

**MANAGEMENT OF CONTRACTING RISKS ON PERFORMANCE OF
CONSTRUCTION PROJECTS IN KILIFI COUNTY, KENYA**

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DECLARATION

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

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DEDICATION

I dedicate this research project to Gitahi's family and my fiancée Doreen Kendi for being a pillar of strength, supporting and loving me unconditionally. They have been a source of wisdom and inspiration in my quest of knowledge. May God bless you.

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ABBREVIATIONS/ACRONYMS

CGK	County Government of Kilifi
DOHS	Department of Occupation Health and Safety
GDP	Gross Domestic Product
ISO	International Standard Organization
KeRRA	Kenya Rural Roads Authority
KeNHA	Kenya National Highways Authority
KNBS	Kenya National Bureau of Statistics
KURA	Kenya Urban Roads Authority
KPI	Key Performance Indicators
NACOSTI	National Commission of Science Technology and Innovation
NCA	National Construction Authority
PMI	Project Management Institute
PPE	Personal Protective Equipment
SPSS	Statistical Package for Social Sciences
UK	United Kingdom
US	United States
EASH	European Agency for Safety and Health

OPERATIONAL DEFINITION OF TERMS

Construction project	Set of interrelated tasks in building works from planning stage, implementation, monitoring and evaluation phase and finally project closure, resulting in accomplishment of set objectives.
Contracting	Refers to a binding agreement between the project owner and general contractor to implement construction project on owner's behalf up to completion.
Performance	In context of construction project, it's an accomplishment of a given task measured against preset standards of construction time, construction cost, and client satisfaction.
Procurement	In context of construction projects, it's the process of selecting contractor, establishing payment terms, strategic vetting, selection, negotiations of contracts, and actual performance of contracted works.
Project owner	In context of construction project, it's an entity that initiates the construction project, contracts it out and also is the beneficiary of the output.
Tendering	Refers to the process by which bids are invited from interested contractors to carry out specific packages of construction work.
Contracting risk management	Refers to management of threats or opportunities resulting from contractors implementing construction projects
Financial risks management	Refers to management of threats or opportunities emanating increased construction costs during Project execution by contractor

Scheduling risks management

Refers to management of threats or opportunities emanating from delayed project completion by contractor

Technical risks management

Refers to management of threats or opportunities emanating from technical factors of a construction Project by contractor

Health & safety risks management

Refers to management of threats or opportunities affecting the health and safety of employees during construction process by contractor

ABSTRACT

Construction projects in Kenya are facing challenges in performance where there has been loss of funds due to increased construction cost, delayed project completion, compromised health and safety of employees and therefore expected economic growth has not been realized as envisaged. Although there is empirical evidence that construction is not performing to standards, there is absence of consensus in research on management of various contracting risks on performance of construction projects in Kenya. The main objective of this study was therefore to establish the influence management of contracting risks on performance of construction projects in Kenya. Specifically the study aimed to establish the influence of management of financial risks, technical risks, scheduling risks and health & safety risks. The study used four theories in understanding and justifying contracting risks namely; agency theory, theory of constraints contingency theory and prospect theory. The population of the study comprised of seventy three construction projects drawn from KURA, KERRA, KENHA and CGK. Stratified random sampling technique was used to select a sample into strata based on the technical staff from respective organization overseeing construction projects. Primary data was collected using a semi structured questionnaire self-administered to thirty six respondents in respective organizations. Cronbach's alpha will be used to determine the degree of data reliability with a coefficient of 0.70 and above implying the data was reliable. Quantitative data collected was analysed by use of descriptive statistics and inferential statistics. The study established a positive and significant relationship between management of financial risks, technical risks, scheduling risks and health and safety risks on project performance. According to findings there was a relationship between health & safety risks and performance (4.859, $p < 0.05$). Relationship between scheduling risks and performance was (2.458, $p < 0.05$). Relationship between technical risks and performance was (2.142, $p < 0.05$) while relationship between financial risks and performance was (4.577, $p < 0.05$). The found that financial risks was most significant with value of 82.3% followed by health & safety risks at 79.0% while technical risks rated at 71.1% and scheduling risks rated 62.2%. The study concludes that construction projects are exposed to the financial risks such as inflation, fluctuation of the currency, lack of solvency. The study concluded that technical risks usually come up during the execution phase of the project and early detection was necessary to manage the arising risk. The study concluded that management of scheduling risks was an effective technique to connect the risk information of project activities to the baseline schedule and enhance construction project success. The study concluded that many construction projects did not embrace health and safety and as a consequence performance of the project was affected. Accidents and poor working conditions have continued to affect the productivity of workers leading to poor performance. The study recommends that in order to manage financial risks of construction projects in Kilifi County solutions such as project costing, forecasting applications, expense management, and contract management should be implemented. On the management of technical risks the project owner should discuss the vision for the project deliverable, have a lay out of a day-to-day plan of action make the vision a reality, articulate, revisit and revise the objectives as necessary, openly share project related information and create an environment of trust and openness. On the management of scheduling risks, they should find out the completion time for a particular event and determine chances likely for completing a job and the risk of not completing a job in time. On the management of health and safety risks, they should have a planned and systematic approach to implementing the safety and health policy through an effective safety and health management system.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Construction projects are termed as unpredictable, heterogeneous and enormously complex. Management of construction risks is an important process which is beneficial when implemented in a systematic manner from conceptual to completion stages. European Union has faced construction related risks in form of health and safety. It's estimated that approximately 1300 people die in construction accidents every year. Globally, it's estimated that construction workers are more prone to death through accidents and twice as likely to be injured in comparison to workers in other occupations (EASH, 2012).

According to Gutman & Chattopadhyay (2015) Africa is being faced by huge infrastructural gap with an estimated annual investment of \$93 billion funding required from World Bank. However, construction projects are riddled with inefficiencies staggering from project delays and cost overruns. Chilese and Kikwasi (2014) notes that African construction projects risks emanate from lack of information and communication between stakeholders. The contractor and project owner usually lack coordinated communication mechanism which hinders effective risk management. Performance of construction projects has been rated in terms of completion time, meeting the set budget and technical requirement.

Construction sector in Kenya is growing at a very fast rate due to the growing middle class economy and demand for better infrastructure from the government both at the county and national level. Njoroge (2015) found out through the economic survey in year 2015 that building and construction industry contributed 4.8% of Kenya GDP which rose to Ksh 4.73 trillion in year 2013 showing growth of about 13.3%. Similarly, KNBS (2013) found out that there was increase in cement production and consumption in Kenya with an estimated

consumption in year 2006 being 1,765,800 tonnes while in year 2012 was 3,937,300 tonnes. There was also an increase of 9.6% in value of private and public buildings completed from year 2011 with Ksh 46.4 billion to year 2012 with Ksh 50.8 billion.

Despite remarkable construction growth, Kenya has experienced increase in number of incomplete projects and stalled projects. Statistics show that construction in Kenya rated poorly in delivery of expected outcome where 70% of construction projects evaluated delayed in time to approximately 50% while 50% of construction project started had cost overruns of approximately 20% (Nyangilo, 2012). Construction in housing projects in Nairobi County has also been reported to have underperformed with 48% of projects delayed in completion while 10% of these projects have completely stalled (Wanjau, 2015).

1.1.1 Contracting risks management

Bloomfield and Ahern (2011) define contracting risks as possibility of flawed contracting practices by contractors that influences performance of construction projects. According to NCA (2014), all public construction projects are procured to registered contractors by National Construction Authority. The registration is categorized into sizes of projects from NCA1 TO NCA8. Gacheru and Ndianga (2015) showed in Kenya there was an increase of quack contractors in the construction industry. Moreover, contractors were found to be corrupt whereby, they offered bribes in order to obtain compliance certificates.

Marques and Berg (2010) clearly portrays contracting risks whereby contractors were found to be opportunist in nature after winning contracts by relatively quoting lower prices during bidding, then renegotiating thereafter to high sums. Renegotiation of contracts after winning the bid at the public tender stage resulted to unfair practices by the contractor. The study concluded that risk is generally taken into account in a flawed way which resulted to contract failure. Jayasudha and Vidivelli (2016) identified and analysed major risks that influenced

successful completion of construction projects. Construction risks were categorized broadly into internal and external risks. Among the major internal risks identified to influence construction projects were: financial risks, health risks, technical risks and scheduling risks. Since all public projects in Kenya are contracted, the study will utilize these major risks as variables in determining their influence on performance of construction projects in Kenya.

David (2005) noted that construction industry with the uncertain economic times is facing financial risks that come from budget overruns and project scheduling changes among other factors. Financial risks in construction project have been found to influence construction performance. Several studies, for instance, Chism and Armstrong (2010); Fetene (2008); Auma (2014); Kariungi (2014) have looked at factors leading to financial risks on performance of construction project. The findings are however not without varying conclusions. Chism and Armstrong (2010) study in USA on project delivery strategy showed that project owners have realized the financial risks are affecting their projects and therefore they were rapidly reducing investing in large construction projects due to apprehension of costs. They found out that the financial risks are affecting the feasibility of construction projects.

Previous research, for instance, Azlan & Rahmat (2010) give conflicting findings on the influence of financial risks on performance of construction projects. Their research found out that cost as measure of project performance rated poorly contrasting most of the previous literatures that cost was an important factor in evaluating performance of a project. The poor performance was associated to variations during construction stage. Conflicting findings by previous scholars drives this study to build on this knowledge area.

Auma (2014) revealed that Kenya construction industry was experiencing delay in completion times where 4.6% to 53.4% of construction projects were delayed in time which

affected the performance ratings of a project. Schedule management was found to be among the major factors affecting performance of the construction project while other associated factors were cost of materials, quality management and leadership style. Nyangilo (2012) similarly found that construction projects in Kenya have escalated in terms of time at a magnitude exceeding 70% of the construction projects started were prone to delays to about 50% which heavily impacted the performance of public building projects. From the study the performance rate in terms of completion time stood at 11.1% over a period of year 2000 to year 2010.

Assaf and Al-Hejji (2009) also evaluated delays in construction projects where approximately 70% of projects were delayed and therefore did not meet the required timeline. Research findings also indicated that project delays ranged from 10%-30%. Azlan & Rahmat (2010) assessed the time as a factor influencing performance of a project. The findings showed that time occupied the lowest ranking among other factors with mean of 3.70. Other scholars found contrasting results where time was found as important component in evaluation of performance. The lack of consensus between these previous literatures and varying conclusions drives this study to build on this knowledge area.

Various scholarly investigations have looked at technical parameters that affect construction project performance. The findings however are not without varying conclusion. Auma (2014) found compelling findings that 81.82% of respondents in construction sector agreed that the nature of materials and apparatus utilized affect the performance in terms of technical aspects of construction projects. Opinion of other 72.73% of respondents showed that competence of project personnel had influence on performance. The study concluded that conformance to specified standard of materials and qualification of staff influence the project.

Githenya and Ngugi (2014) argued that technical risks have been on the rise in the Kenyan housing projects where buildings experienced technical failures resulting to damage of properties and sometimes let to fatalities. The study found there is a positive relationship between project team competence and the performance of construction project. The element of competence of the team was found to affect the implementation of construction projects hence affecting project performance in technical aspects.

Shaban (2008) research showed that important factors that affect the projects were availability of experienced person, qualified individuals, quality of equipment and use of quality raw materials. All these factors encompass the technical risks affecting the performance of a project. European Commission (2012) study on understanding and monitoring infrastructural costs identified incompetent personnel as one of the probable cause of project failures.

Despite many studies on the technical parameters influencing project performance, there is no consistency of results in research and hence to build on this knowledge area, the study consolidates all the technical risks experienced in a construction project to determine their influence on the projects.

Health and safety risks emanates from hazards that places individuals to harm from injury or death (Al Hajeri, 2011). Phoya (2012) study on construction projects in Tanzania revealed that high fall accidents caused higher death rate as compared to other accidents. The cause of accident was attributed to ignorance and carelessness of the contractor. Findings further revealed that procurement system was flawed and health & safety package was not included during tendering stage and hence was largely ignored by most contractors. Available data of accidents in construction sector from Directorate of Occupational Health and Safety (DOHS) is still not reliable because most accidents go unreported by rogue contractors (DOHS, 2011).

