

FACTORS INFLUENCING PROJECT RISK MANAGEMENT IN STATE CORPORATIONS: A CASE OF KENYA PIPELINE COMPANY LIMITED

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Abstract: Project risk management is an essential part of project management. As with life, projects are risky and every organization should strive to have an effective project risk management process in order to identify and manage risks. Hence, the purpose of this study was 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. The theories that support this study were discussed are the Agency theory, contingency theory and communication theory. These theories have vast knowledge that supports the study. Other studies that have been carried out by other researchers were also discussed. A descriptive research design was employed during this study. The study was carried out at the Kenya Pipeline Company. The primary data for the study was collected using the questionnaires. The results of the study were presented using frequency tables. Quantitative data was analyzed using descriptive and regression statistics with the aid of Statistical Package for Social Sciences. For this study, the survey design was preferred because surveys are relatively less costly, easily accessible and also useful in describing the characteristics of a large population and making the results statistically significant even when analyzing the variables. The study selected a sample of 202 respondents from the different segments of the population in KPC to determine the factors influencing project risk management in state corporations. The data collected was tabulated and analyzed. This study employed simple random sampling technique in selecting respondents. This type of sampling is non-biased because each member of the subset has an equal probability of being chosen. From the study data analysis and interpretations, the following summary, conclusions and recommendations were drawn; Project schedule, technical expertise and communication were found to play a big role in influencing project risk management in state corporations. Thus the Kenya Pipeline Company Authority should encourage the use of project schedule, technical expertise and communication practices in project risk management in state corporations. The study found out that there was a statistically significant influence of the three variables i.e. project schedule, technical expertise and communication on project risk management. The study therefore concluded that risk management at KPC should be managed taking into consideration the three factors which were the study variables of this research. A recommendation was made to the effect that the management of KPC should deploy risk schedule, technical expertise and communication in the management of project risks.

Keywords: Project risk management, state corporations, Statistical Package, large population.

1. INTRODUCTION

Background of the Study:

In the recent past, a number of techniques and strategies have been developed to control the potential effects of risk on projects. Recent studies have systematically divided risk management strategies into three categories that included risk management process, risk identification and classification, risk analysis, and risk response (Smith, Tony, & Jobling, 2006). Risk response is further divided into four processes, i.e. retention, reduction, transfer and avoidance. Risk management on the other hand is defined as a system that aims to identify and quantify all risks to which the project is exposed so that a conscious decision can be taken on how to manage the risks (Okmen, 2012).

Lam (2011) defines risk as multiple perceptions in daily business operations. Risk is defined as the probability of an undesirable outcome, there being five types of such outcomes, namely poor system quality, cost overruns, missed deadlines, user dissatisfaction and discontinuation of the project (Besson, 2014). Risk Management is the process whereby organizations methodically address the risks attaching to their activities with the goal of achieving sustained benefit within each activity and across the portfolio of all activities. Li and Liu (2002) define strategic risk management as the uncertainty of loss of a whole organization and the loss may be profit or non-profit. Hillson (2006) just as the presence of risk is recognized and accepted as inevitable and unavoidable in every field of human endeavor, so there is a matching drive to address risk as far as possible

Global research indicates that the success rate of software projects worldwide is currently very low, and has been low for the past few decades. The application of risk management has improved the success rate of software projects in the developed world. The results indicate that the average success rate of software projects in South Africa is indeed very low, and that software projects in South Africa often experience the same risks as in the developed world. It was also found that, where risk management is applied, software projects produce better results than software projects with no risk management. The majority of South African Software Company's use ad hoc internally developed risk management procedures rather than formalized procedures.

Although risk management has been a topic of great interest, very little is actually practiced or carried out correctly (Lyons & Skitmore, 2014). For example, in 2008, a survey was undertaken in the United Kingdom found that "the extent of application of systematic and rigorous probabilistic methods to contract risks in construction (was) very scant" and "the analytical methods currently used to manage risks do not adequately deal with subjectivity" (Adams, 2015). Lyons and Skitmore (2014) carried out a survey in Queensland with similar results –judgement, experience and intuition were stated as preferred assessment methods. Chihuri and Pretorius (2010) found that in South Africa (SA), risk management was also not widely used in the engineering and construction environment, and there was a lack of actual adoption and implementation of risk management policies.

The Kenya Public Procurement Oversight Authority (PPOA) Manual for Procurement and Management of Projects (June, 2009) requires that public entities take adequate steps for risk mitigation in all public procurement contracts. For projects, the Procuring Entity (PE) should maintain a risk register to identify and monitor risks. Any risks identified which are not covered by other measures such as performance guarantees should be isolated and addressed before they affect the performance of the contract.

