Enhancing Performance of the Building Construction Industry through Quantitative Risk Analysis and Risk Response: A Case of Exchequer Funded Building Construction Projects in Machakos County, Kenya

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***Abstract*: In Kenya, the building construction sector has been facing a myriad of challenges leading to project failures. This research study determined how construction projects are influenced by risk management in Machakos County. This research focused on quantitative risk analysis and risk response as the main objectives and its influence on performance of construction projects in Machakos County. This study was guided by uncertainty theory. 585 National Contraction Authority registered contractors were the target population and a sample size of 232. The sample size was calculated from formula taken from Kothari which was representative of the whole population. The study used descriptive research survey design. The data was analysed and presented in frequencies, percentages, means and standard deviation were tabulated and analysed from quantitative data. Fishers test was computed to examine the variable relationships. The finding led to the conclusion that quantitative risk analysis and Risk Response had a significance influence on performance of construction Projects by factor [0.412 and 0.271] with (P = 0.000). (P=0.000<0.05) The p<0.005 therefore the null hypothesis was rejected meaning that there was positive relationship between Quantitative Risk Analysis and Risk Response. The study recommends further research to be done in other areas in Kenya in order to establish whether the explored factors can be generalized to influence the performance of construction projects.**

***Key words:* Building Construction Projects, Exchequer Funded Projects, Quantitative Risk analysis, Risk Response**

I. INTRODUCTION

According to (EASH, 2012) construction projects are termed as unpredictable, heterogeneous and enormously complex. Risk management in construction is a process and is very important when executed nicely from imitation stage to completion stage. European Union has faced challenges in health and safety risks related to construction with estimate of 1300 death incidents of construction accidents yearly. Study done by(EASH, 2012), discerned that construction workers are more prone to death through accidents and twice as likely to be injured in comparison to workers in other occupations. As stated by (Gutman & Sy, 2015)Africa is being faced by huge infrastructural gap with a $93 billion estimated annual investment fund from World Bank. Project delays and cost overrun are one of the risks occurred in construction projects.

Resulting from their study, (Choudhryet et al., 2014)noted that African construction projects risks emanate from lack of information and communication between stakeholders. Lack of proper communication between the project owner and the contractor hampers effective risk management. Technical requirement, budget and completion time are rates of performance of construction project. According to (Choudhryet et al., 2014) practices which are used to manage risks and it has been used for a long time reason because construction projects are usually exposed to high risks. According to the definition of risk, risk is an uncertainty event that occurs and has an effect on projects. Project triangle involves cost, schedule, scope and quality. The causes of risk cane be several with more than one impact. According to (PMI, 2017)requirement, constraint or assumption may be the cause that generates the outcome with possibility been negative or positive.

Each construction phase is related to risk; poor construction project is caused by poor handling of risk practices. Insufficient and inconsistent construction project risk communications are the degrees of inaccuracy in the designing and execution phase.In his study,(Nasirzadeh et al., 2017) argued that an increased number of risk are found in construction projects that have complicated structure that are multiple and interdependent. Therefore, the success of any project risk management is very important and it includes identification, planning, analysis and response. Risk response is an important phase and should not be undermined or ignored in every construction project, risk response is an effective tool in risk management used to overcome the uncertainty and quantitative information in the analysis stage in order to make decisions on how to improve the completion possibility within budget and time.

At this stage the preparation of the response is done by appointment of the responsible officers responsible for the main task. According to (Hällgren & Wilson, 2011) risk response starts in quantitative analysis stage when needed and if possible between the quantitative risk analysis and risk response stage. The most significant stage in risk management is risk response, where by at this stage the project managers are entitled in the decision making about risk. Even though project managers have not sacrificed time and cost in responding to risk, risk planning is ignored part of project risk management. To ensure the success of risk response and to reduce the cost delay, management system and measured should to be developed. According to (Hällgren & Wilson, 2011) there is no much available research for risk response in response to construction project success so to manage this there is need for tools and techniques to manage risk. The success of response measures is different from project to project and this requires different measures (Motaleb and Kishk , 2012).