Similar research by Al Hajeri (2011) found that accident reporting procedures are hardly followed in the construction sector.

Scholars such as Phoya (2012); Lamka (2015); Kemei, Kaluli and Kabubo (2015); Al Hajeri (2011) have found that in construction projects there exists health and safety risks which influence performance of construction projects. However, findings by DOHSS in Kenya show that there is unreliable data on accidents reported in construction sector in Kenya (DOHSS, 2011). Therefore, this necessitates further studies to address inadequate data available concerning health and safety risks in construction projects in Kenya.

1.1.2 Performance of Construction projects

Ahmad, Ismail, Nasid & Zainab, (2009) describes project performance as attainment of projected outcome with set goals which intrinsically influence the project. Enhassi (2009) found out that success of construction project is dependent on their performance in all the phases of construction. Among the factors that were found to affect the projects in construction sector were: poor quality of available equipment and raw materials, high costs of material prices, lack of competent staff and low level of leadership skills.

Construction industry is evolving dynamically whereby different clients have over time used convectional performance measurement methods of time, quality and cost whereas others have embraced non-convectional evaluation methods such as productivity, environment, health and safety. Therefore, a definitive measurement method which covers all aspects of performance is still required to satisfy wide variety of clients (Bhatti, 2013). Azlan and Rahmat (2010) identified six parameters of measuring project performance as cost performance, time performance, quality performance, client satisfaction, functionality and health & safety. Gyadu (2009) asserts that relevant indicators need to be identified before start of the project to provide a framework within which the project will be evaluated. The

framework will provide a platform where project performance will reflect the needs of clients and contractors. This study therefore seeks to measure performance by utilizing the following three indicators; construction time, construction cost and client satisfaction which have consistently been utilized by various scholars and given satisfactory results.

1.1.3 Construction projects in Kilifi County

Kilifi County is among the coastal counties in Kenya with a population of approximately one million one hundred thousand people (KNBS 2013). The county is in coast region and neighbouring Tana River County to the North, Taita Taveta County to the West, Mombasa and Kwale County to the south and Indian Ocean to the East. The county has seven sub counties with Malindi and Kilifi North sub counties holding the largest population. The county headquarters is in Kilifi Township. Public building and road construction projects in Kilifi County have significantly grown within the last 5 years. The department of Roads, Transport and Public works and department of Housing, Physical planning and Urban development have spent over 3 Billion shillings in public roads and housing. Additionally, the national government through KERRA, KURA and KENHA have commissioned projects worth over 5 billion shillings in Kilifi County from Yr. 2013 (KNBS, 2013).

The county has experienced challenges in performance of construction projects with some of the projects such as construction of Mtwapa bus park with estimated project costs of Ksh. 150 million escalating in construction time to over 2 years. Construction of sub county administrator's office has also experienced challenges and projects have not been completed up to date (CGK, 2017). Demand for construction projects are in the rise in the county due to funding from both County and National government.

1.2 Statement of the problem

This study focuses on construction project performance which according to research the industry has contributed 4.8% of Kenya GDP. The budget allocation for infrastructural development in construction projects in Kenya has tremendously increased in past five years (Njoroge, 2015). Contracting in public construction projects in Kenya is practiced virtually in all the projects (NCA, 2014). The expectation of project owners is timely completion of construction projects while meeting the required standards and within the set budgets. However, performance of construction projects has been dismal. Various authors have found that contractors acting on behalf of project owners behaved opportunistically and were not able to deliver projects on time, the projects had cost overruns, project were not standard and experienced health and safety issues during implementation. As a consequence there has been loss of funds due to increased construction cost, compromised health and safety of employees in construction, and expected economic growth has not been realized (Auma, 2014; Kihoro & Waiganjo, 2015; Nyangilo, 2012; Phoya, 2012).

Numerous research studies on performance of construction projects have suggested that financial risk management have positive influence on construction projects. Contractor administering the projects are faced by cash flow problems, cost overruns and general financial difficulties (Auma, 2014; Kariungi, 2014; Fetene, 2008). However, Azlan and Rahmat (2010) found cost a measure used in determining the financial status of a contractor ranked last in measurement of performance. They found poor performance of project was not as a result of contractor financial constraints but complexity of construction projects. The resulting incongruence drives this research to fill this gap.

It's apparent that technical risks are experienced in construction projects which have affected project performance. Various authors such as (Wambui et al., 2015; Kihoro & Waiganjo,

2015; Wambugu, 2013) found several technical factors such as competence of project team, level of workmanship, quality of equipment and experience of workforce influenced performance of construction projects. All the above factors were studied independently and therefore this study will consolidate all these factors together to determine their influence on performance of construction projects.

Most of the construction projects experience scheduling risks emanating from the contractors not meeting the project timelines and incomplete projects which eventually affected the project performance. Nyangilo (2012) found that approximately 70% of initiated projects surged in time an extent of 50% with performance in terms of scheduling rating at 11.1%. Similarly Enhassi, Al-Najjar & Kumaraswamy, (2009) found that construction projects experienced time overrun of 10%-30% due to contractors weakness in understanding contract conditions. However, Azlan and Rahmat (2010) found contrasting findings that time a key component in management of scheduling risks ranked last in factors influencing project performance. The contrasting findings and inconsistencies in findings by these researchers provide a research gap to build on this knowledge area.

Studies by various authors such as (Phoya, 2012; Al Hajeri, 2011; Lamka, 2015) shows that health and safety risks are prevalent in construction projects. The unsatisfactory management of health and safety affects workers effort which lowers overall performance of a project. Kemei, Kaluli & Kabubo (2015) found that accidents and fatality rate in construction sector are high where 64 fatalities per every 100,000 workers are reported in Kenya (Kemei, Kaluli & Kabubo, 2015). However, reports from DOHS indicate that data obtained on accidents in construction in Kenya is unreliable since most accidents go unreported (DOHS, 2011). This therefore necessitates further research to address inadequate data on health and safety risks in construction projects.

Although there is empirical evidence that construction industry was not performing to the expected standards, there is absence of consensus in research on influence of management of various risks on the construction project performance in Kenya. Therefore, this study will provide new areas in management of financial risks, technical risks, scheduling risks and health & safety risks that have major influence in construction project performance. This study therefore sought to establish the influence of management of contracting risks on performance of construction projects in Kilifi County, Kenya.

1.3 Objective of the study

1.3.1 General objective

The general objective was to establish influence of management of contracting risks on the performance of construction projects in Kilifi County, Kenya.

1.3.2 Specific objectives

The study was guided by the following specific objectives:

- i. To establish the influence of management of financial risks in contracting on the performance of construction projects in Kilifi County, Kenya.
- ii. To establish the influence of management of technical risks in contracting on the performance of construction projects in Kilifi County, Kenya.
- iii. To establish the influence of management of scheduling risks in contracting on the performance of construction projects in Kilifi County, Kenya.
- iv. To establish the influence of management of health & safety risks in contracting on the performance of construction projects in Kilifi County, Kenya.

1.4 Research Questions

The study was guided by the following research questions:

- i. What is the influence of management of financial risks in contracting and performance of construction projects in Kilifi County, Kenya?
- ii. What is the influence of management of technical risks in contracting and performance of construction projects in Kilifi County, Kenya?
- iii. What is the influence of management of scheduling risks in contracting and performance of construction projects in Kilifi County, Kenya?
- iv. What is the influence of management of health & safety risks in contracting and performance of construction projects in Kilifi County, Kenya?

1.5 Significance of the study

The study will be beneficial to the construction industry professionals namely; architects, quantity surveyors, engineers, project managers and site agents. The professionals will be able to understand the risks associated with contracting in construction projects. The study will also assist the project owner management team select suitable contractors' and also monitor their performance effectively during project execution phase.

The policy makers in the construction industry will be able to know the influence that contractor play towards the performance of construction projects. The NCA will be able to guide in making necessary regulation to engage contractors as a part of the construction team in training and registration. This study will therefore lead to development of a better framework and development of better policies which will govern the intake of contractors in construction projects.

The study will also benefit project management scholars and other academicians as a source of secondary data while encouraging further research in contracting risks on performance of construction projects. The study will also enable scholars to develop theory in risk analysis of the construction projects.

1.6 Scope of Study

This project covered construction projects in Kilifi County, Kenya in building and road construction projects. The research was inclined on risk management knowledge area, specifically covering contracting risks namely; financial risks, scheduling risks, technical risks and health & safety risks. The research intended to measure construction time, construction cost and level of client satisfaction in public construction projects in Kenya which was wholly or partially contracted. To effectively capture management of contracting risks in contracted projects data was collected from Yr. 2014 to Yr. 2018. The project sought views from construction industry professionals working within Kilifi County, Kenya.

1.7 Limitation of the study

It was anticipated that this study would face limitations such as inadequate documented data about the performance of construction projects in Kilifi County and therefore, to address this, the researcher sought additional information from KNBS, NCA and Ministry of Transport, Infrastructure, Housing and Urban Development. The researcher also anticipated that some of the respondents could be unwilling to give information due to fear of reprisal from their seniors and therefore this was handled by indicating through a letter by university and NACOSTI indicating the purpose of the study. The researcher also anticipated lack of openness due to confidentiality and secrecy experienced in most public institution that usually restricted releasing vital information. The researcher reassured the respondents that the research is purely for academic reasons.

1.8 Organization of the study

This study was organized in five chapters. Chapter one constitutes the background of the study, statement of the problem, objectives, significance, scope, limitations and organization of the study. Chapter two comprises of the theoretical literature review, empirical literature

review, summary of literature review and research gaps and conceptual framework. Chapter three encompasses the methodology which presents the research design, target population, sampling design, research instrument, data collection procedure, data analysis and ethical considerations. Chapter four constitutes the research findings and discussion which presents the response rate, background information, descriptive statistics, inferential statistics and analysis of qualitative data. Chapter five presents the summary, conclusion, recommendations for policy and practice, and recommendations for further study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The following section outlines four theories namely; Agency theory, Theory of constraints, Prospect theory, and Contingency theory that will be used in understanding and justifying contracting risks management in construction projects. Additionally, the study reviews literature done by other scholars on study objectives.

2.2 Theoretical framework

2.2.1 Agency theory

Agency theory finds its roots from the evolution from economic theory of agency which outlines agency as a universal principle and not just a theory of a firm (Ross, 1972). In 1973 Ross and Mitnick postulated that agency theory which states that agency theory is a relationship between two parties where principal (project owner) engages an agent (contractor) to act on his behalf and has all rights to perform as per the contract requirements (Mitnick, 1973). Agency theory is relevant in construction projects because of its simplistic nature of defining the relationship between the principal and agent. There is increase in risks when an agent is engaged in contract by the project owner. This is as a result of increased complexities in execution of project work (Jager, 2008).

Agency theory has been utilized to show the challenges the project owner referred as a principal experience when there is asymmetrical flow of information from the agent to principal (Sheig, 2008). The hidden information from agent overseeing the actual implementation of the project causes the moral hazard risk to the main contractor and the client. By the agent trying to maximize his gains from a construction project he may cause damage to the principal. Emmitt and Gorse (2007) argued that participant in a project mainly

in agency relationship needs to bring in all the relevant information concerning the project in order for the project to become successful. Winch (2010) also asserts that the contract can be opportunist and embezzle the funds allocated for execution of the project before the project owner realizes. After discovery of the fictitious deals it can be very difficult for the project owner to withdraw the contract which can be detrimental to the project.

Bowen et al., (2007) utilized agency theory to show that construction projects experienced malpractices orchestrated by agent such as corruption, dishonesty and unfair practices affecting project performance. The agent (contractor) holds the client at ransom during project execution from the moment contract is signed up to the point the project is completed and handed over. This theory is relevant because it envisage all the risks during the agency relationship during the contract period and assist the main contractor and client plan ahead to ensure completion of the project.

