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

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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.

Key Words: *contracting risks management, construction project performance, Kilifi County, Kenya*

INTRODUCTION

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).

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.

GENERAL OBJECTIVE

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

SPECIFIC OBJECTIVES

1. To establish the influence of management of financial risks in contracting on the performance of construction projects in Kilifi County, Kenya.
2. To establish the influence of management of technical risks in contracting on the performance of construction projects in Kilifi County, Kenya.
3. To establish the influence of management of scheduling risks in contracting on the performance of construction projects in Kilifi County, Kenya.
4. To establish the influence of management of health & safety risks in contracting on the performance of construction projects in Kilifi County, Kenya.

THEORETICAL FRAMEWORK

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.

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.

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 potraying 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.

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 be relevant to this study in trying to establish the 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 problem such as absence behaviour and other small decisions. The small decisions of selecting the contractors to perform small works may not seem to matter but when aggrevated together they present 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 main contractor should not avoid during selection. Tversky and Kahneman (1992) also utilized prospect theory to show that individual are either risk averse or risk taker and therefore the results are either above or below the reference point.

Similarly, the theory was utilized in this study to show main contractor has the responsibility of making day to day decision 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 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 to the project owner to prevent losses generated by illogical behavioural patterns emanating from the contractor. The project owner will also utilize prospect theory in early detection of contracting problems and correct them accordingly to avoid negligible loss of money in the construction projects.

EMPIRICAL LITERATURE REVIEW

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.

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.

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 unconvectional 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.

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.

RESEARCH METHODOLOGY

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.

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.

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. 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 =S2 /V2; 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

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.

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.

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 ($Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \varepsilon$):

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); $\beta 0$= Constant; ε = Error term

RESERCH RESULTS

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:

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.

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.

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.

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.

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 1: 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

From the findings in Table 1 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 2: 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

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 3: Regression coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
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

As per the SPSS generated Table 4.11, the equation ($\mathbf{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon}$) becomes: $\mathbf{Y = 0.411 + 0.790\ X_1 + 0.622\ X_3 + 0.711\ X_3 + 0.823 X_4}$

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.

CONCLUSIONS

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.

RECOMMENDATIONS

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.

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