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Nyarangi, M. H., Ogolla, P., & Kitheka, S.

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EFFECT OF PROJECT RISK MANAGEMENT PROCESSES ON PERFORMANCE OF BOREHOLE PROJECTS IN MOMBASA COUNTY, KENYA

[1] Nyarangi, M. H., [2] Ogolla, P., & [3] Kitheka, S.

[1] Msc. Student, Jomo Kenyatta University of Agriculture & Technology [JKUAT], Kenya
[2] Lecturer, Jomo Kenyatta University of Agriculture & Technology [JKUAT], Kenya
[3] Doctor, Lecturer, Jomo Kenyatta University of Agriculture & Technology [JKUAT], Kenya

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ABSTRACT

The general objective of the study was to establish the effect of risk management processes on performance of borehole projects in Mombasa County, Kenya. Descriptive research design was used. The study focused on 146 borehole projects in Mombasa County, Kenya, undertaken from 2013 to 2018 and focusing on two key units of respondents per each project comprising of project manager and one end user representative per project. The study population was 182 respondents (project managers, clients and contractors). Stratified random sampling techniques was adopted. Structured questionnaires were used to collect primary data from the targeted respondents. Quantitative data was analyzed by use of both inferential and descriptive statistics with the help of statistical software known as Statistical Package for Social Sciences (SPSS version 25). The study found out that there was a positive and significant relationship between project risk identification and performance of borehole projects in Mombasa County, Kenya. There was a positive and significant relationship between project risk evaluation and performance of borehole water supply construction projects in Mombasa County, Kenya. Also There was a positive and significant relationship between project risk handling and performance of borehole projects in Mombasa County, Kenya. Lastly, there was a positive and significant relationship between project risk control and performance of borehole projects in Mombasa County, Kenya. Based on the findings, the study concluded that risk identification, risk evaluation, risk handling and risk control have a positive and significant effect on the performance of borehole projects in Mombasa County, Kenya. The study recommended that project managers should embrace the use of risk identification because it assists the management to develop risk management strategy to allocate resources efficiently, organizations should adopt project's accounting control practices such as risk based auditing, projects should transfer risks through diversification and hedging and lastly, many project policies, although popular should be avoided, but avoiding risks also means losing out on the potential gain that accepting (retaining) the risk may have allowed.

Key Words: *Risk Identification, Risk Evaluation, Risk Handling, Risk Control*

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INTRODUCTION

Risk and uncertainty can potentially have damaging consequences for the projects (Gitau, 2015). Therefore, risk analysis and management continue to be a major feature of the project management in attempt to deal effectively with uncertainty and unexpected events and to achieve project success (Rostami, 2016; Chandra, 2015). Project Management Institute defines project risk as an uncertain event or condition and that the occurrence has positive or negative effect on at least one project objective, such as time, cost, scope, or quality ((Ngundo, 2014).

Risk management process in the borehole water supply project management context is a comprehensive and systematic way of risk identification, risk analysis and risk response with a view to achieving the project objectives (Flanagan & Norman, 2017). In the water construction industry, risk is often referred to as the presence of potential or actual threats or opportunities that influence the objectives of a project during construction, commissioning, or at time of use (Chileshe & Kikwasi, 2014). Success in water drilling project is indicated by its performance in the achievement of project time, cost, quality, safety and environmental sustainability objectives (Gitau, 2015). Despite the efforts by all players in the borehole construction industry, many projects generally run a high-risk of poor performance by being well over budget and significantly late.

In Kenya, just like in other parts of Africa, water is scarce in some parts of the country forcing women and children to trek long distances to fetch water. The exact groundwater potential of the country is unknown, but it has been estimated to be approximately 2.6 billion m3 (ADF, 2015). Despite this abundance, many Kenyan borehole drilling firms have been established for commercial purposes to extract underground water. People have suffered from a lack of access to safe water for centuries. The coast part of Kenya is one of the areas where lack of clean water has led to the establishment of borehole projects. In the blueprint Vision 2030 under the economic pillar are the Flagship projects for Tourism to spur development in the region.

The borehole projects in Kenya generally have poor cost and schedule performance. One of the reasons of the bad performance is that the borehole drilling construction industry is one of riskiest of all business types (Kagiri & wainaina 2017). While some degree of poor cost and time schedule performance is inevitable in construction projects, it is possible to improve risk management processes to minimize their negative impact and thus improve the borehole project performance (Kambi, 2015; Osei-Kyei, & Chan, 2015). This study aims at determining the effects of risk management processes on performance of borehole projects in Mombasa County, Kenya.

Most of the borehole projects in Kenya have been performing dismally with most becoming un-operational or requiring rehabilitation. In Kenya, it is quite a common phenomenon to observe non-functional water projects that are not operational in most parts of the country (Kambi, 2015). However, if the current trend of poor performance of borehole projects can continue, rural water facilities will be completely non-functional which significantly lowers the effective coverage. This is manifested in some borehole projects such as Mombasa County (Kambi, 2015). The boreholes being non-operational after very few years of operation while even those in operation are either silted up or requires rehabilitation.

The Mombasa County has encountered persistent water problems due to many factors like rapid population growth and poor maintenance of existing water supply networks. Although the area is geologically rich in groundwater which is often seen as an option, exploitation is limited due to management of risk management processes (Mwamburi, 2014). Ground water exploitation is also curtailed by lack of adequate expertise on the

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risk management processes. Mombasa County therefore heavily depends on water sources from outside its jurisdiction for its potable needs. Its main sources of water supply are Mzima springs, Baricho water works and Marere supplying the Likoni area. Water from these reticulated supplies satisfies less than 50% of the demand hence it is of inadequate quantity (Kikuvi, 2016)

According to UWAZI (2014) the Mombasa Water Supply and Sanitation Company Ltd that previously operated under the umbrella body called the Coast Water Services Board identified risk management process especially in the water supply construction project which has affected the region to provide safe, reliable, affordable water and sewerage services in an efficient and viable manner to the residents of Mombasa County. However, this can only be achieved when several risk management process factors have been put in place so as to enhance its continuity. Essential for example is risks associated with the proper WSP planning, implementation and monitoring (World Bank, 2014; Kambi, 2015). Currently, there seem to be low level performance of borehole water projects in Mombasa County in Kenya, resulting from low levels of risk management at community level especially from the project initiation stages.

Statement of the Problem

Risk management has in the recent become a key determinant of projects success (Ouma & Nyonje, 2016). This is evident with the ever-increasing demands for project managers and request for expression of interest for risk management consultants in the infrastructure projects. In the developing countries, Kenya included, performance of borehole water project is faced with several challenges in addition to inability to resourcefully respond to changing needs. The Kenya Borehole Water Supply Association (2012) revealed that the risk management of borehole drilling projects in Kenya is weak. More confounding is the fact that where risk management activities are not carried out, the end results are poor performance of these projects.