The study proposed to use the agency theory to exhibit how the contractor (agent) influences the performance of the project when complexities arise between the contractor and project owner. From this theory the study will show the influence the contractor acting as an agent has on the construction project. The study used agency theory as a risk management tool to limit principal exposure and enable better management of contractors to ensure they perform to required standards. This was the main theory that this study is anchored on to show the interconnection of the project owner and the contractor.

2.2.2 Theory of Constraints

Theory of constraints was postulated by Eliyahu Goldratt and first published in the 1984 book *The Goal*. The theory focused on philosophy used in managing the constraints involved in any operations for maximizing the output of operations (Goldratt, 1984). The theory was developed to assist organizations that are faced by various constraints that hinder

performance. The theory interlinks all the processes that influence organization performance by focusing on weakest points which are bottlenecks in the organization. The theory is composed of three concepts which are related namely logistics, performance measurement process and logical thinking.

The theory has been criticized by various authors who find it only applicable in the manufacturing sector which is more cyclic in nature as compared to construction projects and therefore to manage these constraints is more predictable. Additionally, the theory was criticized by being too complicated and just a logical framework because it's too detailed and rigid which can act as a distractor from more embedded learning (Trietsch, 2005). Moreover, the theory has not been empirically developed and tested and therefore it is just a general theory (Patrick, 2004).

On contrary to the above criticism, construction industry has utilized theory of constraint in prioritizing activities in the project that improves the performance of a project in terms of increased profit, improved capacity, reduced lead times and fast improvement of project (Yang, 2003). Theory of constraints consists of five steps that are sequential and concentrates efforts towards achieving required performance. The first step is process of continuous improvements involving the identification system constraints which can be related to this study as contracting risks. The second step is decision on how to exploit the system constraint while the third step is subordinate everything else in foresaid decision. The fourth step is increasing productivity of a constraint towards achievement of project objective if the constraint is overcome as a result of continuous improvement the loop starts again (Trojanowska & Dostatni, 2017). The concept of performance measurement process in this theory was utilized to show how the constraints of contracting risks influenced the project time, project cost and client satisfaction. The theory was relevant to this study in

understanding and managing constraints referred in this study as contracting risks which positively affects performance of construction projects.

2.2.3 Contingency theory

Fred Fieldler postulated the contingency theory in year 1964 by utilizing universal principles of past experiences and applying them in present projects. Contingency theory states that there is no appropriate method of managing an institution and therefore management method which works in some circumstances may not work in others (Fieldler, 1964). The contingency model has been empirically proven to show analysis of individual construction projects and their unique perspectives and therefore to manage them specific considerations needs to be made (Gong and Tse, 2009). Shafritz, Jay & Steven (1992) found contingency theory as a theory which is situational instead of absolute and therefore should be utilized appropriately in different environments. Contingency theory has been criticized on the grounds that it lacks clarity on its theoretical statement with word such as appropriate deemed ambiguous (Schoonhoven, 1981). Additionally other theorists criticize it for failing to explain the model that can be empirically developed and also fails to provide a solution in case there is situational mismatch in the workplace (Northhouse, 2007).

Contingency theory was relevant to this study since construction industry environment is dynamic in nature and therefore organizations managing the projects need to develop critical strategies in risk management. Moreover, construction projects are unique in nature and therefore should be managed according to their specific characteristics and environment (Longenecker and Pringle, 1978). Panthi, Ahmed & Ogunlana (2009) reinforces this by portraying that because of the difficulties to evaluate the levels of risks in construction projects it has become difficult to apply risk management activities appropriately. Changes in construction industry environment impacts on the performance indicators of a project

namely; construction cost, construction time and clients satisfaction. Utilizing contingency theory ensures that mitigating measures are embraced through organizational learning which uses past experience as a model for current situations.

Figueiredo and Kitson (2009) research showed contingency theory as a cost element of an estimate to cover the uncertainty in construction projects. In case unforeseen event occurred, additional costs incurred could influence project scope resulting to financial risks being experienced. Consideration should be put such that all the risks are covered but they don't exceed the usefulness of the project. Therefore, contingency estimation could be considered as one part of the risk management process to cover the uncertainties but not exceed on the needs of the project. The knowledge of contingency theory will be utilized in this study to shield the client in case the contractor is unable to perform to the required standards due to unforeseen circumstances.

2.2.4 Prospect Theory

The theory was formulated in 1979 by Daniel Kahneman and Amos Tversky which in its original form showed behaviour of decision making between two alternatives under conditions of risk. Prospect theory states that losses and gains are evaluated in different scenarios and therefore people takes cognizance of gains instead of losses (Tversky & Kahneman, 1992). Prospect theory shows that individuals show mixed traits of risk seeking and risk averting behaviour based on a reference point. Similarly, the effect of reference dependence is used to show that people hold more value to what they have compared to what they intend to have in a deal (Knetsch, 1989).

Chen, Zhang, Liu & Hu, (2015) applied prospect theory to determine the level of risk during bidding at tendering stage to select the suitable contractor. They noted that construction projects involved large amount of cash and use of behavioural economics and more precisely

prospect theory was essential in understanding how the evaluators make the bidding decisions to choose the most suitable bidder in construction project. Therefore the prospect theory was relevant to this study in trying to establish how the project owner selects the contractor after bidding and how the selection criteria reduce the envisaged contracting risks.

Ahn, Lee & Steel., (2014) shows that construction projects can utilize the prospect theory through determining social norms on typical construction project problems such as absence of behaviour and other small decisions. The small decisions of selecting the contractors to perform small works may not seem to matter but when aggregated together they present a non-negligible amount compared to the project budgets which may lead to project failure. This theory will be utilized in pointing out small but necessary details that are risky in nature that the main contractor should not avoid during selection. Tversky and Kahneman (1992) also utilized prospect theory to show that individuals are either risk averse or risk takers and therefore the results are either above or below the reference point.

Similarly, the theory was utilized in this study to show the main contractor has the responsibility of making day-to-day decisions on the construction projects by evaluating the project in the two scenarios of risk (risk seeking & risk averse). Those decisions will have a significant influence on the cost and schedule of a project. The application of prospect theory in this study is derived from common decisions made during the selection and supervision of contractors. This will help the project owner to prevent losses generated by illogical behavioural patterns emanating from the contractor. The project owner will also utilize prospect theory in the early detection of contracting problems and correct them accordingly to avoid a negligible loss of money in the construction projects.

2.3 Empirical literature review

This chapter discusses the literature related to management of contracting risks. The chapter majors on the discussion of independent research objectives as outlined and as researched by other scholars. The review also looked at the other factors identified by different scholars as influencing construction project performance.

2.3.1 Financial risks management and performance of construction projects

Kariungi (2014) conducted a study to determine the factors that influence timely completion of power projects within Thika region. Descriptive and exploratory research design were adopted, the target population was project engineers, supervisors and technical staff working in the project. The study instrument was questionnaire, interviews and observation to collect data. The data was analysed using both descriptive and inferential statistics. The research findings showed there was a strong relationship through a value of 0.738 between budgetary constraints and project performance. This research showed that cash flow problems significantly affected the performance of construction of power projects because availability of materials was dependent on the contractor having sufficient funds.

Auma (2014) conducted a study on factors affecting performance of construction in Kenya. A quantitative and descriptive research design was adopted for the study with a population comprising building construction projects in Kenya, from which representative sample of 32 low rise building was drawn. Questionnaire was utilized in the study to collect data which was composed of likert type of questions. The data was analysed using both descriptive and inferential statistics. There was empirical evidence that out of 40.91% of projects escalated in cost to approximately 20%, while 54.55% of projects had escalated in cost with a magnitude of 21% to 50% and 4.55% of projects had a cost overrun with a magnitude of more than 50%.

It's apparent that management of financial risks consequently affected the construction project performance.

Abdullah et al., (2010) study on factors affecting construction cost performance in project management projects. Data collection was collected through field studies, interviews and surveys. A total of 36 respondents participated in interviews and questionnaire survey process while data was analysed using both descriptive and inferential statistics. Research findings showed that cash flow and budgetary difficulties faced by contractors was the second dominant factor which influence construction projects. Research findings indicated that project are rarely completed within the estimated budget. It is apparent that cash flow problems dully influence the construction projects at great margins.

KPMG (2010) in an article on project delivery strategy noted that making a project successful by meeting the project deliverables and not about sharing the risks in a large capital project. The research showed that most project owners had sparse industry experience in areas related to financial risk management and there was a need for crystallization of project to ensure good performance. It was found that cost pressures can cause the contractor to make sub optimal construction choices which affects the overall performance of a construction project. Cost was ranked as the greatest risk and major determinant in large capital construction projects and therefore the project owner requires balanced consideration in selection of appropriate contractor.

Rahmat and Ali (2010) studied performance measurement of construction projects managed by ISO certified contractors in Malaysia. The study instrument was a questionnaire which had 30 respondents working in these construction projects. The research found out that cost as measure of project performance ranked last with mean value of 3.70. The findings deviate from other literatures in the same field where cost ranked highly. The poor ranking of cost

was associated to intricate nature of projects in construction sector which resulted to some changes during execution phase which therefore provides a research gap due to incongruences in findings by various authors.

Fetene (2008) studied causes and effects of cost overrun on public building construction projects in Ethiopia. It employed descriptive and exploratory research design and data collection was by questionnaire from project owners, contractors and consultants. The research found out that approximately 96% of building construction projects experienced cost overrun. The findings showed that the rate of cost overrun had a staggering figure of about 126% of the projected costs. Inaccurate cost estimate and unclear project specification were found to be causative agents of cost overruns in the projects which ultimately affected the project owner.

David (2005) article on checklist for prequalifying subcontractors observed that construction industry with the uncertain economic times was facing financial risks that emanated from budget overruns and project scheduling changes among other factors. He observed that the lowest bidders do not reciprocate to be of the lowest cost. Therefore to manage financial risk there was need to vet the competence of contractor's. David (2005) recommended that there was need to understand contractor or subcontractor financial strength by asking two years financial statements or tax returns.

2.3.2 Technical risks management and performance of construction projects

Wambui, Ombui and Kagiri (2015) studied factors affecting completion of road construction projects in Nairobi City County. The study applied a descriptive research design and comprised population of 1200 financial and technical personnel. Both quantitative and qualitative data was analysed. The study identified project manager competence as a major factor affecting completion of road construction. The qualification and experience of project

team attained a mean score of 3.6 out of 5 therefore showing it was influencing completion of a project. Other factors that other factors such as project equipment, project funds and project technology were also found to affect project performance. The study showed that competence of the project team contributes greatly in construction industry performance and there was need for training of employees to improve performance.

Kihoro and Waiganjo (2015) studied factors affecting performance of projects in the construction industry in Kenya. A cross sectional survey design was used and main study instrument used was questionnaire. The population consisted of 200 property managers of gated community development projects. The study focused on three aspects of performance namely timely completion, cost management as well as quality. The study findings established that project team competence and performance of construction project are highly linked which was essential in project performance which indicated a positive correlation of 0.816. Planning stage was found to be a very crucial stage where project design and required workforce are determined which eventually influences the construction project performance.

Githenya and Ngugi (2014) studied the assessment of the determinants of implementation of housing projects in Kenya. The study employed descriptive study where the main study instrument was a questionnaire. The data was analysed using both descriptive and inferential statistics. The study found housing sector experienced technical failures where building collapsed sometimes damaging more property and causing fatalities, furthermore some remained unoccupied due to low standards of construction. The study concluded that there is a positive relationship between project team competence and the performance of construction project. The element of competence of project team was found to affect the implementation of construction projects which cascaded to influence overall project performance. It was recommended that assigning well trained workers specific tasks improved the performance of

construction project significantly. The study researched on only four factors which showed the level of influence at 69%. It is therefore presumed that other technical factors not studied took the remaining share of 31%.

Wambugu (2013) studied determinant of successful completion of rural electrification projects in Kenya. The study used adopted descriptive survey techniques and research instrument was a questionnaire. The population of the study constituted 96 management employees working with Rural Electrification Authority. The study found that there was inadequate supply of quality of materials which as a consequence affected the performance of construction project. Moreover, the coordination of the contractors and subcontractors were found to delay the project completion. Projects that were not adequately inspected by project owner were found to have poor workmanship and eventually failed to meet the required standards.