1.1 Statement of the Problem

There is a great concern in developing countries where by there is a lot of project failures during the implementation phase. According to (Bank, 2012) inadequate prioritization, inadequate project identification, are the main characteristics of project implementation stage. Issues and challenges in construction industry have been conducted by previous studies. According to (Yamo, 2006) in his research on firm performance and strategic planning, he found out that planning varies from one organization to another. (Mandere, 2006).

Argued that quality management practices are low traditional innovation practices which are commonly used management practices. According to (Nyangilo, 2012) that 70% of building construction projects which are implemented exceeded contractual period by 50%. This was supported by (Ali& Kamaruzzaman, 2010) who found out that in their study it was inability of contractors to understand contract terms and conditions which has led to increase the period of contract from 10% to 30%.

In Kenya, Machakos County is one of the leading counties in the execution of building construction projects. The influences of implementation of these projects have not yet been determined in county governments. None of the research has been carried out on quantitative risk analysis and risk response in Machakos County. Therefore this study sought to determine the influence of Quantitative Risk Analysis and Risk Response on the performance of building projects in Machakos County, Kenya.

1.2 Objective of the Study

i. To examine the influence of Quantitative Risk Analysis on the performance of exchequer funded building construction Projects in Machakos County, Kenya.
ii. To determine the influence of Risk Response on the performance of exchequer funded building construction Projects in Machakos County, Kenya.

1.3 Research Hypothesis

The following Null Hypothesis was tested:

H_{01}: There is no significant relationship between Quantitative Risk Analysis and performance of exchequer funded building construction Projects in Machakos County, Kenya.

H_{02}: There is no significant relationship between Risk Response and performance of exchequer funded building construction Projects in Machakos County, Kenya.

II. LITERATURE REVIEW

2.1 Quantitative Risk Analysis

According to (PMI , 2008) Quantitative Risk Analysis is impact analysis process of identifying the risk in construction projects. Further, (PMI, 2017) argue that Quantitative risk analysis is performed on risks that have been prioritized using qualitative risk analysis process, as those are potentially the ones which are substantially affecting the projects.

Organizations performance can be boosted by significantly solving high priority risks. In order to do this, quantitative risk analysis is utilized by incorporating quantitative risk analysis or risk response as one of the methods of prioritizing identified risks. After risk analysis, the results from the findings are utilized to determine the effective method of solving the risk. In order to achieve a successful quantitative risk analysis, distinct quantitative methods and paraphernalia's should be used chronologically(Cooper et al., 2015).

Risk analysis involves all the procedures that ensure there is critical evaluation of risks, and later on arranges the risks in a chronological order beginning with those that are of importance to the management.(El-Sayegh and Mansour , 2015)Risk analysis is of significance importance to all projects since it assess the chances of a risk to occur in line with their effects on the projects objective(Homas , 2006)]. It basically deals with separation of events that are of less importance and taming those once that are anticipated to happen(KarimiAzari et al., 2011). Of significance importance, risk analysis sets the equilibrium between risk identification and the management of the identified risk. It also evaluates the potential effects of the anticipated risk. The evaluation basically targets those risks that are of significant effect to the projects(Wang et al., 2004).

The key aspect in risk management process is the chronological monitoring and reviewing of potential risks by ensuring that new risks are detected and management before they actually occur. Through management meetings, the project manager should table down the Identified risks and formulate effective measures to tame the anticipated risks(Cooper et al., 2015). Subsequently, more information emergence in the meetings hence there is enough room and time to discuss how to tame a risk or how to prevent the identified risks from reoccurring. In this context, those risks which are already dealt with are successfully removed from the risk register (Winch, 2010).

Several scholars have formulated different definition of risk management, according to (Dunović et al., 2013), risk register is the "repository of knowledge corpus and as …starting point for analyses and plans…" They further interpret it as a vital tool in the analysis of risks in relation to technical issues, time and cost. The perception of risk register is changing with time as many organizations use it as the ideal and formal method for risk identification and grouping due to its cost effectiveness (Dunović et al., 2013).