Kenya Pipeline Company has a business enterprise risk section, which looks into the business part of the risks. This section is liable for all sorts of business risks associated with oil marketing and completion from oil tankers. It also looks into tapping to new markets of northern Tanzania, Uganda Burundi and Congo. One thing that lacks is a project risk management unit which can look into the multi-million projects that the Parastatal is engaging in.

Statement of the problem:

The Kenya Public Procurement Oversight Authority (PPOA) Manual for Procurement and Management of Projects (June, 2009) requires that public entities take adequate steps for risk mitigation in all public procurement contracts. For projects, the Procuring Entity (PE) should maintain a risk register to identify and monitor risks. Any risks identified which are not covered by other measures such as performance guarantees should be isolated and addressed before they affect the performance of the contract. The Kenya Pipeline Company limited has experienced several challenges associated with risk. Such as tragic accidents due to oil spillage that claimed hundreds of lives in the industrial areas Sinai settlements in

2011. The company also has experienced the risk of spillage of oil in its pipeline coverage sometimes by accident or even intentionally by people with the intent to steal hence exposing the company to the risk of theft in its projects. In the projects to expand its market Kenya Pipeline Company has been faced with the risk of competition and possible risk due to discovery of oil field in Uganda and realization of peace in Sudan. However, all these risk are merely naturally operational compared to financial risks and project funds misappropriation faced by Kenya Pipeline Company. Financial risks cover all other type of project risks and is the main cause of project failure. These conditions have a big effect on project implementation and hence call for proper risk management practices in order to limit the effects of such challenges.

Kenya Pipeline Company has a business enterprise risk section which looks into the business part of the risks. This section is liable for all sorts of business risks associated with oil marketing and completion from oil tankers. It also looks into tapping to new markets of northern Tanzania, Uganda Burundi and Congo. One thing that lacks is a project risk management unit which can look into the multi-million projects that the parastatal is engaging in. Segismundo and Miguel (2009) sought to investigate Failure Mode and Effect Analysis (FMEA) in the context of risk management in new product development. However, in their study they did not talk about the risk management in planning and project processes. Kululanga and Kotcha (2010) observed that there is relatively low implementation of formal risk management methods in practice by the majority of construction contractors, especially those in the small and medium-sized category in Sub-Saharan Africa, which could lead to the construction industry consistently suffering from poor project performance. Okello (2012) in her study on Factors influencing the development of risk management strategies in the case of Safaricom Limited, captured well the aspect of government policy and strategy but the problem of communication and knowledge was not well explained despite the fact that she identified it at some point.

The question whether risk management contributes to project success is considered relevant by many from both academic and practitioners' communities. Delays in completion, upward revaluation of project costs, poor quality workmanships and premature termination of major government projects are common phenomena in Kenya and are a major concern to researchers, project sponsors, contractors and other stakeholders and cast a major doubt whether the government is able to guarantee value for money to the taxpayers. However, the empirical findings show that communication, knowledge and strategy are the main problem in project risk management. The researcher seeks to do a detailed study on the identified gaps.

Research Objectives:

This study was guided by both general and specific objectives.

General Objectives:

The general objective of the study was to assess the factors influencing project risk management in state corporations.

Specific Objectives:

- 1) To assess the influence of project schedule on project risk management in Kenya Pipeline Company
- 2) To assess the influence of technical expertise on project risk management in Kenya Pipeline Company
- 3) To establish the influence of communication on project risk management in Kenya Pipeline Company.

Research Hypothesis:

- 1) HO₁: Project schedule has no significant influence on project risk management in Kenya Pipeline Company.
- 2) HO₂: Technical expertise has no significant influence on project risk management in Kenya Pipeline Company
- 3) HO₃: Communication has no significant influence on project risk management in Kenya Pipeline Company.

2. LITERATURE REVIEW

Theoretical Framework:

This explains the meaning of some of the theories about the relationships between project schedule, technical expertise and communication. It involved the agency theory, contingency theory and communication theory.

Agency Theory:

Agency theory is directed at the ubiquitous agency relationship, in which one party (the principal) delegates work to another (the agent), who performs that work. In projects this relationship defined by the clients (the principal) and the contractor (the agent). Agency theory is concerned with resolving two problems that occur in agency relationships. The first is the agency problem that arises when; the desires or goals of the principal and agent conflict and it is the difficult or expensive for the principal to verify what the agent is actually doing.

The problem here is that the principal cannot verify that the agent has behaved appropriately. The second is the problem of the risk sharing that arises when the principal and agent have different attitudes towards risk. The problem here is the principal and the agent may prefer different actions because of the different risk preferences. Consequently, ideal principal – agent relationships should reflect efficient organization of information and the risk – bearing costs to best avoid these problems.