A focal issue in the borehole system in developing countries is gauging the willingness of individuals to manage their water sources through the management of risks associated with the projects (Rostami, 2016). Further, according to IRC (2015) despite relative success in the provision of new rural water infrastructure in the last two to three decades, studies show that between 30 to 40 per cent of facilities either do not function or are operating below capacity. For example, about 25 to 30 per cent of the recently completed borehole rural water supply facilities will become dysfunctional in the first three years following completion. Further, WHO (2017) reported that for instance, in Mombasa county from eighty borehole projects constructed by various development agencies in the last decade, 90% were non-functional. This therefore leaves unanswered question as to whether performance of the same projects is guaranteed for future use by the community members. This study therefore seeks to identify if risk management is the actual missing factor especially for performance of borehole water supply projects in Mombasa County, Kenya. If it has been affected, how has it contributed to improvement on performance of borehole water supply projects in Mombasa County, Kenya.

Previous studies by Ogolla, Mugambi and Obwongi (2019); Macharia (2017); Maritim and Chelule (2018); Otaalo, Muchelue and Asinza (2019); Aduma and Kimutai (2018); Odimabo (2016) mainly concentrated on factors influencing project performance of construction projects. From the studies, though the risk management process has gained a lot of popularity as a tool for improving performance of projects in various sectors; it has its own challenges in its application which this study sought to identify especially in the borehole projects. It is on this premise the current study aimed to fill the gap by examining the relationship between project risk management processes (project risk identification, project risk evaluation, project risk handling, project risk control) and

performance of borehole projects in Mombasa County, Kenya

Objectives of the Study

The purpose of the study was to establish the effect of project risk management processes on performance of borehole projects in Mombasa County, Kenya. The study was guided by the following specific objectives:

- To examine the effect of project risk identification on performance of borehole projects in Mombasa County, Kenya.
- To establish the effect of project risk evaluation on performance of borehole projects in Mombasa County, Kenya.
- To determine the effect of project risk handling on performance of borehole projects in Mombasa County, Kenya.
- To examine the effect of project risk control on performance of borehole projects in Mombasa County, Kenya.

The study was guided by the following null hypotheses:

- **Ho_1:** Project risk identification has no significant effect on performance of borehole projects in Mombasa County, Kenya
- **Ho_2:** Project risk evaluation has no significant effect on performance of borehole water projects in Mombasa County, Kenya
- **Ho_3:** Project risk handling has no significant effect on performance of borehole projects in Mombasa County, Kenya
- **Ho_4:** Project risk control has no significant effect on performance of borehole projects in Mombasa County, Kenya.

LITERATURE REVIEW

Theoretical Review

Modern Portfolio Theory

Harry Markowitz introduced Modern Portfolio Theory (MPT) in 1952. MPT is a theory of investment which tries to maximize return and minimize risk by carefully choosing different assets (Aziz, Manab & Othman, 2015). MPT is a mathematical formulation of the concept of diversification in investing, with the aim of selecting a collection of investment assets that has collectively lower risk than any individual asset. This is possible, in theory, because different types of assets often change in value in opposite ways. For example, when the prices in the stock market fall, the prices in the bond market often increase, and vice versa. A collection of both types of assets can therefore have lower overall risk than either individually (Wijelathike & Lama, 2019). This require that the investor to identify the possible risks associated with the investment.

This theory was relevant to this study because it explained the relationship between risk identification and performance of borehole projects. MPT theory elaborates that risk identification calls for risk identification as a continuous process and continuous seeking of new risk. Further, this theory elaborates that risk identification assists the management to develop risk management strategy to allocate resources efficiently. By risk identification the organization is able to study activities and places where its resources are exposed to risks.

Systems Theory

Systems theory was proposed in the 1940's by the biologist Ludwig von Bertalanffy and furthered by Ross Ashby (Giannakis & Papadopoulos, 2016). Systems theory looks at an organization as a system that survives by exchanging with its environment (Devaney, 2018). The theory anchors the interphase between performance contracting and organizational performance. Flanagan and Normann (2017) state that for an organization to survive it must strive to achieve the performance targets agreed upon between its management and the government agency. While the output from the organization is the targets agreed upon the inputs from the environment is the support the organization receives from the government.

This theory was relevant to the risk evaluation independent variable of this study because it clarifies that organization should be treated as open

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system, which is continually dependent upon and influenced by its environmental risks. The basic characteristics of the borehole enterprise is open system theory is basically concerned with evaluation of risk of the borehole system as open system is that it transforms inputs into output within its environment. System theory is basically concerned with evaluation of risks on the relationship of structure and of interdependence as a result there is considerable emphasis on the concept of cross boundaries between the system and its risks in the environment and between the different parts of the system. The current study will adopt the systems theory to expound the relationship between risk evaluation and performance of borehole projects.

Prospect Theory

Prospect theory, also called loss-aversion theory, psychological theory of decision-making under conditions of risk, which was developed by psychologists Daniel Kahneman and Amos Tversky and originally published in 1979 (Wijelathike & Lama, 2019). Prospect theory is a theory of decision-making under conditions of risk (Noga, Raczkowski & Klepacki, 2015). Decisions involve internal conflict over value trade-offs. This theory is designed to better describe, explain, and predict the choices that typical person makes in a world of uncertainty. The theory addresses how these choices are framed and evaluated in the decision-making process. Prospect theory advances the notion that utility curves differ in domains of gain from those in domains of loss. Prospect theory is designed to explain a common pattern of choice. It is descriptive and empirical in nature. Prospect Theory looks at two parts of decision making: the editing, or framing, phase, and the evaluation phase (Krisnawati, Yudoko & Bangun, 2016). Framing refers to the way in which a choice or an option can be affected by the order or way it is presented to a decision maker.

This theory was relevant to the risk handling variable of this study because the theory addresses how these choices are framed and evaluated in the decision-making process. Prospect theory advances the notion that utility curves differ in domains of gain from those in domains of loss. Prospect theory is designed to explain a common pattern of choice. It is descriptive and empirical in nature. Prospect Theory looks at two parts of decision making: the editing, or framing, phase, and the evaluation phase.

Contingency Theory

Chandra (2015). Asserts that the contingency theory of leadership was proposed by the Austrian psychologist Fred Edward Fiedler in his landmark 1964 article, “A Contingency Model of Leadership Effectiveness.” Contingency is an alternative plan that will be used if a possible foreseen risk event becomes a reality. It represents actions that will reduce or mitigate the negative impact of the risk event. This is in reference to the nature of construction projects and the concept of risk. Each project is unique and with its own complexities therefore should be managed according to its specific characteristics and environment in the particular period (Chihuri & Pretorius, 2015). Contingency thinking recognizes the uniqueness and complexities of projects and attempts to identify practices that best fit with the unique demands of different situations. This therefore highlights the complexity involved on managing of risks in projects (Segismundo & Miguel, 2015). The application of various management tools and techniques must be appropriate to the particular situation because each situation presents unique problems. This theory rejects the idea that there is one best way to manage because of the varying management situations (Chandra, 2015).

Contingency theory recognizes that there are a range of contextual variables (risk factors), each influencing the projects objectives differently. Examples of these variables are: External environment, technology, organizational structure and size, cost, culture, people involved, strategy. The theory focuses on the relationship between project risk control variable and project performance. These variables (risks factors)

influence the project and therefore the projects they are implementing. As a result, to manage any project the specific variables associated with it should be controlled.