In the current risk management methodology, risk register plays a pivot role of which it cannot be avoided in every aspect of risk management(Dunović et al., 2013). Apart from this, the register stores information that the risk management methodology proposes i.e. the risk methodology dictates what enters into the register. Importantly, Construction Industry Research and Information Association (CIRIA) and Active Threat and Opportunity Management(ATOM) methodology are the only once that have incorporated the register to play a pivotal role in the risk management process. CIRIA methodology consists of 10 steps. Here the register is used asa tool for risk assessment and storage while in ATOM, the register is used for assessment of risks and regular monitoring process through inspection of projects that are complete and those once that are still on progress (Dunović et al., 2013).

According to (Nils Olsson, 2014), in his study he observed that experience plays a significant role in proposing methods for making assumptions and carrying out follow-up. Further, he observed that when a project draws its conclusion from invalid assumptions then, in the long run the project will experience problems. The changes determined by the assumption should be treated as important warning signs (Project Management Institute, 2013). When new information is available then the assumption changes because the assumption is revisited and incorporated into the scope or a separate assumption log.

2.2 Risk Response

One of the vital and significant approaches in risk management process is risk response. It aids in staging a recovery process in case of a disaster or rather it helps project team to evaluate the effectiveness of the managers in terms of risk tackling(Motaleb et al., 2012). The process of risk response should be classified, justified and designed in a systematic principle approach since it aids in the identification or a risk that is likely to occur(Syedhosini et al., 2009).

The construction industry currently is being given a significant sense of concentration by Skitmore and other coauthors. They have ensured that analysis is conducted to all stages of the construction project. According to(Xiong et al., 2013)In their analysis on "the performance of construction project participants affects contractor project satisfaction in terms of the client's clarity," they found out that the determining factors were client's objectives, cash flow, and the effectiveness of the designer. Similarly (Skitmore et al., 2007) Conducted analysis on "construction auction organizing theory and practice" in which they explained the effectiveness of using the Gates method in carrying out closed-bid competitive procurement action in order to achieve a winning bid for a given mark-up level.

Construction consultants play a pivotal role in every stage of the project. According to(Chow & Thomas, 2007) a significant number of clients frequently measure the effectiveness of engineering consultant's services in order to make solid decision on their respective projects. The unveiling of quantitative indicator in each stage of consultant evaluation improves the level of fairness of consultant performance. With a vivid understanding on the anticipated expectations in each consultancy level, an objective oriented and unified performance evaluation is realized (Chow & Thomas, 2007).

In order to attain high end standards for quality implementations in projects, quality assurance should be incorporated to ease organizational procedures during the implementation. The quality is assured by conducting periodic review in every stage of the project hence ensuring that the project meets its quality standard mark (Council of Registered Builders of Nigeria cited in(Bala et al., 2012). According to(Agbenyega, 2014) Importance of quality assurance is target on the principle of getting everything right at the first time. This can be achieved by implementing, maintaining, improving of quality assurance, and reviewing of quality assurance program. Subsequently, (Agbenyega, 2014)added that quality assurance enables a project to be competed in the specified time, and according to client's specification. Contextually,(Sirbadhoo et al., 2010) perceived quality assurance as a tool for risk prevention and that it should be employed in every stage of the projects lifespan.

In construction projects, unanticipated disasters are prone to occur in every stage of the construction stage. There are disasters that have significantly inspired this paper namely; British Petroleum (BP) oil-drill platform's explosion. It occurred in April 20, 2010 and it caused more than 11 deaths, more than 70 injuries, and a severe pollution of the gulf's waters. The outcome of this disaster was so severe since the then risk managers had not anticipated the disaster earlier on. The White House Energy Committee conducted an investigation on the disaster and concluded that mistaken manipulations, use of materials with low standards, ineffective safety plan, and absence of emergency plan were the major determinants of the disaster New York Times in 2010. Disasters may occur as the result of unpredictable conditions or of underestimated risks(Blackhard, 2006).

2.3 Theoretical Framework

Uncertainty theory was introduced by Charles Berger and

Richard Calabrese (1975) due to generalization of domain of uncertainty. Uncertainty has been adopted for many years in project management. In the 1950s it was used to develop activity networks such as PERT (Program Evaluation and Review Technique), and it is based on the assumption that there is probability of variations between planned task durations. In the 1960s it was further developed to include probabilistic branching and led to the development of Analysis of Potential Problems, Graphical Evaluation and Review Technique, Synergistic Contingency Evaluation and Review Technique.

