PROJECT RISK MANAGEMENT PRACTICES AND SUCCESS OF CAPITAL PROJECTS IN KENYA

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DECLARATION

This research project is my original work and has not been presented to any other institution of learning for the award of any academic certificate.

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The research project report has been submitted for examination with my approval as the university supervisor.

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DEDICATION

This research project is dedicated to my dear wife, Carol and my lovely sons Fredrick and Jeremy for their enormous support during my study. Special thanks to my parents, brother and sisters.

ABSTRACT

This study sought to establish the extent of application of project risk management practices such as risk identification, risk analysis and ranking, risk response and monitoring and use of risk management tools on Kenya Airports Authority capital projects and the influence of these practices on the success of these projects.

This study adopted the case study of the Kenya Airports Authority which has implemented 44 projects which constituted this study's targeted population. The projects had been implemented over the 3 years period from July 2009 to June 2012. Primary data was collected for the purpose of this study. It was collected using interviews and self administered structured questionnaires. Descriptive statistics were used to analyze the data by way percentages, means, variance, standard deviation, correlation analysis and multiple regression analysis.

Findings from the study revealed that, risk management practices have been widely applied in projects which were considered to be complex as these projects attracted a lot of public attention because of substantial impacts on communities, economy, environment, and budgets. While there are plenty of risk management practices, tools and techniques available, many projects implementation teams did not often use them. From the analysis of the data collected, it was proved that risk management has a positive correlation with project success. When used consistently, risk management practices increased the chances of project success.

Due to the low application of risk management practices on low uncertainty projects the study concluded that, there's need to create more awareness on project risk management practices. Additional tools and risk management practices need to be developed and tested to determine which tools works best in the different scenarios and environments. This will ensure that risk management improves project performance and success.

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LIST OF ABBREVIATIONS

CCTV	-Closed Circuit Television
EIA	- Eldoret International Airport
EoT	- Extension of Time
ERM	- Enterprise Risk Management
ERMPF	-Enterprise Risk Management Policy Framework
FIDS	- Flight Information Display System
FMEA	- Failure Mode and Effect Analysis
FTA	-Fault Tree Analysis
FY	-Financial Year
ILRI	- International Livestock Research Institute
JKIA	- Jomo Kenyatta International Airport
KAA	- Kenya Airports Authority
KAP	- Kisumu Airport
MIA	- Moi International Airport
PE	- Procuring Entity
PPOA	- Public Procurement Oversight Authority
PM	- Project Management
PMBOK	-Project Management Book of Knowledge
PRM	-Project Risk Management
RM	- Risk Management
RM&C	-Risk Management & Compliance
SWOT	- Strengths, Weaknesses, Opportunities and Threats
TQM	- Total Quality Management
VIP	-Very Important Persons
VO's	- Variation Orders
VoP	-Variation of Prices
VoR	-Variation Orders or Variation of Quantities
WAP	-Wilson Airport

CHAPTER ONE: INTRODUCTION

1.1 Background

The modern business environment is characterized by turbulence and cut throat competition. The turbulence and competition is spurred by globalization, technological change, more demanding customers and higher levels of uncertainty which have made management of organizations more challenging than before (Black & Fitzgerald, 2000). In times of increasing global competition, the success of projects becomes more decisive to an organization's business performance. However, many projects still present delays, changes in their scope, failures and, some might be cancelled (Shenhar, 2001). As a general rule, those problems may occur due to inefficient management of project risks. Managing project risks has become fundamental to successful project management (Carbone & Tippett, 2004), however, tools and techniques for risk management that have been developed and used to increase the chances of project success are not yet widespread or generally applied (Kumar, 2002).

All entities face uncertainty, the challenge for management is to determine how much uncertainty it is prepared to accept as it strives to grow stakeholder value. Uncertainty presents both risk and opportunity, with the potential to erode or enhance value. Project risk management enables management to identify, assess, and manage risks in the face of uncertainty, and is integral to value creation and preservation. (Kenya Airports Authority Enterprise Risk Management Policy and Framework (ERMPF), 2011)

Project risks may be defined as undesired events that can range from delay, excessive expenditures, and unsatisfactory project results for the organization, society, or environment (Shenhar, Raz, & Dvir, 2002). According to Project Management

Institute's (PMI) Project Management Body of Knowledge (PMBOK, 2004) a project risk is an event or uncertain condition that, if it occurs, produces positive or negative effects on at least one aspect of the project, such as cost, scope, quality, and so on. Project management includes the processes concerned with conducting risk management planning, identification, analysis, responses, monitoring and control on a project (PMBOK, 2004).