Brucker, Drexl, Mohring, Neumann, and Pesch, (2015) in project, potential owner – manager agency types of conflicts may be avoided by well-constructed contracts which specify the contractual relationships between the project owner and the primary contractors. Behavior – based contract and outcome based contracts are two generic types of contractual relationships which have been developed to mitigate the problems which arise from the conflict of interest between principal and agent. The behavior -based contract model is preferable when the principal can completely prescribe and monitor the actions of the agent. Initiatives are created whereby the agent is compensated for following the prescribed behavior and penalized for any deviation. This theory supports the second objective of this study which is the role of technical expertise in project risk management.

Contingency Theory:

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. 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.

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).Demeulemeester (2013), contingency theory takes into account the interaction and interrelation between the organization and its environment. This includes the recognition and accommodation of those elements that cannot be controlled. He articulates that contingency theory involves recognizing that those elements that can be controlled and influenced must be addressed in ways that vary depending on prevailing situations. In applying this theory it is emphasized that each project is unique and has got its own specifications which therefore requires suitable management practice according to its situation and specifications.

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 these contextual variables and the organization. These variables (risks factors) influence the organization and therefore the projects they are implementing. As a result, to manage any project the specific variables associated with it should be considered and evaluated (Chan & Dodin, 2016).

Communication Theory:

Communication theory was proposed by (Scudder, 1980) it states that all living beings existing on the planet communicate although the way of communication is different. Plants communicate their need to be taken care of and watered immediately through visible changes in the color of the leaves, and the falling of leaves and flowers. Animals communicate by sounds, several movements to indicate that they are hungry or unwell or need medical attention. A mother would never understand that her child is hungry unless and until the child cries. Crying is again a form through

which the child communicates that he is hungry and needs food. The same applies when he is injured, where he uses crying again as a tool to communicate his pain and need of urgent medical attention. Thus the universal law of communication theory says that all living beings whether they are plants, animals, human beings communicate through sound, speech, visible changes, body movements, gestures or in the best possible way to make the others aware of their thoughts, feelings, problems, happiness or any other information. If a child scores less marks in examinations, parents would not speak to the child for some time. Again, an effort to communicate that the parents are angry over the child's performance and he needs to buck up for his further examinations. Try to irritate a stray dog, he will surely bark on you - again an animal's way to communicate that he is angry and should not be irritated further.

Communication in project risk management entails two main aspects that is the development and creation of risk management policies and design and execution of communication about policies and issues. The two hazardous communication factors that involve most risk are the physical hazard itself and the reaction to it. Organizations need a way to communicate about present, future, and evolving risks. There is a general perception that risk communication is a two-way process between the communicator and the recipients of the messages, but beyond that, different definitions often explain different understandings. Risk communication definitions are often similar to the definition given by (Cooke-Davies, 2014), who wrote of the "process of exchanging information among different parties about the nature, magnitude, importance, or control of a risk." Other definitions emphasize the significance of risk management (Mumbua, 2015) the need for dialogue between communicators and stakeholders (Pinto, 2017) and the necessity of ongoing risk monitoring (Coombs, 2012).

Organized and centralized risk communication efforts grew out of legal and regulatory mechanisms regarding community right-to-know, Baruch Fischhoff was one of the leading pioneers of risk communication research, which built on early risk perception work driven by Paul Slovic and Sarah Lichtenstein. Fischhoff worked in this area starting in the late 1970s, culminating in the identification of seven evolutionary stages of risk communication and best practices (2009). This theory supports the third objective of this study which how communication affects project risk management.

Conceptual Framework:

Project Schedule:

The project schedule is the tool that communicates what work needs to be performed, which resources of the organization will perform the work and the timeframes in which that work needs to be performed (Bennet & Calman, 2013). The project schedule should reflect all of the work associated with delivering the project on time. Without a full and complete schedule, the project manager will be unable to communicate the complete effort, in terms of cost and resources, necessary to deliver the project (projectinsight.net). The risks associated with the project schedule can lead to budget and time overrun.

The project schedule is one of the most important tools in creating a successful project (usually after building a good team). However, the true value of the schedule is achieved if several other tools are implemented and integrated. To develop a schedule, the team must establish a Work Breakdown Structure (WBS) and an Execution Plan for the work. This is usually an iterative process: the development of each element influences the others. Stated simply, the schedule places detailed activities from the WBS dictionary into their proper sequence, with appropriate relationships defined, consistent with the execution plan (Ward & Chapman, 2013). The schedule is an integral part of the project management system required on move projects. It is integrated with budget, resources, WBS, scope, and quality requirements to produce a virtual model of the project execution plan to guide the work and reflect progress and performance through the life of the project. Initial development of the execution plan, WBS, and detailed activities of the WBS dictionary usually precede initial development of the project schedule and budget. However, the integrated nature of these components makes the development of each piece an iterative and interdependent process, except on very simple projects.