All this were developed with the aim of guiding project managers to be adequately prepared for any uncertainties and have the necessary risk mitigation and contingency in their plans(Henriksen andUhlenfeldt, 2010).Project planning has developed our knowledge on scheduling task, projects and outlining well known procedures as the critical path method (CPM) through the existing extensive literature. Subsequently, knowledge on how to handle the relationship among the involved parties, the paraphernalia used, conflict management and force field analysis is extremely extensive.

Several factors for example uncertainty risk affects how project management handles stakeholder management. The project team in our sample always has a unique way of proactively identifying the uncertainties and communicating them before other stakeholders think of them. In this context, foreseen requires guidelines on how to identify potential risks, planning of preventive measures and communication of actions that are catalyzed by the events(Young, 2012).

Risk response should be utilized not only in the completed activities but also in the ongoing activities. The project managers should be in a position of remedying the underlie issues and be on the forefront in communicating the achievements of the project. This theory states that Quantitative risk and Risk Response results from project uncertainties that can be foreseen during the implementation stage of the project. Planning, management, mitigation and monitoring of the projects are solely supported by the theory (Zwikael and Ahn., 2011).

Conceptual Framework

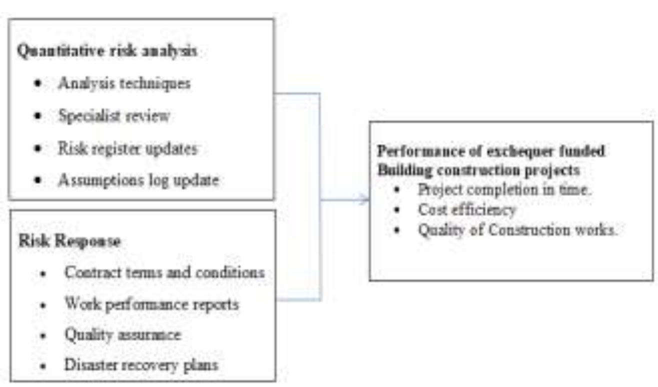

Figure 1: Conceptual Framework

Figure 1 shows the relationship between the independent variable and dependent variable to examine the influence of Quantitative risk analysisand Risk Response on the building construction performance.

III. RESEARCH METHODOLOGY

This study adopted descriptive research design. (Kothari, 2009) Defined the descriptive design as a statistical information about phenomena being studied, was be obtained by use of descriptive statistics and questionnaires were used for data collection.

The researcher used descriptive and inferential statistics to analyze the data. The study targeted NCA contractors who are registered in Machakos County. The choice of NCA is believed to be the representation of the entire construction industry since they operate under a formal organization and is a criterion for choosing a contractor for a project in Kenya. According to (Bryman, 2016)population studies have more representative reason because everyone has equal chance to be included in the final sample that is drawn.

According to (Kothari, 2009), a sample size in a research study is that part of a population from which datais found while sampling refers to the process of selecting categories of individuals from within a statistical population aiming to determine characteristics of the entire population. The use of sampling is more ideal for research purposes where thetarget population exceedshundred respondents. The use sample size is aimed at avoiding wastage by not being too large or being too small and to give confidence to the results of the study (Kothari, 2009). A sample size of contractors consisted of 232 respondents selected from a population of 585 a using formula taken from Kothari (2009).

$n = z^2.p.q.\ N / \{e^2 (N-1) + z^2.p.q\}$

Where,

N = Target Population 585

z= 1.96 (desired confidence level is 95% and value obtained from table)

p= 0.5 (sample proportion).

q= 0.5 {(1-0.5) or (1-p)}

e = 5% or 0.05 (precision rate or acceptable error)

Thus,

$n = \{(1.96)^2 \times (0.5) \times (0.5) \times 585\} / \{(0.05)^2(585-1)+(1.96)^2 \times (0.5) \times (0.5)\}$

n = 561.834/ 2.4204

=232

Table 1: sampling frame

NCA	Population	Sample Size	%
1	18	7	3.0
2	12	5	2.2
3	13	5	2.2
4	30	12	5.2
5	43	17	7.3
6	124	49	21.1
7	106	42	18.1
8	239	95	40.9
Total	585	232	39.7

The study used stratified random sampling technique to sample the respondents because it is unbiased sampling method. According to (Kothari, 2009)stratified random sampling involves dividing of the population into smaller groups called strata. Each stratum was sampled independently in sub population and then the respondents were selected randomly. In this study research the sample was selected from (8) strata that is NCA 1-8.