A project is commonly acknowledged as successful when it is completed on time, within budget, and in accordance with specifications and to stakeholders' satisfaction. Functionality, absence of claims and court proceedings and "fitness for purpose" for occupiers have also been used as measures of project success (Takim & Akintoye, 2002)

KAA implements capital projects worth millions of shillings. These projects are majorly civil works, mechanical, electrical works and IT related works. Other projects consuming a considerable budget in KAA are construction and maintenance works for airport facilitates (including runways, taxiways, aprons, terminal buildings and other structures). Review of these projects has revealed that most of these projects have not been completed on time, budget/cost and/or met quality specifications. Contractors therefore seek extension of time (EoT) and/or variation orders in order to complete the projects and cater for costs attributed to the change in scope.

1.1.1 Project Risk Management Practices

A project is a temporary endeavor undertaken to create a unique product, service or result (PMBOK, 2004). Project management involves initiating, planning, organizing and managing resources in order to achieve project goals and objectives. The primary

challenge of project management is to achieve all project goals and objectives while taking cognizance of the project constrains. Typical constrains are scope, time and budget. The secondary and more ambitious challenge is to optimize the allocation and integration of inputs necessary to meet the predetermined objectives.

Jaafari (2001) defines risk as exposure to loss/gain, or the probability of occurrence of loss/gain multiplied by its respective magnitude. The PMBOK (2004) defines risk as an uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives. Hillson (2004); Ward and Chapman (2003) highlight the importance of including the management of opportunities in any risk management process.

Project risk management includes the process concerned with conducting risk management planning, identification, analysis, responses and monitoring and control on a project (PMBOK, 2004). The discipline of project risk management has developed over the recent decades as an important part of project management. Several researchers, Miles and Wilson (1998) and Mullins et al. (1999), argue risk as being an exposure or a probability of occurrence of a loss. When put into context, risk can have a two-dimensional meaning, namely a negative as well as a positive implication.

Risk management practices involve identifying, understanding and determining the potential unsatisfactory outcomes likely to affect a project. After identifications of these undesired events the risks are analyzed based likelihood and impact of the risks. Tools used in risk assessment include the use of probability/impact matrices (Risk matrices) ,

strength, weakness, opportunity, threat (SWOT) analysis, and top ten risk item tracking technique (Kululanga & Kotcha, 2010 and Cervone, 2006).

After risks are analyzed, they ranked/prioritized depending on their significance to a particular project. According to Lansdowne (1999) and Cervone (2006), probability and impact can be prioritized using a five-point scale for evaluating risk in the scale of critical risk, serious risk, moderate risk, minor risk and negligible risk. Risk control and response includes avoidance, acceptance, transfer and mitigation. Positive risks can be exploited, shared and enhanced (PMBOK, 2004). Risks are continuously monitored and re-assessed to identify new risks and identify effectiveness of risk control and responses (Cervone, 2006).

Raz et al (2002) identifies 5 PRM practices which include; systematic risk identification through documentation reviews and information gathering techniques such as interviews and SWOT analysis; probabilistic risk analysis including the assessment of likelihood that a risk will occur and the consequences if it occurs; detailed planning for uncertainty to reduce the probability and/or the consequences of an adverse risk event to an acceptable threshold; methodic trade-off analysis resulting in a detailed risk response plan and appointing a risk manager.

1.1.2 Project Success

The success of a project is traditionally measured by time, budget, and requirements criteria. Despite the fact that this manner of measuring project success is currently subject to widespread criticism, this criteria is still often used in publications on project success in IT projects (Royal Academy of Engineering, 2004). The criticism refers to

three points, which are related to the assumptions that this definition is based on: the amount of time, the budget, and the project's requirements can be set at the beginning of the project; the project's success is the same for each project stakeholder; the project's success can be determined at the moment the project has produced its deliverables. Setting time and budget limits and defining the requirements always take place at the beginning of the project, when uncertainty is at its maximum (Pinto, 2007), and it is practically impossible to set realistic limits and goals.