Muchungu (2012) studied contribution of human factors in the performance of construction projects in Kenya: a case study of construction project team in Nairobi. The study adopted both qualitative and quantitative research design methods. The data collection instrument was interview and questionnaire method and population was 120 firms in construction industry. The study found out that construction projects in Kenya has cost overruns, did not meet the schedule and were of poor technical standards in all parts of the country. The research findings indicated that 83% of construction companies considered education and training of staff as a necessity in order to achieve the required performance. Defects and quality of workmanship are majorly attributed to the project team hired by contractor and not to consultant and therefore contractor implementation greatly influenced a construction project.

Shaban (2008) assessed factors affecting performance of construction projects in Gaza Strip and adopted a descriptive survey technique. Questionnaire was used as main study instrument

to 120 respondents. The research found important factors that affect the projects were availability of experienced person, qualified individuals, machinery and use of quality raw materials. All these factors encompass the technical risks affecting the performance of a project. Training of human resources ranked second in factors affecting performance showing a positive correlation with a value of 0.835 while conformance to specification had a value of 0.822. It is apparent that performance in construction projects is affected by many technical factors emanating from contractor and therefore there was need to identify and manage all the factors to achieve performance.

2.3.3 Scheduling risks management and performance of construction projects

Wanjau (2015) studied factors influencing completion of building projects in Kenya. The study utilized descriptive research design and semi structured questionnaire as study instrument. The study consisted of a population of 136 managers from Ministry of Land, Housing and Urban Development. The study findings indicated that project was considered successful if it was completed within the stipulated time. The coordination of project owner and contractor in management of project timeline was found to greatly influence the completion of a project. Moreover, risks associated to schedules and their allocation is significant in completion of building projects.

Auma (2014) investigated factors affecting the performance of construction projects in Kenya. A quantitative and descriptive research design was adopted for the study with a population comprising building construction projects in Kenya, from which representative sample of 32 low rise building was drawn. The main study instrument was a questionnaire data was analysed using both descriptive and inferential statistics. The study findings indicated through the opinions of the respondents that 68.2% concurred that estimated time of a project has an impact on performance while 4.5% didn't concur that time influenced

performance. Pre-planning efforts using critical path method to present planning and scheduling of the project were necessary ensuring timely performance of projects.

Githenya and Ngugi (2014) studied the assessment of the determinants of implementation of housing projects in Kenya. The study employed descriptive study where the main study instrument was a questionnaire. The data was analysed using both descriptive and inferential statistics. The researchers noted time was a key factor in determining completion of building projects. They recommended that in order to achieve the expected performance levels utilizing milestones to check on the progress of a project was necessary. Management of project timelines by contractor implementing the project greatly influenced the performance of construction project.

Nyangilo (2012) studied assessment of the organization structure and leadership effects on construction projects performance in Kenya. The study used adopted descriptive survey techniques to examine performance of public buildings projects. The study covered projects within Nairobi region with contract figures of Ksh 100,000,000 and above between years 2000 and 2010. The data was analysed using descriptive and inferential statistics showed that performance of construction in Kenya has escalated in terms of cost and time whereby approximately 70% of the projects started extended their project period to over 50%. From the study the performance rate in terms of completion time stood at 11.1% over a period of year 2000 to yr 2010. From the study it was found there was a gap in risk management in order to improve on timely delivery of projects.

Olatunji (2010) studied influences of construction project delivery time and utilized both descriptive and correlation research design. There was a positive correlation of 0.86 between time delivery by contractor and completion of project. The research found that project delays emanated from inability of the contractor's technical personnel to competently handle the

project from start to finish. However, it was found out that most of projects are eventually completed precisely to required specification, although most never met required timeline which led to many incomplete projects in South Africa on targeted timelines. It's apparent that most of the projects are completed although not within the required timelines.

Ali and Rahmat (2010) assessed the time as a factor influencing performance of a project. Questionnaire was used as main study instrument which involved 30 respondents of senior staff from the construction companies. The research findings showed that time occupied the lowest ranking among other factors with mean value of 3.70. Those findings conflicted most of previous literatures where time was ranked a most important factor. The contradicting results were associated with client being concerned with functionality more than time.

Enhassi, Al-Najjar & Kumaraswamy (2009) studied delays and cost overruns in the construction projects in the Gaza strip. The study utilized descriptive research design and used questionnaire as study instrument. The study found that project delays emanated from the contractors weakness in understanding the contract conditions with time overrun being 10%-30%. Major elements that resulted in delays consisted of quality of materials, closure at border points and delay in delivery of material to site by contractor's suppliers. Masterman (2002) article on Introduction to building procurement system revealed that performance in construction projects is less than expected. The researcher found the construction sector has a poor reputation in the society while input of the contractors was below average which affects the project in many aspects. Use of unconventional procurement system during hiring of a contractor was attributed to project delays and as a consequence inability of the project to achieve higher level of project success.

2.3.4 Health & safety risks management and performance of construction projects

Lamka (2015) studied Investigation of factors influencing construction site labour productivity in Nairobi County. The study adopted explanatory research design method and used a population of 140 contractors in Nairobi. Research findings indicated that unsatisfactory work environment affects workers effort towards work and consequently lowers overall performance. Construction industry is leading in injuries recorded and lost work days due to injuries. Workers in the construction sector lacked basic training skills in health and safety and resulting to unforeseen accidents which affected productivity. The accidents were attributed to constantly changing workplace environment due to change of site at relatively short time.

Kemei, Kaluli and Kabubo (2015) studied Assessment of Occupational Safety and Health in Construction Sites in Nairobi. The study adopted a questionnaire survey which consisted of forty one construction sites sampled from 9 regions in Nairobi City. The study found that Kenya construction industry rated poorly whereby 64 fatalities were reported per every one hundred thousand employees compared to U.K which experienced 0.44 casualties in every one hundred thousand workers while South Africa experienced a staggering figure of 25.5 casualties per every one hundred thousand workers annually. The main causative agents identified were reluctance to provide resources for safety which accounted for 12%, lack of training at 12%, lack of enforcement of regulation at 12% and poor safety consciousness among workers at 11% and lack of strict operational procedures at 11%. The researchers not only found that majority of contractors don't have specific for health and safety budget and allocation was meager one percent of project budget but was in dire need of training in health and safety.

Phoya (2012) studied health and safety risk management in building construction sites in Tanzania. The study adopted a descriptive and exploratory research design. The study utilized questionnaire and interview as study instrument. The study revealed that accident from high falls in buildings was high as compared to other areas in construction. The cause of accident was attributed to ignorance and carelessness of the contractor. Findings further revealed that procurement system was flawed and health & safety is not among the conditions needed to be granted tender and hence was largely ignored by most contractors. Responsibility of construction site health and safety lied on the main contractor and therefore was supposed to conduct health and safety training although the funds were not allocated in the tender sum. Approximately 75% of workers did not have any form of training which resulted to 29% of major accidents. The study recommended that it was paramount to take in consideration of health and safety risks in formative stages of a project to ensure project success.

Al Hajeri (2011) studied Health and safety in the construction industry in United Arab Emirates. This study utilized research questionnaire and interviews to 70 construction workers. Findings indicated that accident reporting procedures are hardly followed in the construction sector. Results from senior technical personnel interviewed showed that 86% of respondents indicated that they did not adhere to accident reporting procedures and a percentage of 83% confessed they did not record accidents, while only 54% carried out follow up action after accident happening. The research also found that health and safety costs are not incorporated in tender sums and therefore difficult to counter during project execution.

2.4 Summary of literature and Research gaps

Table 2.1: Summary of Literature and Research Gaps

Author	Study Focus	Key Findings	Research Gaps
Kariungi (2014)	Factors that influence timely completion of power projects within Thika	There was a strong positive correlation between budgetary constraints and project performance	The study area was in power projects in Thika while this study will be in field of construction in Kilifi
Auma (2014)	Factors affecting performance of construction projects in Kenya: Survey of low rise buildings in Nairobi CBD	The study found out that 72.73% of respondents agreed that qualification and experience of staffs affected the performance of construction projects. Management of financial risks was paramount in the success of a project.	The study focused on low rise buildings in Nairobi while this study will cover both roads and buildings construction in Kilifi County.
Abdullah et al., (2010)	Factors affecting construction cost performance in project management projects	Financial constraints affects construction projects and therefore projects are rarely completed within budget	The study mainly focused on large construction projects in Malaysia while this study will focus on both building and road construction projects in Kilifi County.
Wambui et al., (2015)	Factors affecting completion of road construction projects in Nairobi County	Found that the competence of project team contributes greatly in construction industry performance and there was need for training of employees to improve performance.	The study was carried out in Nairobi on staffs working at KURA while this study will be conducted in Kilifi County on KURA, KERRA, CGK and KENHA staff
Shaban (2008)	Factors affecting performance of construction projects in Gaza strip	Construction projects are majorly affected by competence of the technical personnel, machineries, leadership skills of project	Focused only on technical factors affecting performance in United Arab Emirates while this study will focus on

		manager and quality of raw material at site.	additional factors such as financial risks and scheduling risks. There is also a contextual gap since this study will be carried in Kenya
Kihoro and Waiganjo (2015)	Factors affecting performance in construction projects in Kenya	Planning stage was very crucial where project design and required workforce are determined which eventually influences the construction project performance	Focused on only on technical factors affecting construction projects in Kenya while this study will cover management of technical risks
Phoya (2012)	Health and Safety risk management in construction sites in Tanzania	Procurement system was flawed whereby issues on health and safety were not among factors considered in awarding contracts. Contractors did not conducted health and safety training.	Dealt with aspects of health and safety risks management in construction in Tanzania while this study will focus health and safety risks management in construction projects in Kenya
Kemei, Kaluli and Kabubo (2015)	Assessment of Occupational Safety and Health in Construction sites in Nairobi	Majority of contractors did not have health and safety budget and allocation was meager 1% of project budget.	Study only focused on health and safety risks while this study will have additional constructs such as financial risks, scheduling risks and technical risks influencing performance of construction projects in Kilifi County.
Al Hajeri (2011)	Health and Safety in construction industry in United Arab Emirates	Contractors tend not to include health and safety costs in their tenders therefore	Focused on health and safety risks in United Arab Emirates while this

		reducing their ability to counter hazards in health and safety.	study will be based in Kenya hence a contextual gap.
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2.1 Conceptual framework

Kothari (2004) defined conceptual framework as compilation of ideas which shows the direction of a study. The framework will help in illustrating causal relationship between independent and dependent variable. The study independent variables are financial risks management, technical risks management, scheduling risks management, health and safety risks management. The study dependent variable is project performance.