Theory of Triple Constraints

The triple constraint of project management is rooted in the theory of constraints (TOC), first formulated by Dr. Eliyahu M. Goldratt in his book The Goal, published in 1984 (Lagat & Tenai, 2015). The theory of the triple constraint depicts that: the triple constraint is a triangle of time, cost and quality that bounds the universe within which every project must be accomplished (Dobson, 2004). The theory of triple constraints is derived from the very definition of a project; a temporary group activity designed to produce a unique product, service or result (PMI, 2015). Construction projects brings complications in project management, needs and constraints and therefore for effective project management, constraints must be managed. Projects take place inside organizations were, there is a finite amount of resources with which to accomplish infinite tasks. This results in scarcity and the triple constraints; a deadline, a budget, and a minimum acceptable level of performance (Dobson, 2004).

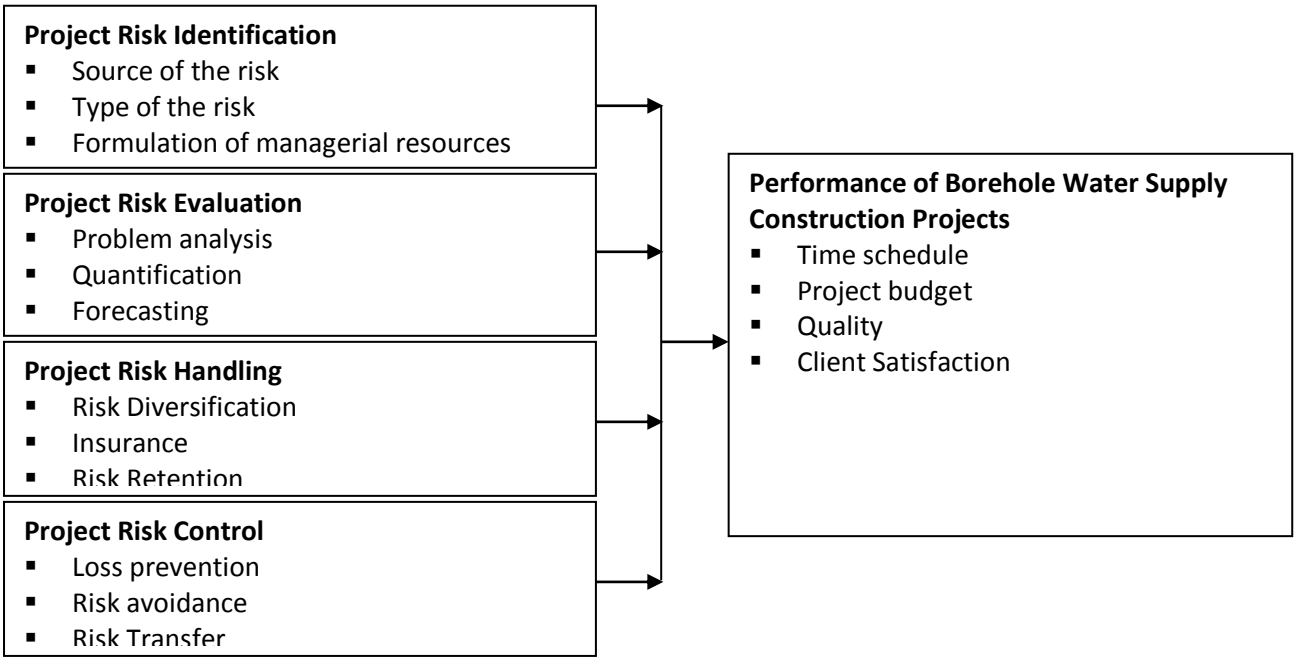

Figure 1: Conceptual Framework

Risk identification process attempts to identify the source and type of risks. Risk identification involves the recognition of potential risk event conditions in the projects and the clarification of risk responsibilities (Odimabo, 2016). Risk identification is the basis for analysis and control of risk management and ensures risk management effectiveness (Gitau, 2015). The identification and mitigation of project risks are crucial steps in managing projects (Lagat & Tenai, 2017). Aziz, Manab & Othman (2015) say that risk identification is the initial stage of risk management. For the implementation of risk management in an organization, the first step is to study risks and their impact on management practices. Lagat and Tenai (2017) concluded that risk identification is a very important step in risk management.

Problem analysis identifies the negative aspects of an existing situation and establishes the "cause and effect" relationships between the identified problems (Gitau, 2015; Ouma & Nyonje, 2016; Rostami, 2016). The problem analysis involves the definition of the framework and subject of analysis

and the identification of the major problems faced by target groups and beneficiaries; and the visualization of the problems in form of a diagram, called a problem tree to help analyze and clarify cause –effect relationships (Anca, Cezar& Adrian, 2015; Chileshe & Kikwezi, 2014; Gawne, *et al.,* 2014). The analysis is aimed at identifying the real bottlenecks which stakeholders attach high priority and which they wish to overcome (Lagat & Tenai, 2015). The problem analysis provides a sound foundation on which to develop a set of relevant and focused project objectives. Involving stakeholder representatives with appropriate knowledge and kills is critical to the quality of the output (Ottaalo, Muchelule & Asinza, 2019; Maritim & Chelule, 2018; Mutwiri, 2017).

Maritim and Chelule (2018) indicated that this technique is used in spreading or diffusing risk exposures. It is a common technique of risk management that seeks to lower risk by combining exposures that are not related (not correlated) to one another (Ouma & Nyonje, 2016; Rostami, 2016). Diversification has got its foundation in Markowitz work related to capital markets portfolio theory which demonstrates how diversification permits the investors who averse to taking risk create portfolios that optimize various levels of risk and return (Aduma & Kimutai, 2018; Mburu, 2017).

Kisaka and Musomi (2017) states that to prevent or to minimize the chance of loss, projects generally advise that some preventive measures be taken. The projects can only reimburse financial loss but not intangible things such as valuable information and files. Loss prevention refers to the measures that reduce the frequency of a particular loss for example: measures that reduce truck accidents and strict enforcement of safety rules (Odimabo, 2015). Rejda (2013) states that projects can put in place measures that reduce the severity of a loss after it has occurred. Therefore, good loss prevention and control practices are thought to enhance project performance (Magangha & Lewa, 2019).

According to Kagiri & Wainaina (2017), project performance refers to the achievement of relevance, effectiveness, efficiency, timeliness, impact and sustainability of the project. Borehole construction projects are considered successful when delivered within the scheduled duration, allocated funds, specified quality and meets the client's satisfaction (McNeil, Frey & Embrechts, 2015; Mbusi, 2016; Mwende, 2015). Delay in the completion and stalling of borehole construction projects is a critical challenge with a global dimension, often leading to increased costs due to time extension or acceleration as well as loss of productivity, disruption of work and project abandonment (Chan & Dodin, 2016).

Empirical Review

An empirical review in research methodology is when the writer reviews the information and theories currently available concerning the topic and the historical background of the topic. The point is to do two things. First, it is to demonstrate thorough understanding of the field or topic in which he or she is conducting research. Second, it is to show that the problem being studied has not been done before or has not been done before in the way proposed by the researcher (Fink, 2019).