According to Chandra (2002), a project is said to succeed when it's in line within the trinity of time, budget and specification constrains. Success factors in a project include among other things, proper feasibility studies, and commitment to project methodology, planning, effective monitoring and evaluation. The primary focus is on the results, with time and cost overruns and project sickness (ability or inability of the project to deliver desired results) being the major performance indicators (Block & Davidson 2001).

A project is commonly acknowledged as successful when it is completed on time, within budget, and in accordance with specifications and to stakeholders' satisfaction. According to Takim and Akintoye (2002), functionality, profitability to contractors, absence of claims and court proceedings and "fitness for purpose" have also been used as measures of project success. According to Khakina (2006) the success of a project is defined by three transaction metrics: time, budget and quality. Success will not only focus on completion but completion within the time, budget and quality constrains.

Most projects in Kenya face various challenges including delays in completion, upward revaluation of project costs, poor quality workmanships and premature termination of

the projects. The numerous incidents of reported delays and increase in project costs for major public sector projects in Kenya is a major concern to researchers, clients, project sponsors, contractors and other stakeholders and cast a major doubt whether the government is able to guarantee value for money to the taxpayers.

This phenomenon is also reflected in KAA were major projects have not been completed on time, budget/cost and met quality and design specifications. Contractors therefore seek extensions of time (EoT), variation of prices and/or variation orders in order to complete the projects and cater for costs attributed to the change in scope. In some cases the project deliverables fail even before they are handed over to the project sponsor while many others fail during the project liability period.

According to Alter and Ginzberg (1978), the likelihood of successful project implementation can be increased by identifying the key uncertainties at each stage of the development process and devising strategies for coping with the range of possible results. Weick and Sutcliffe (2007), suggests that risk management contributes to project success because the stakeholders are aware of the fact that there are risks, on the basis of which they adjust their expectations and behavior accordingly.

1.1.3 Kenya Airports Authority and Capital Projects

The Kenya Airports Authority (KAA) is a parastatal established in 1991 through an Act of Parliament (KAA Act), Chapter 395 of the Laws of Kenya and is charged with the responsibility of providing and managing a coordinated system of airports in the country.

Its main functions include administering, controlling and managing aerodromes, to provide and maintain facilities necessary for efficient operations of aircrafts, to construct, operate and maintain aerodromes and other related activities, and to construct or maintain aerodromes on an agency basis on the request of the government of Kenya.

In the KAA context, a capital project is a long-term investment requiring relatively large sums to acquire, develop, improve, and/or maintain (such as terminal buildings, runways, taxiways, airfield lighting system and aprons). It is a new construction, expansion, renovation, or replacement of an existing facility or facilities, purchase of major equipment (assets) or a major maintenance or rehabilitation of existing facilities. The project must have a total cost of at least Kshs. 10 Million. The project costs include the cost of land, engineering, architectural planning, and contract services needed to complete the project.

KAA is the only institution in Kenya mandated by the laws of Kenya to manage aerodromes. To this end, KAA has implemented various major projects over the period from July 2009 to June 2012 of varying scope ranging from contract price of Kshs. 10 M to Kshs. 4.8B. Over this period about 44 projects with a project sum of Kshs. 29.6B have/are been implemented. The projects are implemented by various project implementation teams who have consistently used various project risk management practices resulting to varying project successes.

In January 2011, KAA set up a Risk Management and Compliance Section in Internal Audit to assist management in developing an Enterprise Risk Management Policy

Framework (ERMPF) and advice it on risk management. It is therefore expected that the adoption of the KAA ERM Policy Framework in 2011 by the KAA board and the setting up of this section will positively influence project success.

1.2 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.