Independent Variables

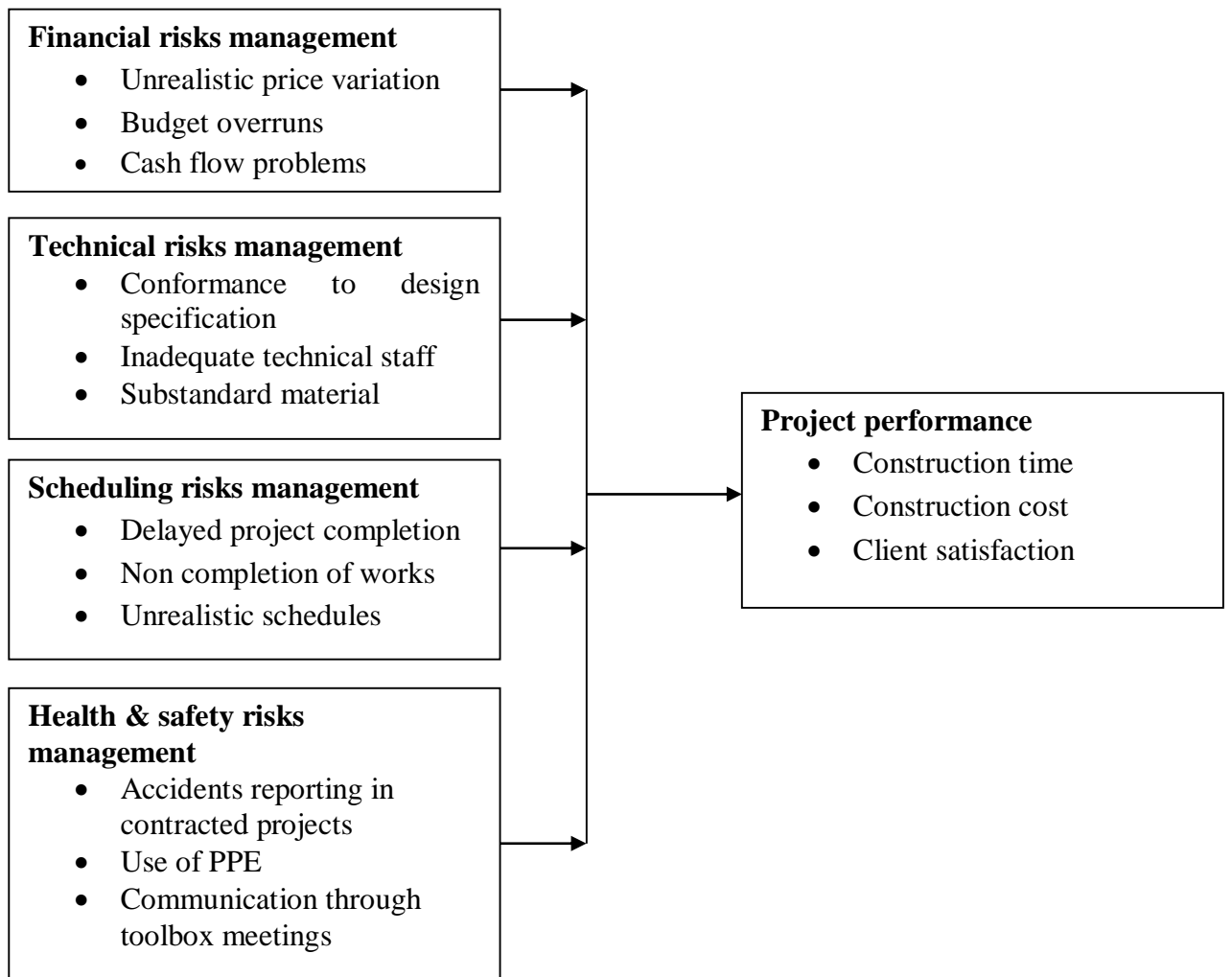


Figure 2.1 Conceptual Framework 1

Source: (Researcher, 2018)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents details of the research approach that was used. The following key sections were covered; research design, target population, sampling design, instruments, data collection procedure, operationalization of variables, data analysis and presentation and ethical issues considered in the research.

3.2 Research design

De Vaus (2001) defines research design as a master plan that consist all the components that are organized in a reasonable manner therefore enabling the researcher to solve research problems. Cooper and Schindler (2008) noted that a descriptive research design is concerned with finding out about how, what and where of a phenomenon. The study adopted descriptive research design which was useful in establishing the extent of influence of management of contracting risk on performance of a construction project in Kenya. Descriptive research involved gathering data and systematically treating it to present comprehensive inference. The study also utilized correlative design in order to give a causal relationship between project performance which was dependent variable and contracting risks which are independent variables.

3.3 Target Population

Hungler and Polit (1999) defined the population as an aggregate or totality of all the objects, subjects or members that conform to a set of specifications. In this study, the target population was seventy three public construction projects undertaken between January 2014 and January 2018 in Kilifi County under supervision of KERRA, KURA, KENHA and CGK. These projects were represented by one respondent per project from respective organizations.

The study population were 73 qualified employees from construction department in the respective organizations in Kilifi County. This shown in Table 3.1.

Table 3.2: Target Population

Organization	Technical Staff	Percentages
KURA	10	14
KERRA	10	14
CGK	38	52
KENHA	15	20
Total	73	100

(Researcher, 2018)

3.4 Sampling Design

Mugenda & Mugenda (2003) posit that in stratified random sampling the strata's are formed based on members shared characteristics. Due to financial and time constraints stratified sampling design was adopted where only a sample population was selected for research. Qualified technical professionals namely; engineers, project managers and quantity surveyors responded to questionnaires administered. Kothari (2008) posited that professionals are considered in order to get empirical, valid and justifiable information based on experience.

3.4.1 Sample size determination

Kothari (2004) defines a sample as a collection unit from the universe to represent it. In order to determine sample size of small population of 73 technical staff the study utilized a statistical formula as shown below:

$$n = n'(1 + (n'/N))$$

Where;

N is the total number of population

n is the sample size from finite population

n' is the sample size from population = S^2 / V^2 ; where S is the variance of the population elements and V is a standard error of sampling population (usually S= 0.5 and V= 0.06).

Therefore;

$$n = 69.44$$

$$1 + (69.44/73)$$

$$n = 36$$

Therefore the sample size for this study was 36 technical staff

Table 3.2: Sample size

Organization	Technical Staff	Percentages
KURA	5	14
KeRRA	5	14
CGK	19	52
KeNHA	7	20
Total	36	100

3.5 Data collection instruments

The instrument of data collection that was employed was a questionnaire. The questionnaire was structured in sections. The first section covered demographic data of the respondents which included years of experience, type of construction project supervised, position in organization and number of projects supervised while the second section covered into details the various contracting risks. The second section with likert scale of 1 to 5 collected information on management of contracting risks namely: financial risks, scheduling risks, technical risks and health & safety risks. The third section sought the respondents' personal opinion on the trend of construction project performance in the last five years.

Secondary data was collected from already documented data on previous studies on performance of construction projects from international journal reports, newsletters, KNBS annual report and other relevant publications that were useful in generating additional information for the study. Cooper and Schindler (2003) points out that secondary data is of great significance in getting stored records and previous publications related to the study.

3.6 Data collection procedure

The researcher acquired a University approval letter to conduct research and also permit from National Commission for Science Technology and Innovation. This was followed by the actual distribution of questionnaires to the respondents. The target population was technical professionals in the construction sector.

Nulty (2008) found out that there was 60% response rate through paper survey method while online survey response rate was 30%. Therefore the researcher adopted paper survey method and took questionnaires to respective sampled organizations administering the projects. The study respondents were engineers, quantity surveyors and project managers. Completed questionnaire were collected by the researcher.

3.7 Pilot test

Pilot test is used by researchers to determine if there are flaws, limitations or weakness and ambiguousness in the design prior to actual implementation. According to Babbie (2004), a pilot questionnaire is administered to several respondents in order to determine if there are flaws. The researcher personally administered the first 10 questionnaires to civil engineers, quantity surveyors, architects and project managers. This study was carried out in Mombasa County Public works department. The responses were then assessed to determine whether they provided anticipated information. The findings greatly assisted the researcher refine the questions used and also incorporate additional questions important for the study.

3.6.1 Validity testing

Validity is the degree to which the research instruments will appropriately and accurately measure what they are supposed to measure (Orodho, 2005). To check the validity of the instrument, the researcher worked with the supervisor as the expert and agreed whether the instrument was valid or not. The instrument was also subjected to face validity, content validity and construct validity test through testing it using research conducted in the past.

3.6.2 Reliability

Mugenda and Mugenda (2003) define reliability as a measure of degree to which research instrument yields same results on repeated trials. The researcher used retest method to determine the reliability of the instruments by giving the same test to the same people. The reliability of the instrument was estimated by examining the constituency of the results between the two measurements. A numerical constant of 0.70 or more will imply that there is a degree of data reliability of the current situation (Hair et al., 1998).

Cronbach's coefficient test was applied to the test the reliability. This was applied for each of the six research questions. The results of Cronbach's alpha test as conducted on ten questionnaires where the respondents were quantity surveyor, civil engineer, architect and project manager got a value of 0.72. This therefore meant that there was sufficient internal reliability of the instrument used.

3.7 Operationalization and measurement of Variables

The study will identify and operationalize the variables and shown in the table below.

Table 3.3: Operationalization and Measurement of Variables

Variable	Type of Variable	Operationalization	Measurement
Financial risks management	Independent	% of contracted projects completed within required	Ratio scale of 1-5

		financial standards 1-20%= 1 21-40%= 2 41-60%= 3 61-100%= 4 >100% =5	
Scheduling risks management	Independent	% of contracted projects completed within required financial standards 1-20%= 1 21-40%= 2 41-60%= 3 61-100%= 4 >100% =5	Ratio scale of 1-5
Technical risks management	Independent	% of contracted projects completed within required financial standards 1-20%= 1 21-40%= 2 41-60%= 3 61-100%= 4 >100% =5	Ratio scale of 1-5
Health & safety risks management	Independent	% of contracted projects completed within required financial standards 1-20%= 1 21-40%= 2 41-60%= 3 61-100%= 4 >100% =5	Ratio scale of 1-5
Project performance	Independent	% of contracted projects completed within required financial standards 1-20%= 1 21-40%= 2 41-60%= 3 61-100%= 4 >100% =5	Ratio scale of 1-5

3.8 Data analysis and presentation

The data was analysed by both qualitative and quantitative methods. Quantitative data from the questionnaire was coded and keyed into computer for computation of descriptive

statistics. Descriptive analyses was conducted by utilizing computer software (SPSS Version 17.0) in order to generate frequency distribution and percentages. The study utilized descriptive statistics to simplify the data by using measures of dispersion and percentages. Presentation of data was in form of tables and graphs. Correlation test was also done to determine the relationship between the independent and the dependent variables in the research. The qualitative data gathered was categorized in themes in accordance with research objectives and reported in narrative form along with quantitative presentation. Therefore the qualitative data was used to reinforce the quantitative data. Mugenda and Mugenda (2003) points out that qualitative research will enhance explanation of data collected in a better method.

To quantify the strength of the relationship between the variables, the researcher carried out a multiple regression analysis so as to determine the relationship between management of contracting risks and performance of construction projects in Kenya. The multiple linear regression analysis was used to determine the form of mathematical model that would define a relationship between project performance and contracting risks management.

The regression equation ($Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$):

Where;

$Y =$ Performance of construction project (client satisfaction, construction time, construction cost)

$X_1 =$ Financial risks management (unrealistic price variations, budget overruns, cash flow problems)

$X_2 =$ Technical risks management (conformance to design specification, inadequate technical staff, substandard material)

$X_3 =$ Scheduling risks management (delayed project completion, non-completion of works, unrealistic schedules)

X_4 = Health & safety risks management (accidents reporting, use of PPE,
communication through toolbox meetings)

β_0 = Constant

ε = Error term

3.9 Ethical considerations

Ethics involves making judgment about right and wrong behavior (Lowe and Mc Phee, 2005). Minja (2009) also notes that ethics refers to norms governing human conduct which significantly affect an individual. The identity of the participants in this study remained confidential throughout the study. Respect for intellectual property was also observed and the researcher acknowledged contribution of knowledge from various stakeholders. Other ethical consideration put in place were objectivity where researcher avoided bias in data analysis, data interpretation, peer review and expert testimony.

CHAPTER FOUR
RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

The purpose of the study was to determine the influence of management of contracting risks on performance of construction projects in Kilifi County, Kenya. The chapter presents the findings of the data analyzed from the research instrument together with their interpretation in line with the objectives of the study. Descriptive statistics was utilized to describe respondents' characteristics while regression analysis was used to determine the relationship between contracting risks and performance of construction projects.

4.2 Response Rate

The study targeted a sample size of 36 respondents and their response rate is shown in Table 4.1.

Table 4.1: Response Rate

Category	Frequency	Percentage
Response	35	97.2
Non-response	1	2.8
Total	36	100

Source: Research Data (2018)

Table 4.1 shows that the overall response rate was 97.2% and none response rate was at 2.8%. Mugenda and Mugenda (2003) show that a response rate of 50% is adequate for analysis and reporting, a response rate of 60% is good and that of 70% and above is very good. This therefore meant that the overall response rate of 97.2% was appropriate for the study.

4.3 Background Information

On the background information of the respondents, the researcher was interested in knowing the work experience, type of construction project supervised, position in the organization and number of construction projects supervised.