The schedule serves as a management-reporting tool as well as an implementation tool to help get the work done on time. The schedule contains activity durations, interdependencies, and constraints that help to identify conflicts and bottlenecks. When completed, the schedule produces a realistic and achievable timetable for executing the work, given the real-world constraints and limitations. The schedule is also one of the most important tools in managing changes on the project. Because the activities in the schedule are tied together with logical relationships, the schedule allows the project team to

accurately evaluate changes from the plan and identify the resulting risk impacts to time and resources throughout the entire project lifecycle, Lam (2011). The schedule also provides the project team with a tool to evaluate alternative execution strategies and manage risks, to meet business objectives (e.g., reduce duration or costs) by adjusting resources and logic.

Technical Expertise:

There is nothing more important to the success of a project than the people who make up the project team. Without good people, who possess the knowledge, experience, and motivation to get the job done, all of your other planning will be quickly wasted. (Birbil & Fang, 2015) Putting together a project team is one of the very first steps of setting up a new project. Without the people to compose a quality team, you won't be able to make very much progress at all into the work that needs to be done. A project team refers to those people doing the actual work of the project. Project management team refers to anyone involved with managing the project (Kutch & Hall, 2015) The project management team is usually a subset of the project team and is responsible for the project management and leadership activities such as planning, executing monitoring and closing the various project phases and managing risks within a project.

According to Lewis, "the primary responsibility of the project manager is to ensure that all work is completed on time, within budget and scope, and at the correct performance level" (Khosravi & Afshari, 2016). That means that, the role of project manager is to get the work done at efficient and effective way by meeting the requirements of the sponsor. This is done by coordinating the resources and managing risks (both human and capital) in a way that will yield maximum results. It is not the role of the project manager to do the actual work, but to plan, direct, monitor, and control the work such as managing the stakeholders especially the project team members, try to gear up motivation among the team so as to get everybody giving in the best to successfully get the job done. That is, the project manager must have people skills.

The "project manager must understand the mission and vision of the organization first, then they must see how the project they are managing meshes with the organization's mission, and they must steer the project to ensure that the interests of the organization are met" (Khosravi & Afshari, 2016). In addition to management skills, the project manager has to exercise leadership role for a successful completion of a project. According to Parker, "Leadership is the art of getting others to want to do something that you believe should be done" (Khosravi & Afshari, 2016). This means that as the project manager deals with the administrative aspects such as budgets, schedules, logistics etc. he also plays the leadership role that will get his team work on the project with enthusiasm by motivating and giving them the necessary authority to carry out their various functions. According to Earnest and young (2006) the Project manager is responsible for risk in their organizations. It is the project manager who must ensure that the company as a whole "gets it right" when it comes to critical decisions on risk.

Communication:

In all elements of work life the most common complaint about an organization is 'lack of communication'. A successful project manager must be a great communicator! Project management communication is a skill that is never perfected, can always be improved and is pivotal in being able to initiate and mobilize a project effectively. The PMI (2013) suggest a project manager should spend 90 per cent of their time communicating! A project team is generally quite a diverse group of people. Project teams are usually thrust together to deliver a bespoke and unique benefit to an organization, something new and different to the day to day activities undertaken (Flanagan & Norman, 2017). This diversity provides a further communication challenge for the project manager. Project leadership calls for clear communication about goals, responsibility, performance, expectations, risks and feedback.

Successful project management communication is about being there for everyone, being in touch with the real challenges of the project, understanding the real issues within the team who must deliver the project as well as understanding the issues of the sponsors who the team delivers the project for. Being present, visible and engaged with everyone is important – during the good times and the challenging times. Communication is not only about speaking to and hearing from people, it's about understanding the complete message. What language to use, how to convey the message with respect to tone, feeling and body language all play an important role in the communication process. If these are used incorrectly, the result is often a confused message and misunderstanding of the real issues.

According to Phil (2013), a successful project manager can only maximize the effectiveness of communication within the team by being prepared to lead by example. A big part of leadership is to be present, and be prepared to communicate with all stakeholders at their respective levels. Projects often ‘fail’ because we simply fail to clearly articulate the vision and the project’s success criteria. This vision must be successfully communicated to each stakeholder and team member. The whole team should be able to visualize the end result, in order to work towards a common goal. Regular reporting of the project’s progress, status and risks is crucial to the success of the project. Communicating this to all stakeholders in a clear and precise manner is paramount, so that all understand what the key messages are. Diagrams, charts, graphs and tables should be maximized here. The well-known saying “a picture is worth a thousand words” is no less true than when communicating project progress, status or risks.