Alter and Ginzberg (1978) suggests the likelihood of successful project implementation can be increased by identifying the key uncertainties at each stage of the development process and devising strategies for coping with the range of possible results. However, the use of the word "suggest" indicates, the effects of risk management are hard to establish. A number of other studies which have been done in PRM and PM include; Bakker et al (2009) in a study on whether risk management contributes to IT project success concludes that that risk management can only be effective in specific project situations. Weick and Sutcliffe (2007), suggests risk management contributes to project success because the stakeholders are aware of the fact that there are risks, on the basis of which they adjust their expectations and behavior accordingly.

Other studies examined, mainly focus on the risk management processes in projects. For instance, Segismundo and Miguel (2009) sought to investigate Failure Mode and Effect

Analysis (FMEA) in the context of risk management in new product development. 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.

Although a number of scholars have explored project risk management in projects, as yet, there does not appear to be any study that has considered the influence of PRM on the success of projects in Kenya. A close examination of studies done in Kenya reveals that they have focused on functional silos such project risk management, quality management and TQM. Ngugi (2007) found that foreign exchange risk influences the project management practices adopted at ILRI. Mandere (2006) examined the quality management practices in large construction firms in Kenya and found that very few firms were using modern quality management practices. A study by Omufira (2001) to find the extent of TQM implementation in the construction industry in Kenya revealed that very few firms were practicing it.

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.

This phenomenon is also reflected in KAA were major projects have not been completed on time, budget/cost and met quality and design specifications. In some cases the project deliverables fail even before they are handed over to the project sponsor while many others fail during the project liability period.

KAA has implemented various major projects over the period from July 2009 to June 2012. The projects are implemented by various project implementation teams who have consistently used various project risk management practices; as such the projects have recorded varied successes in meeting the project objectives. KAA also adopted the ERM Policy Framework in 2011 and set up a risk management section to advice on risk management. It's expected that these actions will/have led to accelerated project success

This study therefore sought to answer the following questions: To what extend are project risk management practices applied to KAA major projects, and Do these project risk management tools, practices and techniques influence the success of the projects?

1.3 Objectives of the Study

The general objective of this study was to establish the influence of project risk management practices on the success of projects; however the specific objectives were;

i) To establish the extent of application of project risk management practices in projects at the KAA; and

ii) Determine the relationship between project risk management practices and the success of capital projects implemented by the KAA.

1.4 Value of the Study

The findings of this study are expected to add value to number of players involved in project management including:

Kenya Airports Authority will be able to streamline its project implementation function since the study will provide information on the significance of project risk management on the success of projects.

Risk management practitioners will get valuable information on how risk management practices influence the success of projects. This study will also help project managers understand the effectiveness of PRM practices in ensuring project success.

To scholars the study will form a base for development of PRM as a discipline /field of study and further studies on project risk management and project success. The findings of this study will also add new knowledge about PRM in the local public sector industry and will serve as a basis for further research.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter introduces the review of theoretical literature relating to project risk management and project success. It provides a critical look at the work that has been done by other researchers which is related to this study. Relevant literature are presented and discussed under different sub-sections as outlined below.

2.2 Project Risk Management

A project is a temporary endeavor undertaken to create a unique product, service or result Project management involves initiating, planning, organizing and managing resources in order to achieve project goals and objectives (PMBOK, 2004). Jaafari (2001) defines risk as exposure to loss/gain, or the probability of occurrence of loss/gain multiplied by its respective magnitude. The PMBOK (2004) defines risk as an uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives.

Project Risk Management includes the process concerned with conducting risk management through planning, identification, analysis, responses and monitoring and control on a project (PMBOK, 2004). The discipline of project risk management has developed over the recent decades as an important part of project management. Several researchers, Miles and Wilson (1998) and Mullins et al. (1999), argue risk as being an exposure or a probability of occurrence of a loss.

The interest on how risk management contributes to project success goes back as far as the 1970's with Alter and Ginzberg (1978), whose article suggests that the likelihood of

successful project implementation can be increased by identifying the key uncertainties at each stage of the development process and devising strategies for coping with the range of possible results" (Alter and Ginzberg, 1978). However, the use of the word "suggest" indicates, the effects of risk management are hard to establish.