4.3.1 Respondents' Work Experience

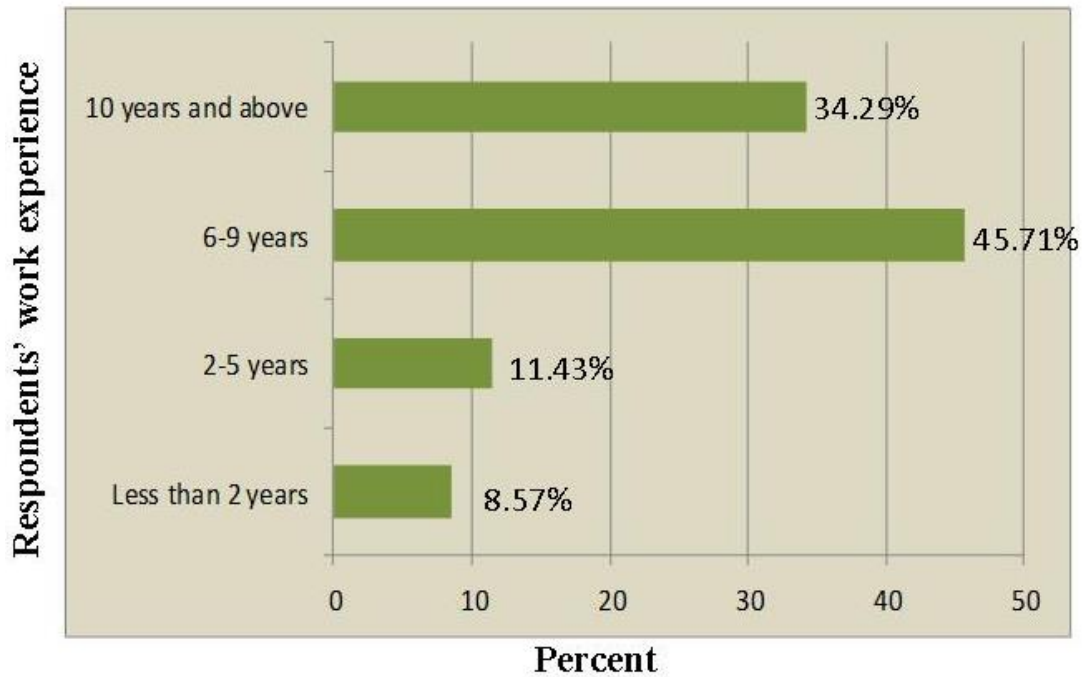


Figure 4.1: Respondents' Work Experience 1

Source: Research Data (2018)

The results in Figure 4.1 above shows that majority (45.71%) of the respondents had a work experience ranging between 6 to 9 years, followed by 34.29% with a work experience of 10 years and above, 11.43% between 2 to 5 years and 1.7% less than 2 years. These findings show that the study had engaged respondents who had enough experience in construction sector to provide credible information.

4.3.2 Type of Construction Project Supervised

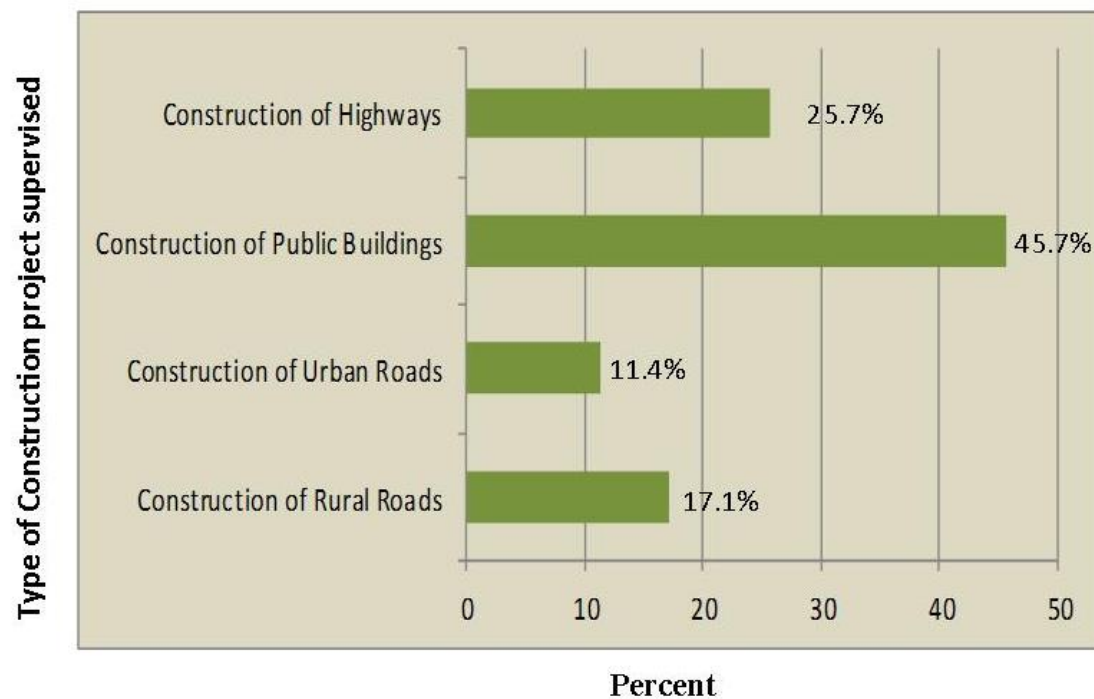


Figure 4.2: Type of Construction Project 1

Source: Research Data (2018)

The results in Figure 4.2 shows that majority (45.7%) of the respondents had supervised construction of public buildings, 25.7% construction of highways, 17.1% construction of rural roads and 11.4% construction of urban roads.

4.3.3 Position in the Organization

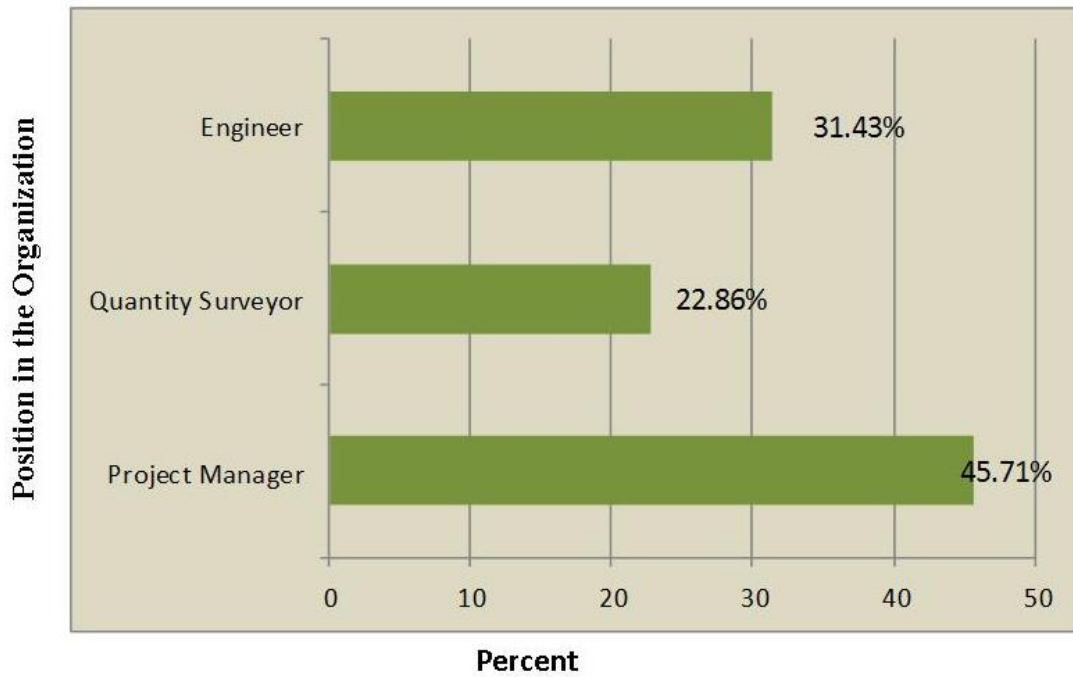


Figure 4.3: Position in the Organization 1

Source: Research Data (2018)

The results in the Figure 4.3 show that majority (45.71%) of the respondents were Project managers, 31.43% were Engineers, while 22.86% were Quantity Surveyors.

4.3.4 Number of construction project supervised

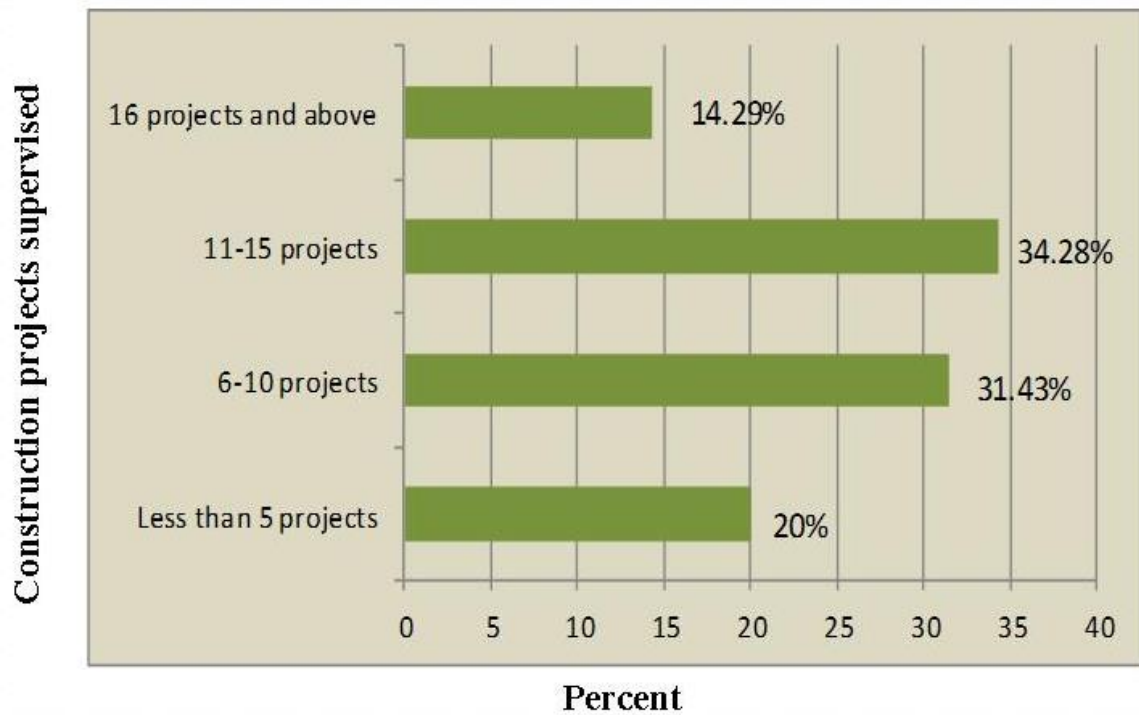


Figure 4.4: Construction projects superv 1

Source: Research Data (2018)

The results in Figure 4.4 above shows that majority (34.28%) of the respondents had a worked in projects ranging between 11 to 15 projects, followed closely by those who had worked on projects ranging from 6 to 10 projects represented by 31.43%. This was followed by 20% of supervised projects ranging from 1 to 5 projects, closely followed by 16 to 20 projects represented by 14.29%. These findings show that the study had engaged respondents who had ample experience in overseeing and managing construction projects of different dynamics.

4.4 Descriptive Statistics

Descriptive statistics such as means and standard deviations were used to present that quantitative data with the use of Statistical Package for Social Sciences (SPSS) version 17.0. These were presented as per the study objectives as follows.

4.4.1 Management of financial Risks

The first research objective sought to establish the influence of management of financial risks in contracting on the performance of construction projects in Kilifi County, Kenya. The findings are shown in Table 4.3.