Muthoni and Ogolla (2018) study sought to examine the factors influencing project risk management in state corporations. The study based its research on three specific objectives which sought to; To determine how project schedule influences project risk management in state corporations, to examine how technical expertise influence project risk management in state corporations and to establish how communication influences project risk management in state corporations. A descriptive research design was employed during this study. The study was carried out at the Kenya Pipeline Company. The study selected a sample of 202 respondents from the different segments of the population in KPC. This study employed simple random sampling technique in selecting respondents. The study found out that there was a statistically significant influence of the three variables that is project schedule, technical

expertise and communication on project risk management.

Mohammed and Ogolla (2018) study examined the factors influencing implementation of such water projects specifically by the Coastal Water Services Board. This study was guided by four objectives based on the risk management that is examine how project mission influences project implementation, examine the influence of resources on project implementation, examine how good management influences project implementation and examine the influence of budget allocation on project implementation. The target population was 203 respondents from which stratified random sampling was employed to sample 134 respondents randomly. From the study findings it was established that factor associated with risk management such project resources, management and budget allocation were found to play a big role in factors influencing implementation of water projects in Coast Water Services Board.

Ogolla, Mugambi and Obwongi (2019) study investigated the Influence of project manager's risk management competence on performance of Mombasa County Government projects. The study findings showed that all the respondents were in agreement that training (mean of 3.6845) and experience (mean of 3.9061) can enhance project performance. It can be seen that both were reliable with coefficients of 0.719 and 0.768 respectively which exceed the proposed threshold of 0.70. Correlation results showed that there were average significant positive relationships between measures of Project Managers risk management Competence and performance. Training had correlation coefficients of 0.392 and 0.369 with Functionality and Budget respectively. Budget on the other hand had correlation coefficients of between 0.492 and 0.433 with functionality and Budget respectively. The study recommended that Mombasa County Government should train their project team members to enable them adopt risk management practices for their particular project environment.

Ogollah and Mburu (2015) examined the effects of risk management strategies on the project performance of small and medium information communication technology (ICT) enterprises in Nairobi, Kenya. The study was governed by four theories including Logical Framework Approach, Project Risk Analysis and Management model, Network Theory and Portfolio theory. The independent variables were the risk management strategies while dependent variable was the project performance of the SME ICT project. A descriptive research design was adopted. Target population was 48 ICT SMEs in Nairobi, Kenya. The study adopted random sampling technique to select sample size of the project staff in the target population. The study established that there existed a positive relationship between risk management strategies affecting project performance and ICT project performance for SMEs in Kenya and were statistically significant at0.05level.

Mbuva, Rambo and Oketch (2018) study was to determine the extent to which risk assessment influence performance of SME projects in Machakos County. Study used multiple regressions model against a sample size of 265 selected from a population of 5311 small and medium enterprise projects in Machakos County using stratified and convenience sampling approach as guided by the Yamane (1967) formula. The study finding revealed that majority of the risk assessment components were positively supported by the respondents and their response mean was above 3.50, composite mean. Inferential statistics depicted that risk identification, prioritization and managing change significantly influenced financial performance further, risk identification and prioritization significantly influenced non-financial performance.

METHODOLOGY

A cross-sectional survey was used to collect data, across several projects at one point in time in order to determine the relationship among the study variables. This mixed approach was chosen since as argued by Creswell and Creswell (2017), having both quantitative and qualitative techniques as well

as surveys the study is able to triangulate the empirical, constructs and the reality approaches thereby, bringing about validation of the variables, deepening and widening understanding of this area under investigation. The study target population for this research was the borehole construction projects in Mombasa County, Kenya, undertaken from 2013 to 2018 focusing on three units of observation for the borehole water project comprising of project manager, contractor and clients. The unit of analysis was borehole water supply projects. With a population of 182, a sample size of 125 was used and was sufficient for the study. Primary and secondary data was used. Primary data was collected using researcher generated questionnaires. Statistical package for Social Science Software version 25 software was used to run different statistical tests from data sets from the closed and open-ended questionnaires. Correlation analysis (Pearson) was used to carry out inferential data analysis to determine the direction and strength of the relationship between the independent and the dependent variables. Regression models was also fitted. Testing of the hypothesis was done using multiple regression analysis and standard F and tests, at 95% level of significance (Kothari, 2011).

Model 1: $Y = \beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\varepsilon$.

Where;

Y = Performance of borehole water supply construction projects ($Y = f(X_1, X_2, X_3, X_4)$

X_1 =Project Risk Identification

X_2 =Project Risk Evaluation

X_3 =Project Risk Handling

X_4 =Project Risk Control

ε = Error term.

$\beta_1..\beta_4$= regression coefficient of four variables

RESULTS AND DISCUSSIONS

Project Risk Identification

The study sought to investigate the effect of project risk identification on performance of borehole projects in Mombasa County. Table 1 summarized respondents' level of agreement on how project risk identification affect performance of borehole projects. Most of the respondents agreed that there is always brainstorming, meetings and interviewing of project team to identify potential risks as shown by a mean of 4.32. Most of the respondents also agreed that risk identification processes are fully integrated in the project processes and procedures as shown by a mean of 4.25. Respondents agreed that the project design is made in such a way to identify risks in time as depicted by a mean of 4.22. Respondents also agreed that pilot sites are always carried out to identify potential risks in time as shown by a mean of 4.20 and a mean of 4.18 was obtained on the question that there is a standardized document for risk identification processes. These results were in agreement with Kisaka and Musomi (2017); Ochieng (2017) and Nketeket et *al.,* (2016) who were all in agreement that risk identification is important as it ensures that the risk management function is established throughout the whole corporation, moreover identification helps to sort risk according to their importance. The risk identification assists the management to develop risk management strategy to allocate resources efficiently. By risk identification the organization is able to study activities and places where its resources are exposed to risks.

Table 1: Project Risk Identification

	N	Mean	Std. Deviation
There is a standardized document for risk identification processes	110	4.18	.387
Risk identification processes is fully integrated in the project processes	110	4.25	.432
There is always brainstorming, meetings and interviewing of project team to identify potential risks	110	4.32	.468
The project design is made in such a way to identify risks in time	110	4.22	.415
Pilot sites are always carried out to identify potential risks in time	110	4.20	.402
Valid N (listwise)	110		

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Project Risk Evaluation

The study sought to establish the effect of project risk evaluation on performance of borehole projects in Mombasa County. From the findings indicated in tables 2 most of the respondents agreed that there are risk audits being carried at every stage of the project as shown by a mean of 4.32. Most respondents also agreed that there are continuous risk assessments to reduce cost overruns as shown by a mean of 4.31. The statement that there is objective programming of work to reduce potential risks in the project had a mean of 4.27. The statement that there is continuous risk trend analysis to reduce time overruns as shown by a mean of 4.18. The statement that there is project risk mapping to ensure compliance with the time and cost requirements as shown by a mean of 4.23.