A number of other studies have been done in PRM and PM especially include; Bakker et al (2009) in a study on whether risk management contributes to IT project success concludes that that risk management can only be effective in specific project situations and that knowledge of the risks alone is not enough to contribute to project success. Furthermore, it would be interesting to combine the relation found by Cooke-Davies (2000) between risk management planning and a timely delivery of the project with the work of Weick and Sutcliffe (2007), who discuss awareness creation and attention shaping as conditions for stakeholder behavior in uncertain situations. In this view, risk management contributes to project success, because the stakeholders are aware of the fact that there are risks, on the basis of which they adjust their expectations and behavior accordingly.

According to Kutsch and Hall (2005) knowledge of the risks does not automatically imply that this knowledge is used for managing those risks. That less is known about what happens inside the risk management process; what risk management practices are used within a project, which stakeholders are participating in these practices, how these risk management practices influence stakeholders, and how these practices influence project success. These are relevant questions, to which the risk management approach so

far has not provided satisfactory answered, and neither does it give a truthful representation of how stakeholders actually behave.

Other studies examined, mainly focus on the risk management processes in projects. For instance, Scgismundo and Miguel (2009) sought to investigate Failure Mode and Effect Analysis (FMEA) in the context of risk management in new product development. Raz et al (2002) in their study on risk management, project success and technological uncertainty in Israel concluded that risk management was still in its infancy in projects management and the since there are various risk management tools, further research was needed to find what works best in what circumstances and environments. Dey (2007) studied managing of projects in a fast track, a case study of public sector organizations in India. Kululanga and Kotcha (2010) in their study on measuring project risk management processes for construction contractors with statement indicators linked to numerical scores concluded that in the Sub-Saharan Africa, 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, which could lead to the construction industry consistently suffering from poor project performance.

Although a number of scholars have explored project risk management in the in projects, as yet, there does not appear to be any study that has considered the influence of PRM on the success of projects in Kenya. A close examination of studies done in Kenya reveals that they have focused on functional silos such as effects of foreign exchange risks on project management, TQM and materials management. Major examples Ngugi

(2007) who sought to investigate the effect and extent of foreign exchange risk in project management at the ILRI. Kimilu (2005) sought to investigate and document materials quality management practices in Kenyan building industry and found out that there is some level of usage of materials management practices. Mandere (2006) examined the quality management practices in large construction firms in Kenya and found that very few firms were using modern quality management practices. A study by Omufira (2001) to find the extent of TQM implementation in the construction industry in Kenya revealed that very few firms were practicing it.

2.3 Project Risk Management Practices

Recent development in the field of project risk management has enabled better understanding of the overall risk management concept by introducing risk management processes nine phases (Chapman, 1997), or five phases as per Tummala and Burchett (1999) instead of the three phases of identification, analysis, and mitigation. Moreover, the development has also gone into a more detailed level in identifying, estimating, and responding phases (Artto et al., 2000). Several researchers Shen (1997), March and Shapira (1987), Uher and Toakley (1999), Pender (2001) and Williams (1999), argue that today's methodologies of risk management are not sufficient for industrial use. Therefore, risk management philosophy and framework must be capable of quickly re-evaluating the project's options against surprise developments and provide a systematic basis for its re-structuring (Jaafari, 2001). PMBOK (2004) identifies 6 steps in project risk management which include, risk management planning, risk identification, qualitative risk analysis, quantitative risk analysis, risk response planning and risk monitoring and control. Dey (2000) identified 4 steps in managing project risks in the

public sector to include identifying risk factors; analyzing their effect; responding to risk; and controlling the responses.

Other researchers (Wang and Chou, 2003; Baker et al., 1999; Kangari, 1995; Shen et al., 2001; Chio et al., 2004; Shang et al., 2005) identified the following process of project risk management; risk identification; risk analysis, systems risk approach, risk exposure, risk prioritization, risk response, risk contingency planning, risk monitoring, risk continuous reassessment, and the application of total quality management tools. KAA ERM Policy and Framework (2011) has identified 8 stages in the process of risk management which include; internal environment, objective setting, event identification, risk assessment, risk response, control activities, information and communication and monitoring.