Risk Management:

Risk and uncertainty can have a potential damaging results on any projects (Flanagan, Norman, & Chapman, 2010). Therefore, risk management continue to be an important feature of the project management in an attempt to deal effectively with uncertainty and unanticipated events and to achieve project success. Project Management Institute defines project risk as an uncertain condition and that the occurrence has positive or negative effect on any of the project variables, such as time, cost, scope, or quality (PMI, 2008).

Risk management is one of the most knowledge areas identified by the Project Management Institute (PMI, 2008). Risk management in the general 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 (ICE, 2005). Risk is often referred to as the presence of potential or real threats or opportunities that influence the objectives of a project during construction, commissioning, or at time of use (ICE, 2005). The indicators of achieved risk management is in the effectiveness by which the risks are handled, timeliness and completeness of the project.

3. RESEARCH METHODOLOGY

Research Design:

This study adopted a descriptive survey method, in which both qualitative and quantitative approaches were used. Qualitative analysis was used in behavioral skills, personal attributes and quality data that cannot be quantified while quantitative approach was used in the numerical data that can be easily measured. Descriptive studies- cross-sectional are more formalized and typically structured with clearly stated investigative questions (Vyas & Bapat, 2011). This study design was used because it is the most commonly used research method in social research. It serves a variety of research objectives such as descriptions of phenomenon or characteristics associated with a subject population, estimates the proportion of a population that have this characteristics and discovery of associations among different variables. This was used to find out the factors influencing project risk management in state corporations.

Target Population:

The target population contains members of a group that a researcher will study. This study was conducted in Kenya Pipeline Company Ltd. This provided a good sample for assessing the factors influencing project risk management in state corporations. The target population of this study included 410 different employees of the Kenya pipeline company from department of strategy, finance and operations and infrastructure departments.

The study population of 410 permanent and temporary employees of Kenya Pipeline Company was included as per composition in the table 3.1 below;

Table 3.1: Target population

Respondents	No of Staff	Calculation	Sample Size
Finance	36	$202/410*36$	18
Strategy	101	$202/410*101$	50
Operations	173	$202/410*173$	85
Infrastructure	100	$202/410*100$	49
TOTAL	410	$410/(1+410*0.05^2)$	202

Sample Size:

Sample size determination is the act of choosing the number of observations or replicates to include in a statistical sample. The sample size is an important feature of any empirical study in which the goal is to make inferences about a population from a sample (Bryman & Bell, 2015). The total sample size for this study was obtained using the formulae developed by Cooper and Schinder, (2013) together with (Kothari, 2014). The sample size was 202

$$n = N / 1 + N (\alpha)^2$$

Where: n= the sample size,

N= the sample frame (population)

α = the margin of error (0.05%).

$$n = 410 / 1 + 410(0.05)^2 = 202$$

Sampling Technique:

The study adopted a simple random sampling technique. In this technique, each member of the population had an equal chance of being selected as subject. The entire process of sampling was done in a single step with each subject selected independently of the other members of the population. There are many methods to proceed with simple random sampling (Cooper & Schinder, 2013).

Data Collection Instruments:

This section outlined the methods that was used to collect primary data which was a questionnaire. It also indicates the method that will be used to collect secondary data for the study.

Primary Data:

The primary research data was collected using a semi-structured questionnaire. Items in the questionnaire were arranged in a logical sequence according to the themes being studied and items that would elicit similar responses being grouped together. The questionnaire had both closed and open-ended, predetermined and standardized set of questions. These closed-ended questions were adopted since they are easier to analyze as they are in an immediate usable form, are easier to administer and are economical to use in terms of time and money (Kothari, 2014). The open ended questions gave the respondents complete freedom of response in one's own words. The researcher hopes to access greater depth of responses from these open-ended questions since the respondents' responses could give an insight into their feelings, background, hidden motivation, interests and decisions (Bryman and Bell, 2015).

Secondary Data:

Secondary data was obtained from literature sources through review of published literature such as journals, articles, published theses and text books. The researcher made use of secondary data from the education sector. These sources were reviewed to give insight in the search for the primary information.