The research instrument which was used in this study was questionnaire. According to(Connaway & Powel, 2010) questionnaires are advantageous since they are filled up by the respondents in their own comfort and efficiency. Each section on the questionnaire was developed to address specific objectives of the study. The respondents in this study were registered contractors of National construction Authority. The instrument was piloted and was not involved in the study especially in the neighboring county which is an area with the same characteristics as the study area. The researcher and his enumerators who acted as translators administered the questionnaire.

Before the actual data collection was commenced, piloting was done by use of 23 respondents to pre-test the questionnaires for the preparation of the main study. According to(Babbie, 2012) he argued that piloting is done to ascertain the efficiency of research instrument. The pilot testing of the research instrument was conducted in Machakos County from the list of NCA registered firms. Procedures which was used in piloting was similar to the one used in the main study(Mugenda & Mugenda, 2009).

According to (Saunders & Thornhill, 2007) validity refers to whether the questionnaire or survey measures what it intends to measure.Content validity, Construct validity, face validity and Criterion validity are the four types of validity. Content validity assesses whether the test items in the scale fully represented. Expert panel consisting of research supervisors assured the validity by conducting the comprehensive literature review. Further confirmation was done during piloting and after data collection for the main study. Construct validity investigated whether the individual scale items correctly operationalized the study variables, as outlined in the theoretical framework. Construct validity was assessed by the expert panel of supervisors. Internal consistency and reliability of the questionnaire was tested using Cronbach's Alpha.

According to (Mugenda & Mugenda, 2009)argued that a coefficient of 0.7 and above is acceptable. This gave values of (0.711 and 0.821) and the instrument was therefore termed as reliable for use.

The researcher did not include the data which was used during piloting in the final study. Computation of the Cronbach‘s Alpha was as follows:

$\alpha = \kappa/\kappa\text{-}1 \times [1- \sum (S^2)/\sum S^2\text{sum}]$

α = Cronbach's alpha

κ = Number of responses

$\sum (S^2)$ = Variance of individual items summed up

$\sum S^2$ = Variance of summed up scores

To counter the ethical issues in this study, the permit from University of Nairobi was given to the researcher, NACOSTI and a letter from respective department in Machakos County, further the researcher and his assistants set date and appointments for the issuing of questionnaires as well as conducting interviews. The researcher gave the respondents 14 days period to fill the questionnaires. Data from the field was collected, coded, signed and put into the PC utilizing SPSS V.25.

Data analysis technique in this study included, Descriptive statistics of the five point Likert scale (Mean and SD), frequencies and percentages in the demographic information. Inferential statistics which was used was Spearman's product-moment correlation coefficient which measures the strength of a linear association between independent variable and dependent variable. The relationship between the quantitative risk analysis, risk response and performance of conduction projects was analysed using linear regression.

Formula for Linear regression is presented below.

$Y = a + bX1 + cX2 + \epsilon$

Where:

Y – Dependent variable, X1 – Quantitative Risk Analysis, X2–Risk Response, a – Intercept, b& c– Slopes and **ϵ** – Error term

The research objective in this study was formulated from the variable Quantitativerisk analysis and risk response. ANOVA test was conducted Hypothesis.

IV. RESEARCH FINDING AND DISCUSSIONS

4.1 Questionnaire Return Rate

The response rate finding was shown in the Table 2.

Table 2 Response Rate

Respondents	Frequency	%
Responded	175	75.4
Not responded	57	24.6
Total	232	100

The questionnaire return rate was 75.4% as shown in table 2 where by 175 questionnaires were filled and returned out of 232 which were given out. This return rate concurred with (Mugenda & Mugenda, 2009)who argued that 50% and above questionnaire return rate is adequate for analysis of the data. Therefore, the response rate of 75.4% was acceptable.

4.2 Distribution of respondents by their NCA category

The researcher analysed the descriptive statistics of the distribution of respondents according to NCA Category and presented in table 3.

