regularly. Provide ongoing training for the assessors for them to retain the desired level of competency and precision when evaluating risks. Inclusion of some other stakeholders can also enrich the quality of assessments. In addition, reporting on the project decisions made based on the assessments would strengthen execution of the plans drawn, ensuring the risk analysis contributes meaningfully to project management.

The report suggests that KeNHA further allocate training resources on implementation of mitigation measures to staff. Focused internal capacity enhancement will enable a more proactive and agile approach to managing mitigation strategy risks. Moreover, while promoting standardized processes that can be adapted to numerous projects, flexibility regarding mitigation plan changeability needs to be sustained. Defining boundaries for modifying

protocols to address new challenges can strengthen organizational agility while improving consistency in managing project risks.

The report suggests that KeNHA incorporate more real-time data streams into its risk monitoring to enhance risk tracking, reporting, and response. Enhancements to existing tracking systems and their regular maintenance will also improve oversight of prevailing risks and their mitigation. Streamlined collaboration among stakeholders can accelerate responses to newer or evolving risks. These steps will bolster the organization's capacity to monitor risks proactively, ensure accountability, and seamlessly advance construction engineering projects.

5.4 Suggestions for Further Research

This research examined the impact of project risk management on construction engineering project delivery at KeNHA. Other private construction companies or government agencies may be studied later to explore the same practices for a comparative analysis. Furthermore, other scholars may study the impact of organizational culture, risk management practices, leadership style, or technological adoption on its efficacy. Longitudinal research could also focus on how risk management evolves over time. Further studies may further explore the complexities of risk management through quantitative lenses to capture deeply the issues, challenges, and best practices in a myriad of project contexts.

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APPENDIX I: INTRODUCTION LETTER

Management University of Africa

P. O Box 29677-00100,

Nairobi

Dear Respondent

RE: DATA COLLECTION

I am a Bachelor's Student at Management University of Africa. In partial fulfillment for the Bachelor's degree, I am currently conducting research on **“EFFECTS OF PROJECT RISK MANAGEMENT ON DELIVERY OF CONSTRUCTION ENGINEERING PROJECTS IN KENYA. A CASE STUDY OF KENYA NATIONAL HIGHWAYS AUTHORITY (KENHA)”**

Your organization has been chosen to become part of this research. I humbly ask you to aid in the collection of data through completion of the questionnaire. The provided data is to strictly be employed for purposes of academics and utmost confidentiality of the data upheld.

Thank you

Cordially,

ELIZABETH MWARANGU

APPENDIX II: QUESTIONNAIRE

1. What is your Gender?

Male

Female

2. What is your Age Bracket?

18 to 30

31 to 40

Above 41

3. What is your Highest Level of Education?

Certificate

Diploma

Undergraduate

Postgraduate

4. For how long have you worked in this Organization?

0 to 5 years

6 to 10 years

11 to 15 years

16 years and above

SECTION B: Study Variables

Use the Likert scale provided to respond to the following statements.

Where 5: Strongly Agree, 4: Agree, 3: Neutral, 2: Disagree and 1: Strongly Disagree

Variable	Statement	1	2	3	4	5
Risk identification	Risk identification is conducted frequently throughout the project lifecycle.					
	A variety of techniques are used to identify potential risks in projects.					
	Stakeholders are actively involved in the risk identification process.					
	Identified risks are well-documented and accessible for future reference.					
	Risk identification is effectively integrated into project planning activities.					
Risk assessment	A structured risk assessment framework is consistently applied in projects.					
	The potential impact of each identified risk is accurately assessed.					
	Risk assessments are reviewed regularly throughout the project.					
	Risk assessors have the required expertise and training.					
	Assessment outcomes are used to support project decision-making.					
Risk mitigation strategies	Risk mitigation strategies are effective in reducing the impact of risks.					
	The project team responds to risks in a timely manner.					
	Sufficient resources are allocated for implementing mitigation plans.					

	Staff are adequately trained on how to execute mitigation measures.					
	Mitigation strategies are flexible and adaptable to emerging project needs.					
Risk monitoring	Project risks are monitored frequently throughout execution.					
	An effective system is in place to track risks and mitigation progress.					
	The team responds quickly when new risks or changes are detected.					
	Real-time data is available to support risk monitoring efforts.					
	Risk-related communication among project stakeholders is timely and effective.					
Delivery of construction engineering projects	Most projects are completed within the scheduled time.					
	Projects adhere to the initially approved budget.					
	Delivered projects meet the expected quality standards.					
	Stakeholders' express satisfaction with project delivery outcomes.					
	Project delivery experiences minimal disruptions or delays.					

APPENDIX III: DATA COLLECTION LETTER



Date: 7th May 2025

TO WHOM IT MAY CONCERN

ELIZABETH MWARANGU BDS/32/00252/3/22

This letter serves to introduce the above named who is a **Bachelors of Arts in Development Studies (BDS)** student and is interested in carrying out research on **Effects of Project Risk Management on Delivery of Construction Engineering Projects in Kenya. A Case Study of Kenya National Highways Authority (KENHA).**

Any assistance accorded to her in pursuit of this study will be greatly appreciated.

Yours Sincerely,

Dr. Juster Nyaga

Dean, School of Management and Leadership