Data Collection Procedure:

The data collection instrument in this study was a questionnaire. The research instrument were conveyed to the respondents through the drop and pick technique. The researcher approached each respondent, introduced himself to the respondents by explaining to them the nature and purpose of the study and then will leave the questionnaires with the respondents for completion and picked later within three days. Before the questionnaire is given out, the researcher had to seek for authorization from Kenya Pipeline Company Authority to collect data. A covering letter explaining the objectives of the study and assuring the respondents' confidentiality and asking them to participate in the study accompanied the questionnaire. Respondents were asked to willingly participate in the survey and give the data. Respondents were required to fill the questionnaires that included responses on measurement of sustainable performance as well as the demographic information

Pilot Testing:

Cooper and Schindler (2013) indicates that a pilot test was conducted to detect weakness in design and instrumentation and to provide proxy data for selection of a probability sample. Pilot testing provides an opportunity to detect and remedy a wide range of potential problems with an instrument. By conducting a Pilot testing it ensures that appropriate questions are asked, the right data is collected, and the data collection methods works. A pilot study was undertaken on 22 respondents to test the reliability and validity of the questionnaire. The rule of the thumb is that 1% of the sample should constitute the pilot test (Cooper & Schindler, 2013, Creswell, 2013). The proposed pilot test was within the recommendation.

Reliability:

Testing of the reliability of the scale is very important as it shows the extent to which a scale produces consistent results if measurements are made repeatedly. This was done by determining the association in between scores obtained from different administrations of the scale. If the association is high, the scale yields consistent results, thus it is reliable. Cronbach's alpha will be used to determine the internal reliability of the questionnaire that will be used in this study. Values range between 0 and 1.0; while 1.0 indicates perfect reliability, the value 0.70 is deemed to be the lower level of acceptability (Hair, Black, Barry, Anderson, & Tatham, 2006).

Validity:

Validity is the degree to which results obtained for the analysis of the data actually represent the phenomena under study. It indicates how accurate the data obtained in the study represent the variables of the study (Mugenda & Mugenda, 2009). The researcher used the most common internal consistency measure known as KMO Bartlett's test. It may be mentioned that its value varies from 0 to 1 but, satisfactorily value is required to be more than 0.6 for the scale to be reliable (Bryman & Bell, 2015). The recommended value of 0.7 is the cut off of reliability.

Data Processing, Analysis and Presentation:

Kothari and Gang, (2014) argue that data collected had to be processed, analyzed and presented in accordance with the outlines laid down for the purpose at the time of developing the research plan. Data analysis involved the transformation of data into meaningful information for decision making. It involved editing, error correction, rectification of omission and finally putting together or consolidating information gathered. The collected data was analyzed quantitatively and qualitatively. Descriptive and inferential statistics was done using SPSS version 22 and specifically multiple regression model was applied. Set of data was described using percentage, mean standard deviation and coefficient of variation and presented using tables, charts and graphs. Fraenkel and Wallen, (2014) argue that regression is the working out of a statistical relationship between one or more variables. The researcher used a multiple regression analysis to show the influence of the independent variables on the dependent variables.

The multiple regression equation is as follows;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Y = Represents the dependent variable, Risk Management

β_0 = Intercept of regression line

$\beta_1 - \beta_3$ = Partial regression coefficient of the Independent Variables

X_1 = Project Schedule

X_2 = Technical Expertise

X_3 = Communication

ε = error term or stochastic term.

4. DATA ANALYSIS RESULTS AND DISCUSSIONS

Response rate:

The study targeted 202 employees of Kenya Pipeline Company Ltd. From the study, 131 out of the 202 sample respondents filled-in and returned the questionnaires making a response rate of 64.9% as per Table 4.1 below. According to Kothari and Gang, (2014) a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent; therefore, this response rate was adequate for analysis and reporting.

Table 4.1: Questionnaire Response Rate

	Frequency	Percentage
Response	131	64.9
Non-Respondents	71	35.1
TOTAL	202	100

Validity Analysis:

Factor analysis was used to check validity of the constructs. Kaiser-Meyer-Olkin measures of sampling adequacy (KMO) & Bartlett's Test of Sphericity is a measure of sampling adequacy that is recommended to check the case to variable ratio for the analysis being conducted. In most academic and business studies, KMO & Bartlett's test play an important role for accepting the sample adequacy. While the KMO ranges from 0 to 1, the world-over accepted index is over 0.5. Also, the Bartlett's Test of Sphericity relates to the significance of the study and thereby shows the validity and suitability of the responses collected to the problem being addressed through the study. For Factor Analysis to be recommended suitable, the Bartlett's Test of Sphericity must be less than 0.05.