Table 3 NCA distribution of respondents by their NCA category

NCA	Frequency	%
1	4	2.3
2	5	2.9
3	4	2.3
4	10	5.7
5	13	7.4
6	41	23.4
7	36	20.6
8	62	35.4
Total	175	100.0

The results from the table 3 were that, NCA1(4,2.3%), NCA2(5,2.9%), NCA Table 3 shows that NCA3(4,23%), NCA4(10,5.7%), NCA5(13,7.4%) NCA6(41, 23.4%), NCA7 (36, 20.6%) while NCA8 (62, 35.4%), indicating that NCA8 were the majority.

4.3 Quantitative Risk Analysis

The researcher analysed the descriptive statistics of various statements on quantitative risk analysis to determine the influence of construction projects performance.

The five point Likert scale rating was used and the results were presented in table 4.

Table 4 Quantitative Risk Analysis

The researcher analysed the descriptive statistics of the distribution of respondents according to agreement level on Quantitative Risk Analysis and presented in table 4.

Statement	N	Mean	SD
Specialist reviews are conducted	175	2.13	1.165
Analysis techniques are in place	175	3.67	.949
Risk register updates are done	175	3.29	.999
Assumptions log are periodically updated	175	2.47	.999
There is inadequate or insufficient site information (site investigation report)	175	2.92	1.222
Information unavailability-details, drawings, sketches	175	3.58	1.301
Contractors have an execution plans (programme of works)	175	4.10	.998
Composite mean and SD	175	3.17	1.091

Table 4 results shows that composite mean is 3.17 and standard deviation is 1.091.The findings revealed that quantitative risk analysis has an influence in risk management in construction projects. The item ‘Contractors have an execution plans (programme of works)’ had the highest (mean=4.10 and SD=0.998). This was followed by ‘Analysis techniques are in place’ (mean=3.67, S.D=0.949) ‘Information unavailability-details, drawings, sketches’ (mean=3.58, S.D=1.301). ‘Risk register updates are done’ (mean=3.29, S.D=0.999). ‘There is inadequate or insufficient site information (site investigation report)’ (mean=2.92, S.D=1.222). ‘Assumptions log are periodically updated’ (mean=2.47, S.D=0.999). ‘Specialist reviews are conducted’ (mean=2.13, S.D=1.165).

Performance of the building construction projects was the dependent variable in this study. Various statements were set to be answered by the respondents in order to measure the strength of this variable. The results and the finding of this showed that is strong relationship between this independent variable and dependent variable. The statement that Contractors have an execution plans (programme of works) was the most outstanding in relation to performance of building projects. This finding was supported by(Nils Olsson, 2014) who states that for the project to generate benefits then the project executers should be very careful with the assumptions of the original planned project delivery. According to (Project Management Institute, 2013) “every project and its plan is conceived and developed based on a set of hypotheses, scenarios, or assumptions. Assumptions analysis explores the validity of assumptions as they apply to the project. It identifies risks to the project from inaccuracy, instability, inconsistency, or incompleteness of assumptions”.

4.4 Risk Response

The researcher analysed the descriptive statistics of various statements on risk response to determine the influence of construction projects performance. The five point Likert scale rating was used and the findings were presented in table 5.

Table 5 Risk Response

The researcher analysed the descriptive statistics of the distribution of respondents according to the level of agreement on Risk response and presented in table 5.

Statement	N	Mean	SD
Contracts terms and conditions are effectively laid down	175	4.21	.907
Work performance reports is submitted regularly	175	4.13	.999
Quality assurance systems are in place	175	3.99	.988
Disaster recovery plans available	175	3.41	1.170
Compliance with safety and health requirements on site	175	3.89	1.059
Contractors are compliance with new government Acts and Legislations	175	3.90	.910
Contractors have the highest risk in fixed price contracts and least in the cost type contracts.	175	4.07	.903
Composite mean and standard Deviation	175	3.94	.991

Table 4 results shows that composite mean is 3.94 and standard deviation is 0.991.The findings revealed that risk response has an influence in risk management in construction projects.The item 'Contracts terms and conditions are effectively laid down' was found to have the highest mean of 4.21 and SD of 0.907. This was followed by 'Work performance reports is submitted regularly' (mean=4.13, S.D=0.999) 'Contractors have the highest risk in fixed price contracts and least in the cost type contracts' (mean=4.07, S.D=.903). 'Quality assurance systems are in place' (mean=3.99, S.D=0.988). 'Contractors are compliance with new government Acts and Legislations' (mean=3.90, S.D=.910). 'Compliance with safety and health requirements on site' (mean=3.89,S.D=1.059). 'Disaster recovery plans available' (mean=3.41, S.D=1.170).