2.3.1 Risk Identification

Risk identification entails understanding and determining the potential unsatisfactory outcomes likely to affect a project. Risk identification is associated with the use of the following techniques: expert judgment, brainstorming, Delphi technique and interviews. (Kululanga & Kotcha, 2010). In risk identification the project team initially considers a range of potential events – stemming from both internal and external sources.

2.3.2 Risk Assessment and Analysis

Risk analysis involves the assessment of the likelihood and impact of risks to determine their magnitude in order that the range of forces that could produce an adverse effect are known, the assets that could be affected are recognized, the features that increase the risk likelihood are identified and the extent to which the risk manifest itself. Tools

associated with this stage include the use of probability/impact matrixes, strength/weakness/opportunity/threat analysis, and top ten risk item tracking technique (Kululanga & Kotcha, 2010 and Cervone, 2006).

2.3.3 Risk Prioritization or Ranking

Risk prioritization involves itemizing all identified project risks in a particular hierarchy of project risk significance for a particular project (Kululanga & Kotcha, 2010 and Cervone, 2006). Risks are assessed both quantitatively and qualitatively and measured in terms of impact and likelihood. Impact is the potential loss should the risk materialize. Likelihood (risk exposure) is the probability that an adverse event, which could cause materialization of the risk, may occur (KAA, 2011)

According to Lansdowne (1999), impact can be prioritized using a five-point scale for evaluating risk impact: *Critical risk* – five points – would cause program failure, *Serious risk* – four points – would cause major cost or schedule increases and secondary requirements may not be achieved, *Moderate risk* – three points – would cause moderate cost/schedule increases; important requirements would still be met, *Minor risk* – two points – would cause only small cost/schedule increases and *Negligible risk* – one point – would have no substantive effect on cost or schedule.

The second dimension, probability, is based on Kendrick's (2003) rubric of; *High probability* – five points – likely occurrence with a 50 percent or greater chance, *Medium probability* – three points – unlikely with a 10 percent to 49 percent chance of

occurrence and *Low probability* – one point – very unlikely with a 10 percent or less chance of occurrence.

The third dimension, entitled discrimination and based on criteria from Kendrick (2003), is unique within simple decision-based models. It provides an additional perspective that is designed to gauge the impact of the risk to the overall framework of the project, rather than looking at each risk as an independent variable within the project. The levels of discrimination are: *High effect* – one point – project objectives are at risk, this risk will result in a mandatory change to scope, schedule, or resources, *Medium effect* – three points – project objectives will be achieved, but significant re-planning will be required and *Low effect* – five points – no major plan changes will result; the risk is an inconvenience or can be handled with minor overtime work.

With each risk evaluated in the context of the three dimensions, a point value can be assigned to each risk using the formula: *Overall risk factor = (Probability*impact)/discrimination*: All of the project risk factors can then be ranked by severity of risk and, therefore, overall potential impact on the project. (Cervone, 2006)

2.3.4 Risk Management Response Strategies

Risk response focuses on the identified and quantified project risks. Risk responses include, eliminating the risk by avoiding it usually by treating the root causes; accept the risk but have a contingency plan in place; shift risk to a third party by transferring it, for example, through insurance; and reducing the likelihood of its occurrence by mitigation (Cervone, 2006).

Risk response strategies are the approaches made in dealing with the risks identified and quantified. The strategy(s) most likely to be effective should be selected for each risk (PMBOK, 2004). There are 3 typical strategies which deal with negative risks or threats and 3 strategies which deal with positive risks or opportunities.

2.3.4.1 Strategies for Negative Risks or Threats

The strategies to deal with threats in projects include avoiding, transferring and mitigation. Risk avoidance involves changing the project management plan to eliminate the threat posed by the adverse risk, to isolate the project objectives from the risk impact or to relax the project objective that is in jeopardy such as extending the schedule or reducing the scope (PMBOK, 2004). An example of avoiding risk could be avoiding use of untested third party components in the software design, or avoiding inclusion of an inexperienced resource the project team.