The study applied the KMO measures of sampling adequacy and Bartlett's test of sphericity to test whether the relationship among the variables has been significant or not as shown in below in table 4.2. Factor 1 was based on four items that represented project schedule; Factor 2 was based on four items that represented technical expertise, Factor 3 was based on four items that represented communication, Factor 4 was based on four items that represented risk management. The Kaiser-Meyer-Olkin measures of sampling adequacy shows the value of test statistic as 0.510, which is greater than 0.5 hence an acceptable index. While Bartlett's test of sphericity shows the value of test statistic as 0.000 which is less than 0.05 acceptable indexes. This result indicates a highly significant relationship among variables.

Table 4.2: KMO & Bartlett Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.510
	Approx. Chi-Square	142.071
Bartlett's Test of Sphericity	df	6
	Sig.	.000

Reliability Analysis:

Prior to the actual study, a pilot study was carried out to pre-test the validity and reliability of data collected using the questionnaire. The pilot study allowed for pre-testing of the research instrument. The results on reliability of the research instruments are presented in Table 4.3

Table 4.3: Reliability Analysis

Scale	Cronbach's Alpha	Number of Items	Remarks
Project Schedule	0.776	4	Accepted
Technical Expertise	0.709	4	Accepted
Communication	0.783	4	Accepted
Risk Management	0.781	4	Accepted

The overall Cronbach's alpha for the four categories which is 0.789. The findings of the pilot study showed that all the four scales were reliable as their reliability values exceeded the prescribed threshold of 0.7 (Bryman and Bell, 2015).

Coefficient of Correlation:

Pearson Bivariate correlation coefficient was used to compute the correlation between the dependent variable (Risk Management) and the independent variables (Project Schedule, Technical Expertise and Communication). According to Sekaran, (2015), this relationship is assumed to be linear and the correlation coefficient ranges from -1.0 (perfect negative correlation) to +1.0 (perfect positive relationship). The correlation coefficient was calculated to determine the strength of the relationship between dependent and independent variables (Kothari and Gang, 2014).

In trying to show the relationship between the study variables and their findings, the study used the Karl Pearson’s coefficient of correlation (r). This is as shown in Table 4.4 below. According to the findings, it was clear that there was a positive correlation between the independent variables, project schedule, technical expertise and communication and the dependent variable risk management. The analysis indicates the coefficient of correlation, r equal to 0.008, 0.696 and 0.406 for project schedule, technical expertise and communication respectively. This indicates positive relationship between the independent variable namely project schedule, technical expertise and communication and the dependent variable risk management.

Table 4.4: Pearson Correlation

Correlations				
	Risk management	Project schedule	Technical expertise	Communication
Risk management	1			
Project schedule	.008	1		
Technical expertise	.696**	.288**	1	
Communication	.406**	.259**	.374**	1

*. Correlation is significant at the 0.05 level (2-tailed)
 **. Correlation is significant at the 0.01 level (2-tailed).

Coefficient of Determination (R2)

To assess the research model, a confirmatory factors analysis was conducted. The three factors were then subjected to linear regression analysis in order to measure the success of the model and predict causal relationship between independent variables (project schedule, technical expertise and communication), and the dependent variable (risk management).

Table 4.5: Coefficient of Determination (R2)

Model	R	R Square	Model Summary	
			Adjusted R Square	Std. Error of the Estimate
1	.755 ^a	.570	.560	1.71240

a. Dependent variable: Risk Management

b. Predictors: (Constant), Communication, Project schedule, Technical expertise

The model explains 57% of the variance (Adjusted R Square = 0.560) on risk management. Clearly, there are factors other than the three proposed in this model which can be used to predict risk management. However, this is still a good model as Cooper and Schinder, (2013) pointed out that as much as lower value R square 0.10-0.20 is acceptable in social science research.

This means that 57% of the relationship is explained by the identified three factors namely project schedule, technical expertise and communication. The rest 43% is explained by other factors in the risk management not studied in this research. In summary the three factors studied namely project schedule, technical expertise and communication determines 57% of the relationship while the rest 43% is explained or determined by other factors.

Regression Analysis:

Analysis of Variance (ANOVA):

The study used ANOVA to establish the significance of the regression model. In testing the significance level, the statistical significance was considered significant if the p-value was less or equal to 0.05. The significance of the regression model is as per Table 4.6 below with P-value of 0.00 which is less than 0.05. This indicates that the regression model is statistically significant in predicting factors of risk management. Basing the confidence level at 95% the analysis indicates high reliability of the results obtained. The overall Anova results indicates that the model was significant at $F = 56.222, p = 0.000$.