Performance of the building construction projects was the dependent variable in this study. Various statements were set to be answered by the respondents in order to measure the strength of this variable. The results and the finding of this showed that is strong relationship between this independent variable and dependent variable.

The statement that Contracts terms and conditions are effectively laid down was the most outstanding in relation to project performance. This concurs with the findings by(Yamo, 2006) who analyzed how the performance of construction project participants influences projects.

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	F Change	df1	df2	Sig. F Change
1	.648a	.419	.413	3.65864	.419	62.098	2	172	.000

a. Predictors: (Constant), Quantitative Risk Analysis, Risk Response

Dependent: Performance of exchequer funded building construction Projects

Table 6 shows that adjusted R-squared is 0.413. Meaning that quantitative risk analysis and Risk Response variables explains 41.3% variations in the dependent variable while the rest are explained by the error term.

Table 7: ANOVAa

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1662.445	1	831.222	62.098	.000b
	Residual	2302.332	173	13.386		
	Total	**3964.777**	**174**			

a Dependent Variable: Performance of exchequer funded building construction Projects .

b. Predictors: (Constant), Quantitative Risk Analysis, Risk Response

The variations of quantitative risk analysis and risk response values influence performance of building projects at 0.000 meaning that the overall model was significant.

The results of table 7 shows that quantitative risk analysis and risk response indicates that numerator df(1), denominator df(174). The results findings of the F-test show that the model had a good fit for the data. The F-Test (F=62.098, P=0.000< 0.05). The regression model is significant since P value = 0.000 which is less than 5%. This provides a significant level of explanation of the relationship between dependent variable and independent variables. This implies that 95% chance that the relationship with the variable is not due to chance.

Table 8: Coefficients

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	T	Sig.
1	(Constant)	98.73	1.581		6.243	.000
	Quantitative Risk Analysis	.412	.073	.411	5.601	.000
	Risk Response	.271	.064	.309	4.221	.000

Dependent Variable: Performance of exchequer funded building construction Projects.

(Y= 98.73+ 0. 412X1+ 0.271 X2+ ϵ)

The findings depict that quantitative risk analysis and Risk response would lead to performance construction Projects by factor of 0.412 and 0.271 with P values of 0.000. At 5% level of significance and 95% level of confidence this is statistically significant as the P-Value is lower than 0.05. The study therefore reject the null hypothesis implying that there is significant influence of Quantitative risk analysis and Risk response on performance of construction Projects. On the basis of these statistics, the study concludes that there issignificant positive relationship between Quantitative risk analysis, Risk response and performance of exchequer funded building construction Projects.

V. CONCLUSION

The conclusion of the research study is that quantitative risk analysis influences the performance of construction projects. The study shows that majority of the respondents agreed that contractors have an execution plans (programme of works)with a mean of 4.10.Since P calculated is less than 0.05

level of significance (P=0.000<0.05), the study rejects the null hypothesis and concludes that there is significant influence of Quantitative risk analysis on performance of construction Projects.

Risk response influences the performance of construction projects. The study shows that majority of the respondents agreed that contracts terms and conditions are effectively laid down influences the performance of construction Projects with a mean of 4.21. Since P calculated is less than 0.05 level of significance (P=0.000<0.05), the study rejects the null hypothesis and concludes that there is significant influence of Risk response on performance of construction Projects.

VI. RECOMMENDATIONS

i. Quantitative risk analysis, there is need for specialist reviews to be conducted, assumptions log to be periodically updated and adequate or sufficient site information are crucial. This will enhance performance of construction projects among contractors.
ii. Risk response, there is need for disaster recovery plans and compliance with safety and health requirements on site.
iii. The study recommends further research to be done in other areas in Kenya in order to establish whether the explored factors can be generalized to influence on the performance of construction projects.

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