Table 2: Project Risk Evaluation

	N	Mean	Std. Deviation
There is risk audits being carried at every stage of the project	110	4.32	.468
There is continuous risk assessments to reduce cost overruns	110	4.31	.484
There is continuous risk trend analysis to reduce time overruns	110	4.18	.387
There is project risk mapping to ensure compliance with the time and cost requirements	110	4.23	.421
There is objective programming of work to reduce potential risks in the project	110	4.27	.487
Valid N (listwise)	110		

Project Risk Handling

The respondents were requested to state their individual opinions on five specific statements regarding the effect of project risk handling on performance of borehole projects in Mombasa County. The results were as shown in table 3. The statement that the project ensures that there is adherence to technical specifications to reduce cost and time overruns had a mean score of 4.19. The statement that the performance bond/insurance is normally a requirement for all the project contracts had a mean score of 4.28. The statement that project work is normally contracted to third parties and agreement on key performance targets executed had a mean score of 4.29. The statement that there is always team building for better cooperation and coordination among the parties for the achievement of the common objective had a mean score of 4.17. The statement that there is dispute resolution mechanisms (contracting wording, avoid ambiguity) by use of dispute clauses in the contracts had a mean score of 4.33.

Table 3: Project Risk Handling

	N	Mean	Std. Deviation
The project ensures that there is adherence to technical specifications to reduce cost and time overruns	110	4.19	.395
Performance bond/insurance is normally a requirement for all the project contracts	110	4.28	.452
Project work is normally contracted to third parties and agreement on key performance targets executed	110	4.29	.476
There is always team building for better cooperation and coordination among the parties for the achievement of the common objective	110	4.17	.380
There is dispute resolution mechanisms (contracting wording, avoid ambiguity) by use of dispute clauses in the contracts	110	4.33	.471
Valid N (listwise)	110		

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Project Risk Control

The study sought to determine the effect of project risk control on performance of borehole projects in Mombasa County. From the findings indicated in table 4 most of the respondents agreed that there were continuous schedule revisions to reduce time overruns with a mean of 4.34 being obtained. These results are consistent with the findings obtained on the question on whether there is forecasting to ensure compliance with the time and cost requirements by showing a mean of 4.34. The statement that the project carries out external and internal investigation of risks at every stage of the project depicted a mean score of 4.16. The statement that there are continuous cost revisions to reduce cost overruns depicted a mean score of 4.22. The statement that there is objective measurement of the actual physical work progress to avoid scope creep depicted a mean score of 4.17. These results concur with Ondara (2017) study that found that risk control is a strategy which ensures that the chance of loss is reduced to zero because the loss exposure is never acquired. If projects fail to avoid some of the risks, they can run bankrupt. Projects therefore apply a system of policies and strategies in order to avoid the risk of bankruptcy provided their resources are applied effectively (Nketekete et *al.,* 2016). This finding is consistent with that of Magangha and Lewa (2019) who in their study assert that projects can put in place project risk control measures that reduce the severity of a loss after it has occurred. Therefore, good loss prevention and control practices are thought to enhance project performance.

Table 4: Project Risk Control

	N	Mean	Std. Deviation
The project carries out external and internal investigation of risks at every stage of the project	110	4.16	.372
There is continuous cost revisions to reduce cost overruns	110	4.22	.415
There is continuous schedule revisions to reduce time overruns	110	4.34	.475
There is forecasting to ensure compliance with the time and cost requirements	110	4.34	.359
There is objective measurement of the actual physical work progress to avoid scope creep	110	4.17	.380
Valid N (listwise)	110		

Performance of Borehole Water Supply Construction Projects in Mombasa County

The respondents were requested to state their individual opinions on five specific statements regarding performance of borehole projects in Mombasa County. The results were as shown in table 5. The statement that the project had been delivered within time had a mean score of 4.27. The statement that project has been delivered within budget depicted a mean of 4.16. The statement that project work has been delivered within the scope had a mean score of 4.22. The statement that the project has been delivered with the standards required (quality) had a mean score of 4.34. The statement that the client is satisfied with project implementation process depicted a mean score of 4.34. These results concurred with Segismundo and Miguel (2015) study that found that construction projects are considered successful when delivered within scheduled duration, allocated budget, and specified quality.

Table 5: Performance of Borehole Water Supply Construction Projects

	N	Mean	Std. Deviation
The project has been delivered within time	110	4.27	.487
The project has been delivered within budget	110	4.16	.372
Project work has been delivered within the scope	110	4.22	.415
The project has been delivered with the standards required (quality)	110	4.34	.475
The client is satisfied with project implementation process	110	4.34	.530
Valid N (listwise)	110		

Correlation Analysis

To establish the relationship between the dependent and independent variables, the study conducted a correlation analysis which involved coefficients of correlation and determination.

Coefficient of Correlation

From table 6, the results generally indicated that independent variables (project risk identification, Project risk evaluation, project risk control and project risk handling) were found to have positive significant correlations on performance of borehole projects at 5% level of significance. There was a strong positive and highly significant correlation between project risk identification and performance of borehole projects ($r = 0.575$, $P < 0.05$). There was a strong positive and highly significant correlation between project risk evaluation and performance of borehole projects ($r = 0.806$, $P < 0.05$). There was a strong positive and highly significant correlation between project risk handling and performance of borehole projects ($r = 0.796$, $P < 0.05$). There was a strong positive and highly significant correlation between project risk control and performance of borehole projects ($r = 0.797$, $P < 0.05$). The results imply that independent variables; project risk identification, project risk evaluation, project risk control and project risk handling significantly influenced the dependent variable, performance of borehole projects in Mombasa County.

Table 6: Pearson Correlations

		PRI	PRE	PRH	PRC	PBWCP
PRI	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	110				
PRE	Pearson Correlation	.488**	1			
	Sig. (2-tailed)	.000				
	N	110	110			
PRH	Pearson Correlation	.597**	.777**	1		
	Sig. (2-tailed)	.000	.000			
	N	110	110	110		
PRC	Pearson Correlation	.487**	.843**	.787**	1	
	Sig. (2-tailed)	.000	.000	.000		
	N	110	110	110	110	
PBWCP	Pearson Correlation	.575**	.806**	.796**	.797**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	110	110	110	110	110

**Correlation is significant at the 0.01 level (2-tailed).

Key: PRI=Project Risk Identification, PRE=Project Risk Evaluation, PRH=Project Risk Handling, PRC=Project Risk Control, PBWCP= Performance of Borehole Projects

Coefficient of Determination (R^2)

To ascertain the research model, a confirmatory factors analysis was conducted. The independent variables were subjected to linear regression analysis in order to measure the success of the model and predict causal relationship between the independent variables; project risk identification, project risk evaluation, project risk control and project risk handling and the dependent variable, performance of borehole projects.

The model, shown in table 7, explained 74.9% of the variance (R Square = 0.749) on performance of borehole water supply construction projects. Clearly, there were factors other than the four proposed in this model which can be used to predict performance of borehole projects. This

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implies that 74.9% of the relationship is explained by the identified four factors namely; project risk identification, project risk evaluation, project risk control and project risk handling. The rest 25.1% is explained by other factors in project management not studied in this research.

Table 7: **Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.865[a]	.749	.739	.15097

a. Predictors: (Constant), Project Risk Handling, Project Risk Identification, Project Risk Control, Project Risk Evaluation

Analysis of Variance (ANOVA)

From the ANOVA table 8, it was clear that the overall standard multiple regression model (the model involving constant, project risk handling, project risk identification, project risk control, project risk evaluation) is significant in predicting the effect of project risk management processes on performance of borehole projects in Mombasa County, Kenya. The regression model achieves a high degree of fit as reflected by an R^2 of 0.749 ($F = 78.284$; $P = 0.001 < 0.05$).