Table 4.6: ANOVA

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	494.587	3	164.862	56.222	.000 ^b
	Residual	372.406	127	2.932		
	Total	866.992	130			

a. Dependent Variable: Risk management

b. Predictors: (Constant), Communication, Project schedule, Technical expertise

Multiple Regression:

Table 4.7: Multiple Regression

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.186	1.743		4.122	.000
	Project schedule	.301	.071	.262	4.259	.000
	Technical expertise	.496	.046	.691	10.760	.000
	Communication	.217	.064	.216	3.400	.001

a. Dependent Variable: Risk management

The regression equation was:

$$Y = 7.186 + 0.301X_1 + 0.496X_2 + 0.217X_3$$

Where;

Y = the dependent variable (Risk Management)

X₁ = Project Schedule

X₂ = Technical Expertise

X₃ = Communication

The regression equation above has established that taking all factors into account (risk management as a result of project schedule, technical expertise and communication) constant at zero risk management was 7.186. The findings presented also shows that taking all other independent variables at zero, a unit increase in project schedule will lead to a 0.301 increase in the scores of risk management; a unit increase in technical expertise will lead to a 0.496 increase in risk management; a unit increase in communication will lead to a 0.217 increase in the scores of risk management. This therefore implies that all the three variables have a positive relationship with technical expertise contributing most to the dependent variable.

From the table we can see that the predictor variables of project schedule, technical expertise and communication got variable coefficients statistically significant since their p-values are less than the common alpha level of 0.05.

Table 4.8: Hypotheses Testing

Research Hypothesis	β	t	Sig.	Comments
HO ₁ : Project schedule has no significant influence on project risk management in Kenya Pipeline Company.	.262	4.259	.000	Reject H ₀ 1
HO ₂ : Technical expertise has no significant influence on project risk management in Kenya Pipeline Company.	.691	10.760	.000	Reject H ₀ 2
HO ₃ : Communication has no significant influence on project risk management in Kenya Pipeline Company.	.216	3.400	.001	Reject H ₀ 3

5. SUMMARY OF THE FINDINGS, CONCLUSION AND RECOMMENDATION

Summary of the findings:

The study established that project schedule through scheduling methods help Kenya Pipeline Company to manage project risk management. Further the study established that project schedule through scheduling tools help enhance project risk management in Kenya Pipeline Company. The study results in general showed that there was a statistically significant influence of project schedule on project risk management in Kenya Pipeline Company Ltd

The study established that technical expertise enhances the project risk management at Kenya Pipeline Company. Knowledge was established as the key to gaining technical expertise and hence contributing to proper strategies in project risk management. Further the study established that technical expertise through leadership skills and risk ownership enhances project risk management at Kenya Pipeline Company. The study results in general showed that there was a statistically significant influence of technical expertise on project risk management in Kenya Pipeline Company Ltd.

The study established that communication enhances the distribution of information hence helping in the management of project risk management in Kenya Pipeline Company. Further the study established that communication through proper planning of communication and feedback reporting on performance of projects at every phase enhances project risk management in Kenya Pipeline Company. The study results in general showed that there was a statistically significant influence of communication on project risk management in Kenya Pipeline Company Ltd.

Conclusion:

The study concluded that project schedule through scheduling methods help Kenya Pipeline Company to manage project risk management. Further the study concluded that project schedule through scheduling tools help enhance project risk management in Kenya Pipeline Company. The study results in general concluded that there was a statistically significant influence of project schedule on project risk management in Kenya Pipeline Company Ltd.

The study concluded that technical expertise enhances the project risk management at Kenya Pipeline Company. The study concluded that knowledge is the key to gaining technical expertise and hence contributing to proper strategies in project risk management. Further the study concluded that technical expertise through leadership skills and risk ownership enhances project risk management at Kenya Pipeline Company. The study results in general concluded that there was a statistically significant influence of technical expertise on project risk management in Kenya Pipeline Company Ltd.

The study concluded that communication enhances the distribution of information hence helping in the management of project risk in Kenya Pipeline Company. Further the study concluded that communication through proper planning of communication and feedback reporting on performance of projects at every phase enhances project risk management in Kenya Pipeline Company. The study results in general concluded that there was a statistically significant influence of communication on project risk management in Kenya Pipeline Company Ltd.

Recommendation:

The study recommended the following:

1. That Kenya Pipeline Company Ltd should adopt project scheduling techniques such as project information, scheduling methods and scheduling tools in order to enhance proper project risk management in the organization.

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2. That Kenya Pipeline Company Ltd should encourage recruitment and retention of technical experts with knowledge in various aspects of management and leadership skills so as to enhance proper risk management in the organization.
3. That Kenya Pipeline Company Ltd should have a clear communication plan to help distribute accurate information to various stakeholders and also help enhance performance reporting of various projects at each and every phase so as to enhance proper risk management in the organization.

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