Table 4.2: Management of Financial Risks

Statement	Mean (M)	Standard Deviation (SD)
Contracted project experience cost overruns	4.09	1.197
Contractors renegotiate contracts to higher sums after winning the bid	4.11	0.832
Contracted project has inaccurate cost estimates as compared to actual project budget	4.37	0.547
Contracted project experience additional costs due to variation of works	4.23	0.808
Contracted experience inflation of cost estimates during project execution	4.57	0.502
Contracted project experience cash flow problems	4.49	0.612
Contractor's employees are not competent in financial management	4.60	0.497
Aggregate Score	4.35	0.714

Source: Research Data (2018)

The results in Table 4.3 shows that the respondents strongly agreed that management of financial risks in contracting influenced the performance of construction projects in Kilifi County, Kenya as shown by the aggregate mean score of 4.35 with a significance variance of 0.714. The respondents strongly agreed on the statement that contractor's employees are not competent in financial management, contracted experience inflation of cost estimates during project execution and contracted project experience cash flow problems as shown by mean

score of 4.60, 4.57 and 4.49 respectively and with respective standard deviation of 0.497, 0.502 and 0.612. This is in line with the findings of Kariungi (2014) found that there was a strong relationship through a value of 0.738 between budgetary constraints and project performance.

The respondents also agreed on the statements that contracted project has inaccurate cost estimates as compared to actual project budget, contracted project experience additional costs due to variation of works, contractors renegotiate contracts to higher sums after winning the bid and that contracted project experience cost overruns as shown by mean score of 4.37, 4.23, 4.11 and 4.09 respectively and standard deviation of 0.547, 0.808, 0.832 and 1.197. This agrees with the findings of Abdullah *et al.*, (2010) whose study findings indicated that project are rarely completed within the estimated budget. It is apparent that cash flow problems dully influence the construction projects at great margins.

4.4.2 Management of Technical Risks

The second research objective sought to establish the influence of management of technical risks in contracting on the performance of construction projects in Kilifi County, Kenya. The findings are shown in Table 4.4.

Table 4.3: Management of Technical Risks

Statement	Mean (M)	Standard Deviation (SD)
Contracted projects don't conform to design specification	3.89	1.491
Contractor use substandard raw material in construction process	3.40	1.459
Construction projects experience construction mistakes and defective work	4.34	0.968
Contracted projects don't have competent project team	3.37	1.734
Contracted projects has inadequate qualified technical teams	3.94	1.110
Contracted projects has inadequate plant & machinery for execution of works	4.40	0.912

Contracted projects experience inaccurate quantity material estimate	4.36	0.901
Aggregate Score	4.44	1.225

Source: Research Data (2018)

The results in Table 4.4 shows that the respondents strongly agreed that management of technical risks in contracting influenced the performance of construction projects in Kilifi County, Kenya as shown by the aggregate mean score of 4.44 with a significance variance of 1.225. The respondents strongly agreed on the statements that contracted projects has inadequate plant & machinery for execution of works, contracted projects experience inaccurate quantity material estimate and that construction projects experience construction mistakes and defective work as indicated by mean score of 4.40, 4.36 and 4.34 respectively with respective standard deviation of 0.912, 0.901 and 0.968. This agrees with the findings of Wambui *et al.* (2015) who identified project manager competence as a major factor affecting completion of road construction and competence of the project team contributes greatly in construction industry performance and there was need for training of employees to improve performance.

The respondents agreed on the statements that Contracted projects don't conform to design specification and that contracted projects have inadequate qualified technical teams as shown by mean score of 3.94 and 3.89 respectively and with respective significance variance of 1.110 and 1.491. This is in line with the findings of Kihoro and Waiganjo (2015) who established that project team competence and performance of construction project are highly linked which was essential in project performance and planning stage was found to be a very crucial stage where project design and required workforce are determined which eventually influences the construction project performance.

The respondents were neutral on the statement that contractor use substandard raw material in construction process and that contracted projects don't have competent project team as indicated by mean score of 3.40 and 3.37 respectively and with respective significance variance of 1.459 and 1.734. This contradicts with the findings of Wambugu (2013) who found that there was inadequate supply of quality of materials which as a consequence affected the performance of construction project. Moreover, the coordination of the contractors and subcontractors were found to delay the project completion.

4.4.3 Management of Scheduling Risks

The third research objective sought to establish the influence of management of scheduling risks in contracting on the performance of construction projects in Kilifi County, Kenya. The findings are shown in Table 4.5.

Table 4.4: Management of Scheduling Risks

Statement	Mean (M)	Standard Deviation (SD)
Contracted project experience delayed project completion	4.08	0.406
Contractor's workers are not paid salaries and wages on time	4.00	0.123
Contracted project experience poor planning and coordination during project execution	4.71	0.860
Contracted projects have unrealistic execution schedules in their timelines	4.89	0.471
Contracted projects experience delayed orders in material procurement	4.20	1.623
Contracted projects experience equipment allocation problems	4.63	0.490
Construction projects experience communication breakdown between project owner and contractor	4.00	0.728
Aggregate Score	4.46	0.672

Source: Research Data (2018)

The results in Table 4.5 shows that the respondents strongly agreed that management of scheduling risks in contracting influenced the performance of construction projects in Kilifi County, Kenya as shown by the aggregate mean score of 4.46 with a significance variance of

0.672. Majority of the respondents strongly agreed on the statements that contracted projects have unrealistic execution schedules in their timelines and contracted project experience poor planning and coordination during project execution as shown by mean score of 4.89 and 4.71 respectively with respective significance variance of 0.471 and 0.860. This is in line with the findings of Wanjau (2015) who found that project was considered successful if it was completed within the stipulated time. The coordination of project owner and contractor in management of project timeline was found to greatly influence the completion of a project. Moreover, risks associated to schedules and their allocations are significant in completion of building projects.

The respondents agreed on the statements that contracted projects experience equipment allocation problems, contracted projects experience delayed orders in material procurement, contracted project experience delayed project completion, contractor’s workers are not paid salaries and wages on time and construction projects experience communication breakdown between project owner and contractor as indicated by mean score of 4.63, 4.08 and 4.00 respectively and with respective significance variance of 0.490, 0.406, 0.123 and 0.728. This concur with the findings of Auma (2014) who observed that pre-planning efforts using critical path method to present planning and scheduling of the project were necessary ensuring timely performance of projects.

4.4.4 Management of Health & Safety Risks

The fourth research objective sought to establish the influence of management of health & safety risks in contracting on the performance of construction projects in Kilifi County, Kenya. The findings are shown in Table 4.6.

Table 4.5: Management of Health and Safety Risks

Statement	Mean	Standard
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	(M)	Deviation (SD)
Contractor's employees use personal protective equipment at all times when working	4.29	1.126
Contractor communicates health and safety issues through tool box meetings	3.34	1.371
Health and safety training is carried during construction process	4.71	0.825
Contractor adheres to accident reporting procedures in construction process	3.51	0.781
There is an allocation of funds in the tender sum for health and safety for construction project	3.00	0.804
Workplace hazards and accidents are experienced in the construction process	4.57	0.502
Warning signs are always put in unsafe areas during construction process	4.49	0.612
Aggregate Score	3.98	0.860

Source: Research Data (2018)

The results in Table 4.6 shows that the respondents agreed that management of health & safety risks in contracting influenced the performance of construction projects in Kilifi County, Kenya as shown by the aggregate mean score of 3.98 with a significance variance of 0.860. Majority of the respondents strongly agreed on the statements that health and safety training is carried during construction process, workplace hazards and accidents are experienced in the construction process and warning signs are always put in unsafe areas during construction process as shown by mean score of 4.71, 4.57 and 4.49 respectively and with respective significance variance of 0.825, 0.502 and 0.612. This in line with the findings of Lamka (2015) who indicated that unsatisfactory work environment affects workers effort towards work and consequently lowers overall performance. Construction industry is leading in injuries recorded and lost work days due to injuries.

The respondents agreed on the statements that contractor's employees use personal protective equipment at all times when working and contractor adheres to accident reporting procedures in construction process as shown by mean score of 4.29 and 3.57 respectively and with

significance variance of 1.126 and 0.781 respectively. This concur with the findings of Phoya (2012) who revealed that accident from high falls in buildings was high as compared to other areas in construction. The cause of accident was attributed to ignorance and carelessness of the contractor.

The respondents were neutral on the statements that contractor communicates health and safety issues through tool box meeting and that there is an allocation of funds in the tender sum for health and safety for construction project as shown by mean score of 3.34 and 3.00 respectively and with significance variance of 1.371 and 0.804 respectively. This is in contrary to the findings of Al Hajeri (2011) who found that health and safety costs are not incorporated in tender sums and therefore difficult to counter during project execution.

4.4.5 Construction Project Performance

The study sought to establish the extent to which the performance of construction projects in Kilifi County, Kenya was achieved for the last five years. The findings are shown in Table 4.7.

Table 4.6: Construction Project Performance

Statement	Mean (M)	Standard Deviation (SD)
Client satisfaction	4.52	0.464
Construction time	4.45	1.278
Construction cost	4.03	1.671
Aggregate Score	4.33	1.138

Source: Research Data (2018)

The results in Table 4.7 indicated that respondents agreed that construction project performance in Kilifi County was improving as shown by the aggregate mean of 4.33 and significance variance of 1.138. Client satisfaction, construction time and construction cost were improving as shown by the mean score of 4.52, 4.45 and 4.03 respectively and with respective significance variance of 0.464, 1.278 and 1.671. Gyadu (2009) pointed out that

relevant indicators need to be identified before start of the project to provide a framework within which the project will be evaluated. The results also concurred with Azlan and Rahmat (2010) who utilized similar parameters of measuring performance namely; time performance, cost performance, quality performance, client satisfaction, functionality and health & safety.

4.5 Regression Analysis

Multiple regression analysis was conducted so as to test relationship among variables using statistical Package for Social Sciences (SPSS) version 17.0.

Table 4.7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.688 ^a	.473	.403	.472

a. Predictors: (Constant), Financial Risks, Scheduling Risks, Technical Risks, Health & Safety Risks

Source: Research Data (2018)

From the findings in Table 4.8 the value of adjusted r squared was 0.403(40.3%) an indication that there was variation of 40.3% on the performance of construction projects in Kilifi County, Kenya was due to changes in financial risks, scheduling risks, technical risks, health & safety risks at 95% confidence interval. Additionally, this therefore means that factors not studied in this research contribute 59.3% of the performance of construction projects in Kilifi County, Kenya and a further research should be conducted to investigate the other factors that contribute to this gap.

Table 4.8: Analysis of Variance (ANOVA)

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	6.002	4	1.500	6.734	.001 ^a

Residual	6.684	30	.223	
Total	12.686	34		

a. Predictors: (Constant), Financial Risks, Scheduling Risks, Technical Risks, Health & Safety Risks

b. Dependent Variable: Construction Project Performance

Source: Research Data (2018)

The significance value is 0.001^a which is less than 0.05 thus the model is statistically significance in predicting how various factors affect performance of construction projects in Kilifi County, Kenya. The F critical at 5% level of significance was 1.500. Since F calculated is greater than the F critical (value = 6.734), this shows that the overall model was significant. The relationship ($p < 0.05$) indicated a linear relationship among the variables under the study meaning there was 95% chance that the relationship among the variables was not due to chance.

Table 4.9: Regression coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	.411	.904		4.235	.000
	Health & Safety Risks	.790	.113	2.124	4.859	.001
	Scheduling Risks	.622	.048	4.062	2.458	.000
	Technical Risks	.711	.081	1.020	2.142	.002
	Financial Risks	.823	.071	3.645	4.577	.000

a. Dependent Variable: Construction Project Performance

Source: Research Data (2018)

As per the SPSS generated Table 4.11, the equation ($Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon$)

becomes: $Y = 0.411 + 0.790 X_1 + 0.622 X_2 + 0.711 X_3 + 0.823 X_4$

Where $Y =$ Construction Project Performance

$X_1 =$ Health & Safety Risks

$X_2 =$ Scheduling Risks

$X_3 =$ Technical Risks

$X_4 =$ Financial Risks

According to the regression equation established, taking all the independent variables into constant at zero, performance of construction projects in Kilifi County, Kenya would be 41.1%. The data findings analyzed also showed that all the independent variables had a positive and significant effect on the performance of construction projects in Kilifi County, Kenya. as indicated by t-values.