Table 8: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.137	4	1.784	78.284	.000[b]
	Residual	2.393	105	.023		
	Total	9.531	109			

a. Dependent Variable: Performance of Borehole Water Supply Construction Projects

b. Predictors: (Constant), Project Risk Handling, Project Risk Identification, Project Risk Control, Project Risk Evaluation

Multiple Regression

Table 9 presents the Regression Coefficients and the Significance of the Regressions (p-value). From the regression result, the coefficient of project risk identification was 0.128. This implied that one unit change in project risk identification, increases performance of borehole projects by 0.128 units holding other factors constant. Young and Hall (2015) indicate that project risk identification is the first stage of risk management. They assert that correct project risk identification ensures project risk management effectiveness such that, if risk managers do not succeed in identifying all possible losses or gains that challenge the organization, then these non-identified risks will become non-manageable. The coefficient of project risk evaluation is 0.296, thus a unit increase in project risk evaluation would result to an increase in performance of borehole projects by 0.296 units holding other factors constant. The coefficient of project risk control is 0.259. The result implied that a unit increase in project risk control increases performance of borehole projects by 0.259 units holding other factors constant. The coefficient of project risk handling is 0.226. The result implies that a unit increase in project risk handling increases performance of borehole projects by 0.226 units holding other factors constant.

Table 9: Multiple Regression (Coefficients)

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.375	.230		1.629	.106
	Project Risk Identification	.128	.057	.137	2.243	.027
	Project Risk Evaluation	.296	.090	.319	3.300	.001
	Project Risk Handling	.259	.087	.270	2.971	.004
	Project Risk Control	.226	.090	.249	2.518	.013

a. Dependent Variable: Performance of Borehole Water Supply Construction Projects

The results findings for the hypostasized regression model, and the interpretation of the results findings was as indicated below.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

Therefore, from the regression findings, the research model becomes;

$$Y = 0.375 + 0.128X_1 + 0.296X_2 + 0.259X_3 + 0.226X_4$$

Whereby Y = Performance of Borehole Water Supply Construction Projects

X_1= Project Risk Identification X_2= Project Risk Evaluation, X_3= Project Risk Handling, X_4= and Project Risk Control.

Test of Hypotheses

Table 10: Summary of Regression Coefficient and Test of Hypothesis

Model		Standardized Coefficients Beta	t	Sig	Deductions
1	(Constant)		1.629	.106	
	Project Risk Identification	.137	2.243	.027	Reject HO_1
	Project Risk Evaluation	.319	3.300	.001	Reject HO_1
	Project Risk Handling	.270	2.971	.004	Reject HO_1
	Project Risk Control	.249	2.518	.013	Reject HO_1

a. Dependent Variable: Performance of Borehole Water Supply Construction Projects

CONCLUSION AND RECOMMENDATIONS

Based on the findings, the study concluded that project risk identification has a positive and significant effect on performance of borehole projects in Mombasa County, Kenya. The identification and mitigation of project risks are crucial steps in managing projects. Project risk identification is the initial stage of risk management. For the implementation of risk management in an organization, the first step is to study risks and their impact on management practices. Project risk identification ensures risk management effectiveness such that, if risk managers do not succeed in identifying all possible losses or gains that challenge the organization, then these non-identified risks will become non-manageable.

The study concluded that project risk evaluation has a positive and significant effect on performance of borehole projects in Mombasa County, Kenya. Consistent project risk evaluation and rating of exposures of various types are essential to understand risks, and the extent to which these risks must be mitigated or absorbed. Outside audits, regulatory reports, and rating agency evaluations are essential for investors to gauge asset quality and firm level risk. Risk management has moved from the narrow view that focuses on evaluation of risk from a narrow perspective to a holistic, all-encompassing view.

The study also concluded that risk handling has a positive and significant effect on performance of borehole projects in Mombasa County, Kenya. Risk handling technique is used in spreading or diffusing risk exposures. It is a common technique of risk management that seeks to lower risk by combining exposures that are not related (not correlated) to one another. Diversification permits the investors who averse to taking risk create portfolios that optimize various levels of risk and return.

Based on the findings, the study concluded that risk control has a positive and significant effect on performance of borehole projects in Mombasa County, Kenya. Projects can only reimburse financial loss but not intangible things such as valuable information and files. Projects can put in place measures that reduce the severity of a loss after it has occurred. Therefore, good loss prevention and control practices are thought to enhance project performance. Avoidance is a strategy, which implies that the chance of loss is reduced to zero because the loss exposure is never acquired. If projects fail to avoid some of the risks,

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they can run bankrupt. Projects therefore apply a system of policies and strategies in order to avoid the risk of bankruptcy provided their resources are applied effectively.

The study recommended the following;

- Project managers should embrace the use of project risk identification because it assists the management to develop risk management strategy to allocate resources efficiently. Project risk identification ensures risk management effectiveness such that, if risk managers do not succeed in identifying all possible losses or gains that challenge the organization, then these non-identified risks will become non-manageable.
- Projects should adopt project's accounting control practices such as risk-based auditing, because they are crucial to the success of a project as it acts as a powerful brake on the possible deviations from the predetermined objectives and policies. Organization that puts in place an appropriate and adequate system of risk-based auditing is likely to perform better than those that do not.
- Projects should transfer risks through diversification. Using a reinsurance technique, projects can allocate risks to those parties who are most appropriate to bear them. This can reduce losses of the original project and therefore improve performance.
- Projects can put in place measures that reduce the severity of a risk after it has occurred. Therefore, good loss prevention and control practices are thought to enhance project performance. Project managers should therefore apply a system of policies and strategies in order to avoid the risk of bankruptcy provided their resources are applied effectively.

Areas for Further Research

The study sought to establish the effect of project risk management processes on performance of borehole projects in Mombasa County, Kenya. This called for the analysis of Mombasa County only, thus area for further studies could consider other regions in Kenya for purpose of making a comparison of the findings with those of the current study.

The study used only four variables that is project risk identification, project risk evaluation, project risk handling and project risk control as the only variables that affect performance of borehole projects in Mombasa County, Kenya, therefore future studies can incorporate other variables.

REFERENCES

Al Mihar, M.M., & Irtemeh, H.J (2017). Impact of risk management process on project success; An empirical investigate in Jordanian Ministry of Environment. *European Journal of Business and Management*, 9(19), 2222-2839

Anca, U., Cezar, B., & Adrian, U. (2015). Risk identification in project management. *In International Conference on Economic Sciences and Business Administration*, 2(1), 259-266 [Accessed on 22nd April 2019].

Aduma, L. K., & Kimutai, G. (2018). Project risk management strategies and project performance at the National Hospital Insurance Fund in Kenya. *International Academic Journal of Information Sciences and Project Management*, *3*(2), 111-136.

Alizadehsalehi, S., & Yitmen, I. (2019). A concept for automated construction progress monitoring: technologies adoption for benchmarking project performance control. *Arabian Journal for Science and Engineering*, *44*(5), 4993-5008.

Ameyaw, E. E., & Chan, A. P. (2015). Risk ranking and analysis in PPP water supply infrastructure projects: an international survey of industry experts. *Facilities*, *33*(7/8), 428-453.

Aziz, N. A. A., Manab, N. A., & Othman, S. N. (2015). Exploring the perspectives of corporate governance and theories on sustainability risk management (SRM). *Asian Economic and Financial Review*, *5*(10), 1148.

Cagliano, A. C., Grimaldi, S., & Rafele, C. (2015). Choosing project risk management techniques. A theoretical framework. *Journal of Risk Research*, *18*(2), 232-248.

Castillo-Rodríguez, J. T., Needham, J. T., Morales-Torres, A., & Escuder-Bueno, I. (2017). A combined risk analysis approach for complex dam–levee systems. *Structure and Infrastructure Engineering*, *13*(12), 1624-1638.

Chan, K., & Dodin, B. (2016). A decision support system for audit staff scheduling with precedence constraints and due dates. *The Accounting Review Journal*, 61(3), 726-734.

Chandra, P. (2015). Projects planning, analysis, selection and review. New Delhi: Tata Mcgraw.

Chihuri, S., & Pretorious, L. (2015). Managing risks for success in a South African Engineering and Construction project environment. *South African Journal of Industrial Engineering,* 21(2), 63-77.

Chileshe, N., & Kikwasi, G. J. (2014). Risk assessment and management practices (RAMP) within the Tanzania construction industry: Implementation barriers and advocated solutions. *International Journal of Construction Management*, *14*(4), 239-254.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Creswell, J. W., & Poth, C. N. (2017). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.

Cronk, R., & Bartram, J. (2017). Factors influencing water system functionality in Nigeria and Tanzania: a regression and Bayesian network analysis. *Environmental science & technology*, *51*(19), 11336-11345.

Devaney, R. (2018). *An introduction to chaotic dynamical systems*. CRC Press.

Duff, P. (2018). *Case study research in applied linguistics*. Routledge.

Flanagan, R., & Norman, G. (2017). Risk management and building. *Journal of Building Management and Economics,* 18(4), 491-500.

Fink, A. (2019). *Conducting research literature reviews: From the internet to paper*. Sage publications.

Fisher, M. B., Shields, K. F., Chan, T. U., Christenson, E., Cronk, R. D., Leker, H., ...& Bartram, J. (2015). Understanding hand pump sustainability: Determinants of rural water source functionality in the Greater Afram Plains region of Ghana. *Water resources research*, *51*(10), 8431-8449.

Gawne, B., Roots, J., Hale, J., & Stewardson, M. (2014). Commonwealth Environmental Water Office Long–Term Intervention Monitoring Project: Basin Evaluation Plan. *Report prepared for the Commonwealth Environmental Water Office by The Murray–Darling Freshwater Research Centre. MDFRC Publication*, *42*, 2014.

Giannakis, M., & Papadopoulos, T. (2016). Supply chain sustainability: A risk management approach. *International Journal of Production Economics*, *171*, 455-470.

Gitau, L. M. (2015). The effects of risk management at project planning phase on performance of construction projects in Rwanda. *Master of Science in Project Management Thesis, Jomo Kenyatta University of Agriculture and Technology*.

Glaser, B. G., & Strauss, A. L. (2017). *Discovery of grounded theory: Strategies for qualitative research*. Routledge.

Goh, C. S., & Abdul-Rahman, H. (2014). The identification and management of major risks in the Malaysian construction industry. *Journal of Construction in Developing Countries*, *18*(1), 19.

Han, Y., & Peng, Z. R. (2019). The integration of local government, residents, and insurance in coastal adaptation: An agent-based modeling approach. *Computers, Environment and Urban Systems*, *76*, 69-79.

Hashim Motaleb, O., & Kishk, M. (2014). Assessing risk response maturity: A framework for construction projects success in the United Arab Emirates. *International Journal of Managing Projects in Business*, *7*(2), 247-262.

Iqbal, S., Choudhry, R. M., Holschemacher, K., Ali, A., & Tamošaitienė, J. (2015). Risk management in construction projects. *Technological and Economic Development of Economy*, *21*(1), 65-78.

Ju, C., & Rowlinson, S. (2014). Institutional determinants of construction safety management strategies of contractors in Hong Kong. *Construction management and economics*, *32*(7-8), 725-736.

Kagiri, D., & Wainaina, G. (2017). Time and Cost Overruns in Power Projects in Kenya: A Case Study of Kenya Electricity Generating Company Limited. *ORSEA JOURNAL*, *3*(2).

Kambi, S. B. (2015). *Impact of Communal Projects Implementation Process on The Welfare of Local Communities; The Case of Msumarini Shallow Wells in Kilifi County, Kenya.* Doctoral Dissertation, University of Nairobi.

Kanda, E., Muchelule, Y., & Mamadi, S. (2016). Factors Influencing Completion of Water Projects in Kakamega County, Kenya.

Kikuvi, K. M. (2016). Determinants of Successful Implementation of Water and Sanitation Projects in Kenya: A Case of Informal Settlement in Kenya Mombasa County.

Kinyua, E., Ogollah, K., & Mburu, D. K. (2015). Effect of risk management strategies on project performance of small and medium information communication technology enterprises in Nairobi, Kenya. *International Journal of Economics, Commerce and Management*, *3*(2), 1-30.

Kisaka, S. E., & Musomi, B. (2017). The Effect of Risk Management on Performance of Investment Firms in Kenya. *Orsea Journal*, *5*(1).

Krisnawati, A., Yudoko, G., & Bangun, Y. R. (2016). Modeling an Effective Corporate Social Responsibility Based on Systems Theory and Management Functions: A Case Study in Indonesia.

Kulinkina, Alexandra V., Karen C. Kosinski, Alexander Liss, Michael N. Adjei, Gilbert A. Ayamgah, Patrick Webb, David M. Gute, Jeanine D. Plummer, and Elena N. Naumova (2016). "Piped water consumption in Ghana: A case study of temporal and spatial patterns of clean water demand relative to alternative water sources in rural small towns." *Science of the Total Environment*. 5(59), 291-301.

Kumar, R. (2019). *Research methodology: A step-by-step guide for beginners*. Sage Publications Limited.

Lagat, F. K., & Tenai, J. (2017). Effect of Risk Identification On Performance of Financial Institutions. *International Journal of Business Strategies*, *2*(1), 75-87.

Leong, T. K., Zakuan, N., Mat Saman, M. Z., Ariff, M., Md, S., & Tan, C. S. (2014). Using project performance to measure effectiveness of quality management system maintenance and practices in construction industry. *The scientific world journal*, *2014*.

Macharia, K. P. (2017). *Risk Management Strategies and Performance of Construction Projects in Public Secondary Schools in Murang'a County, Kenya* (Doctoral Dissertation, Kenyatta University).

Mackey, A., & Gass, S. M. (2015). *Second language research: Methodology and design*. Routledge.

Maritim, S. K., & Chelule, K. (2018). Influence of Project Risk Management Practices On Performance of Telecommunication Network Modernization Projects in Kenya. *European Journal of Business and Strategic Management*, *3*(7), 101-124.