The relationships ($p < 0.05$) are all significant with health & safety risks (4.859, $p < 0.05$), scheduling risks (2.458, $p < 0.05$), technical risks (2.142, $p < 0.05$) and financial risks (4.577, $p < 0.05$). Financial risk was found to be the most (82.3%) significant among the other

variables under study, followed by Health & Safety Risks (79.0%), Technical Risks (71.1%) and Scheduling Risks (62.2%).

David (2005) noted that construction industry with the uncertain economic times is facing financial risks that come from budget overruns and project scheduling changes among other factors. Nyangilo (2012) found that construction projects in Kenya have escalated in terms of time at a magnitude exceeding 70% of the construction projects started were prone to delays to about 50% which heavily impacted the performance of public building projects. Auma (2014) found compelling findings that 81.82% of respondents in construction sector agreed that the nature of materials and apparatus utilized affect the performance in terms of technical aspects of construction projects. Githenya and Ngugi (2014) argued that technical risks have been on the rise in the Kenyan housing projects where buildings experienced technical failures resulting to damage of properties and sometimes let to fatalities.

CHAPTER FIVE

SUMMARY, RECOMMENDATION AND CONCLUSIONS

5.1 Introduction

This chapter covers that summary of the study, recommendations for policy and practice, conclusions and recommendations for further studies.

5.2 Summary of the Study

The general objective was to establish influence of management of contracting risks on the performance of construction projects in Kilifi County, Kenya. The study focused on management of financial risks, technical risks, scheduling risks and health & safety risks on project performance. The study adopted descriptive research design and correlative design where the study targeted a sample size of 36 responds derived from technical staff in four organizations namely; KURA, KeRRA, CGK and KeNHA. Data was collected using questionnaires and analysed using both descriptive statistics and inferential statistics. The summary of findings is presented as follows:

5.2.1 Financial risks management and performance

The first research objective sought to establish the influence of management of financial risks in contracting on the performance of construction projects in Kilifi County, Kenya and established a positive and significant relationship between management of financial risks and project performance. Contractor's employees are not competent in financial management, contracted projects experience inflation of cost estimates during project execution and contracted project experience cash flow problems.

5.2.2 Technical risks management and performance

The second research objective sought to establish the influence of management of technical risks in contracting on the performance of construction projects in Kilifi County, Kenya and established a positive and significant relationship between management of technical risks and project performance. Contracted projects has inadequate plant & machinery for execution of works, contracted projects experience inaccurate quantity material estimate and that construction projects experienced construction mistakes and defective work.

5.2.3 Scheduling risks and performance

The third research objective sought to establish the influence of management of scheduling risks in contracting on the performance of construction projects in Kilifi County, Kenya and established a positive and significant relationship between management of scheduling risks and project performance. Contracted projects have unrealistic execution schedules in their timelines, contracted project experience poor planning and coordination during project execution and that contracted projects experience equipment allocation problems, contracted projects experience delayed orders in material procurement, contracted project also experience delayed project completion.

5.2.4 Health & Safety risks and performance

The fourth research objective sought to establish the influence of management of health & safety risks in contracting on the performance of construction projects in Kilifi County, Kenya and established a positive and significant relationship between management of health & safety risks and project performance. Health and safety training is inadequate during construction process, workplace hazards and accidents are experienced in the construction process and warning signs are always put in unsafe areas during construction process.

5.3 Conclusions

The study concludes that:

Management of financial risks is paramount since the risks greatly influenced the performance of construction projects. Most of the contractor employees' are not competent in financial management while other contracted projects experienced inflation of cost estimates during project execution. Therefore, more training was necessary to the contractors' staff to be able to envisage arising financial risks and mitigate them at early stage which consequently would make the project successful.

Management of technical risks experienced during contracting is necessary for the construction project to be successful. Technical risks usually come up during execution phase of the project and early detection is necessary in order to eliminate or decrease the impact. Most contractors have inadequate plants and machinery to execute the works whereas the technical personnel were not able to accurately quantify material estimates resulting to incomplete work. Technical risks arising as a result of contracting greatly influenced the performance of construction projects and therefore better management practices should be embraced to enhance performance.

Management of scheduling risks was found to greatly influence the performance of construction projects. By managing scheduling risks helps in delivering a project in time thus avoiding cost overruns as longer projects always cost more. Pre-planning is necessary to allow any arising anomalies to be mitigated before actual works began. Management of scheduling risks is an effective technique to connect the risk information of project activities to the baseline schedule and enhance construction project success.

Management of health & safety risks was found to be paramount in order to ensure success of construction project. Many construction projects did not embrace health and safety training

and as a consequence affected the performance of construction project. Moreover, injuries have been on the increase to the people working on the projects through accidents and poor working conditions and which have affected the productivity of the workers leading to poor project performance. Management of health and safety risks will mitigate most of the potential hazards and increase the performance of construction project.

5.4 Recommendations for Policy and Practice

The study recommends that:

On the management of financial risks, the management of construction projects in Kilifi County should ensure that contractors train their employees on prudent financial management on topics such as project costing, forecasting applications, expense management, and contract management. The project owners should monitor and evaluate the contractors' project cost estimates to mitigate against inflated costs during tendering phase. The project owners should also ensure that payment for construction works is made in timely manner to avoid contractor experiencing cash flow problems. They should also have access to solutions for procurement and contractor management, which helps to improve communication, compliance, and financial management. This will ensure the right resources are utilized effectively, minimizing costs through more effective project portfolio management.

On the management of technical risks, the contractors should provide more accurate material estimate to ensure construction project perform effectively. The contractors should also have enough plant and machinery before being awarded tender to execute the works. This will ensure the technical risks are managed and project meets the expected standards.

On the management of scheduling risks, contractor should ensure they have more realistic execution schedules to avoid constraints arising from construction delays. Proper planning and coordination is necessary during project execution. By utilizing of available

computerized tools such as Microsoft Project and Primavera assist the technical personnel monitor project baselines that will identify potential risk factors associated with the project.

On the management of health and safety risks contractors should have a planned and systematic approach to implementing the safety and health policy through an effective safety and health management system. The health and safety policy should look at use of PPE and warning signs in the workplace to ensure safety of construction workers is catered for. This will minimize hazards in health and safety which will ensure better performance of core project activities effectively. The study also recommends the necessity of incorporating of key project stakeholders such as client and design team and other consultants in managing health and safety risk.

5.5 Suggestions for Further Studies

The study mainly focused on how the management of financial risks, technical risks, scheduling risks and health and safety risks on the performance of construction projects in Kilifi County, Kenya. Therefore, further studies should be carried out on how other variables not studied affect the performance of construction projects.

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APPENDICES

Appendix I: Approval of Research Project Proposal



KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke

P.O. Box 43844, 00100

Website: www.ku.ac.ke

NAIROBI, KENYA

Tel. 020-8704150

Internal Memo

FROM: Dean, Graduate School

DATE: 23rd October, 2018

TO: Samuel Mwangi Gitahi
C/o Management Science

REF: D53/OL/MSA/26605/2014

SUBJECT: APPROVAL OF RESEARCH PROJECT PROPOSAL
=====

We acknowledge receipt of your revised Research Project Proposal as per our recommendations raised by the Graduate School Board 11th October, 2018 entitled "Management of Contracting Risks on Performance of Construction Projects in Kilifi County, Kenya".

You may now proceed with your Data collection, subject to clearance with the Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Thank you.

JULIA GITU
FOR: DEAN, GRADUATE SCHOOL

CC. Chairman, Management Science Department

Supervisors:

1. Dr. Joshua Tumuti
C/o Management Science Department
Kenyatta University

JG/rwm

Appendix II: NACOSTI Research Authorization



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,
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When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/18/36324/26539**

at: **16th November, 2018**

Samuel Mwangi Gitahi
Kenyatta University
P.O. Box 43844-00100
NAIROBI

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "*Management of contracting risks on performance of construction projects in Kilifi County, Kenya*" I am pleased to inform you that you have been authorized to undertake research in **Kilifi County** for the period ending **15th November, 2019**.

You are advised to report to **the County Commissioner and the County Director of Education, Kilifi County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit a **copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

**GODFREY P. KALERWA MSc., MBA, MKIM
FOR: DIRECTOR-GENERAL/CEO**

Copy to:

The County Commissioner
Kilifi County.

The County Director of Education
Kilifi County.

Appendix III: Questionnaires for the Project Team

Kindly you are requested to provide answers to these questions as honestly and precisely as possible. Responses to these questions will be treated as confidential. Please do not write your name anywhere on this questionnaire.

Please tick [√] where appropriate or fill in the required information on the spaces provided

Reference No.

Section A: Demographic Data

1. How many years of experience do you have in the construction industry?

- Less than 2 years [] 2 – 5 years []
- 5 – 9 years [] 10 and above []

2. Which type of construction project do you supervise?

- Construction of Rural Roads []
- Construction of Urban Roads []
- Construction of Public building []
- Construction of Highways []

3. What is your position in your organization?

4. How many construction projects have you supervised on behalf of your organization?

.....

Section B: Financial risks management on performance of construction projects

To what extent do you agree with the following statements about contractor’s management of financial risk?

Key: Strongly agree(SA)=5, Agree(A)=4, Slightly agree(U)=3, Disagree(D)=2, and Strongly Disagree(SD)=1.

Statement	1	2	3	4	5
Contracted project experience cost overruns					

Contractors renegotiate contracts to higher sums after winning the bid					
Contracted project has inaccurate cost estimates as compared to actual project budget					
Contracted project experience additional costs due to variation of works					
Contracted experience inflation of cost estimates during project execution					
Contracted project experience cash flow problems					
Contractor's employees are not competent in financial management					

Section C: Technical risks management on performance of construction projects

To what extent do you agree with the following statements about contractor's management of technical risk?

Key: Strongly agree(SA)=5, Agree(A)=4, Slightly agree(U)=3, Disagree(D)=2, and Strongly Disagree(SD)=1.

Statement	1	2	3	4	5
Contracted projects don't conform to design specification					
Contractor use substandard raw material in construction process					
Construction projects experience construction mistakes and defective work					
Contracted projects don't have competent project team					
Contracted projects has inadequate qualified technical teams					
Contracted projects has inadequate plant & machinery for execution of works					
Contracted projects experience inaccurate quantity material estimate					

Section D: Scheduling risks management on performance of construction projects

To what extent do you agree with the following statements about contractor's management of scheduling risk?

Key: Strongly agree(SA)=5, Agree(A)=4, Slightly agree(U)=3, Disagree(D)=2, and Strongly Disagree(SD)=1.

Statement	1	2	3	4	5
Contracted project experience delayed project completion					
Contractor's workers are not paid salaries and wages on					

time					
Contracted project experience poor planning and coordination during project execution					
Contracted projects have unrealistic execution schedules in their timelines					
Contracted projects experience delayed orders in material procurement					
Contracted projects experience equipment allocation problems					
Construction projects experience communication breakdown between project owner and contractor					

Section E: Health and Safety risks management on performance of construction projects

To what extent do you agree with the following statements about contractor’s management of health and safety risk?

Key: Strongly agree(SA)=5, Agree(A)=4, Slightly agree(U)=3, Disagree(D)=2, and Strongly Disagree(SD)=1.

Statement	1	2	3	4	5
Contractor’s employees use personal protective equipment at all times when working					
Contractor communicates health and safety issues through tool box meetings					
Health and safety training is carried during construction process					
Contractor adheres to accident reporting procedures in construction process					
There is an allocation of funds in the tender sum for health and safety for construction project					
Workplace hazards and accidents are experienced in the construction process					
Warning signs are always put in unsafe areas during construction process					

Section F: Construction project performance

To what extent has construction projects in Kilifi County performed for the last five years?

Key: Greatly Improved (GI)=5, Improved(I)=4, Constant(C)=3, Decreased(D)=2, and Greatly Decreased(GD)=1.

Statement	1	2	3	4	5
Client Satisfaction					
Construction Time					
Construction Cost					