Marks, S. J., Komives, K., & Davis, J. (2014). Community participation and water supply sustainability: evidence from hand pump projects in rural Ghana. *Journal of Planning Education and Research*, *34*(3), 276-286.

Maghanga E.M & Lewa, M. (2019). Influence of project risk management on performance of cement manufacturing firm's projects in Kenya. *International Journal of academics and Research* 1(4), 204-208

Mburu, D. K. (2017). Effect of Risk Management Strategies On Project Performance of Small and Medium Information Communication Technology Enterprises in Nairobi, Kenya.

Mbusi, E. T. (2016), *Influence of Monetary and Fiscal Policies on Construction Output Levels in Kenya*[online], available from http://ir.jkuat.ac.ke/handle/123456789/2082 [accessed on 01st July 2019]

Mbuva, P. M., Rambo, C. M., & Oketch, T. (2018). Influence of Risk Assessment on Performance of SME Projects in Machakos County, Kenya. *European Scientific Journal*, 14(19), 1857-7881

McNeil, A. J., Frey, R., & Embrechts, P. (2015). *Quantitative Risk Management: Concepts, Techniques and Tools-revised edition*. Princeton university press.

Mohammed, S., & Ogolla., P. (2018). Factors influencing implementation of water projects in Coast Water Services Board. *International Journal of Novel Research in Humanity and Social Sciences*, 5 (4), 53-69

Morley, C., Ablett, P., & Macfarlane, S. (2019). *Engaging with Social Work*. Cambridge University Press.

Müller-Bloch, C., & Kranz, J. (2015). A framework for rigorously identifying research gaps in qualitative literature reviews.

Mutwiri, S. (2017). *Determinants of Strategic Risk Management in Projects: A Case of AMREF Health Africa* (Doctoral dissertation, United States International University-Africa).

Mwamburi, E. K. (2013). *Factors Affecting Access of Water Supply in Kisauni Area, Mombasa County, Kenya* (Doctoral dissertation, Doctoral Dissertation, University of Nairobi).

Mwende, J. (2015), Big Projects Lift Construction Sector, *Construction Business Review* [online], available from http://www.constructionkenya.com/2888/construction-growth-kenya/, [accessed on 22nd July, 2019]

Muthoni, A. & Ogolla, P. (2018). Factors Influencing Project Risk Management in State Corporations: A Case of Kenya Pipeline Company Limited. *International Journal of Novel Research in Humanity and Social Sciences,* 5 (4),38-52

Ndambiri, J.N., & Kimutai G., (2018), Risk management and performance of health systems digitalization projects in public hospitals in Nyeri County, Kenya. S*trategic Journal of Business and Change Management*, 5(2), 2533-2549.

Ngundo, J. M. (2014), *Factors affecting effectiveness of risk management in public housing construction projects in Kenya: a case of Kibera slum upgrading housing scheme in Nairobi*, Unpublished Master of Arts Research Project, University of Nairobi, Nairobi, Kenya.

Njogu, P. M. (2015). *Assessment of effects of construction risks on project delivery among contractors in Kenya* (Doctoral dissertation, JKUAT).

Nketekete, M., Emuze, F., & Smallwood, J. (2016). Risk management in public sector construction projects: Case studies in Lesotho. *ActaStructilia*, *23*(2), 1-24.

Noga, M., Raczkowski, K., & Klepacki, J. (2015). *Risk Management in the Polish Financial System*. Springer.

Ochieng, C.H.O., (2017). Influence of project risk management strategies on the performance of organizations in the motor industry, A case of Isuzu East Africa Ltd, Kenya, *International Journal of Novel Research in Engineering and Science*, 4(2), 28-41

Odimabo, O. (2016). Risk Management System to Guide Building Construction Projects in Developing Countries: A Case Study of Nigeria.

Ogolla. P.J., Mugambi, F., & Obwongi, J. (2019). Influence of Project Managers Risk Management Competence on Performance of Mombasa County Government Project, Kenya. *The international Journal of Business & Management*, 7(5), 157-165

Ogolla, K., & Mburu, D. (2015). Effect of Risk Management Strategies on Project Performance of Small and Medium Information Communication Technology Enterprises in Nairobi, Kenya. *International Journal of Economics, Commerce and Management.,* 3(2),146-166.

Okumu, J. M., & Wanjira, J. (2017). Risk Mitigation Strategies and Performance of Insurance Industry in Kenya: A Case of Motor Insurance Companies. *American Journal of Strategic Studies*, *1*(1), 22-43.

Ondara, A. E. (2017). *Risk management strategies and performance of construction firms in selected counties in Kenya* (Doctoral dissertation, Kenyatta University).

Otaalo, G., Muchelule, Y., & Asinza, K., (2019). Effect of risk identification and risk analysis on performance of road construction projects in Kenya; A case study of Kakamega County. *International Journal of Social Sciences and Human Resources*, 7(2), 407-411

Ott, R. L., & Longnecker, M. T. (2015). *An introduction to statistical methods and data analysis*. Nelson Education.

Ouma, V.O & Nyonje R. (2016); Influence of Types of Risks on performance of distribution projects; A case of Kenya Power and Lighting Company in Nairobi County; *International Journal of Humanities and Social Sciences*, 6(8)

Pimchangthong, D., & Boonjing, V. (2017). Effects of risk management practices on IT project success. *Management and production engineering review*, *8*(1), 30-37.

Rostami, A. (2016). Tools and techniques in Risk identification: a research within SMEs in the UK construction industry. *Universal journal of management*, *4*(4), 203-210.

Saldaña, J. (2015). *The coding manual for qualitative researchers*. Sage.

Sbârcea, I. R. (2014). International Concerns for Evaluating and Preventing the Bank Risks–Basel I Versus Basel II Versus Basel III. *Procedia Economics and Finance*, *16*, 336-341.

Segismundo, A., & Miguel, P. (2015). Failure Mode and Effect Analysis (FMEA) in the context of risk management in new product development. *International Journal of Quality and Reliability Management,* 25(9), 899-912.

Silverman, D. (Ed.). (2016). *Qualitative research*. Sage.

Singh, A. S., & Masuku, M. B. (2014). Sampling techniques & determination of sample size in applied statistics research: An overview. *International Journal of Economics, Commerce and Management*, *2*(11), 1-22.

UWAZI, (2014). *It's our Water too!* Bringing greater equity in access to water in Kenya-Policy brief.

World Bank. (2014). *"Shoring Up Water Infrastructure.* "World Bank Website, as accessed on 10August 2019. http:// go.worldbank.org/I7M6HR9BP0

Yin, R. K. (2017). *Case study research and applications: Design and methods*. Sage publications.

Yirenkyi-Fianko, A. B., & Chileshe, N. (2015). An analysis of risk management in practice: the case of Ghana's construction industry. *Journal of Engineering, Design and Technology*, *13*(2), 240-259.

Young, K., & Hall, J. W. (2015). Introducing system interdependency into infrastructure appraisal: from projects to portfolios to pathways. *Infrastructure Complexity*, *2*(1), 2.

Wijethilake, C., & Lama, T. (2019). Sustainability core values and sustainability risk management: Moderating effects of top management commitment and stakeholder pressure. *Business Strategy and the Environment*, *28*(1), 143-154.