Risk transfer requires shifting the negative impact of a threat, along with ownership of a response to a third party. Transferring the risk gives another party responsibility for its management but does not eliminate it, in most cases it involves payment of a risk premium to the party taking on the risk (PMBOK, 2004). Transference tools include use of insurance, performance bonds, fixed cost contracts, warranties, defect liability periods and guarantees.

Risk mitigation involves reduction in the probability and/or impact to an acceptable level. Reduction in probability of occurrence would reduce the likelihood of its occurrence and reduction in impact would imply a lesser loss if the risk event occurs (PMBOK, 2004). Examples of risk mitigation include prototyping, adopting less

complex processes, choosing a more stable supplier, conducting more tests and designing redundancies into a system.

2.3.4.2 Strategies for Positive Risks or Opportunities

The strategies to deal with potentially positive impacts on projects include Exploiting, Sharing and Enhancing. Risk exploiting seeks to eliminate the uncertainty associated with a particular upside risk by making the opportunity to happen (PMBOK, 2004). An example could be a situation where the seller will pay an incentive fee if work is completed a week ahead of the completion deadline or assigning more talented resources to the project. On the other hand Risk sharing involves allocating ownership to a third party who is able to best capture the opportunity for the benefit of the project (PMBOK, 2004). It includes sharing the fruits of an opportunity with a third party because you do not have the capability to exploit it alone. Examples include joint ventures, teams or special purpose companies. Risk enhancement modifies the size of the opportunity by increasing the probability and/or positive impacts by reinforcing its trigger condition or key drivers (PMBOK, 2004).

2.3.5 Risk Monitoring and Continuous Improvement

Risk monitoring and continuous reassessment involves monitoring known risks, identifying new risks, reducing risks, and evaluating the effectiveness of risk reduction. The main output at this stage has been associated with corrective actions and project change requests. Continuous reassessment involves periodic reviews of project risk status to identify new risks, and to examine changes in probabilities or impacts and

changes in the contractor's project risk responses (Kululanga & Kotcha, 2010 and Cervone, 2006).

2.4 Sources of Projects Risks

Projects risks arise from internal or external environment. According to a global research conducted by the Muto Performance Corp, 2010, the top 10 risks or reasons for project failure include; changes to project scope (scope creep); inadequate resources (excluding funding); insufficient time to complete the project; critical requirements are unspecified or missing; inadequate project testing; critical project tasks are delivered late; key team members lack adequate authority; the project sponsor is unavailable to approve strategic decisions; insufficient project funding and key team members lack critical skills. Horine (2005) identified 11 sources of project risks as detailed in the table 2.4.

2.5 Risk Management Tools and Techniques

Raz et al (2002) identifies 5 PRM practices which include; systematic risk identification through documentation reviews and information gathering techniques such as interviews and SWOT analysis; probabilistic risk analysis, including the assessment of likelihood that a risk will occur and the consequences if it occurs; detailed planning for uncertainty to reduce the probability and/or the consequences of an adverse risk event to an acceptable threshold; methodic trade-off analysis resulting in a detailed risk response plan and appointing a risk manager. PMBOK, 2004 identifies tools and techniques for risk identification to include; documentation reviews, interviewing, brainstorming, cause and effect diagrams, checklist analysis, Failure Mode and Effect Analysis (FMEA) and

the Fault Tree Analysis (FTA). The output of these techniques is the risk management plan and the risk register.

Table 2.4: Common Sources of Project Risks

Risk Source Category	Examples/Factors
Project size and complexity	Effort hours, calendar time, team size (number of resources), number of sites or business units, number of system interfaces and number of dependencies on other projects or other systems.
Requirements	Volatile requirements, unrealistic or aggressive performance standards and complex requirements.
Change Impact	Replacement or new system, impact on business policies or organizational structures and operations.
Organization	Wrong priorities, lack of project management "buy-in" and support and misallocation and mismanagement of resources.
Sponsorship	Lack of strong executive commitment, lack of clear ownership and loss of political support.
Stakeholder involvement	All key stakeholders not identified, missing "buy-in" from a key stakeholder, stakeholder needs not completely identified and key stakeholders not fully engaged
Schedule	Wrong estimates and contingency is not adequate.
Funding	Reduction in available capital, cash flow issues and inflation or exchange rate factors.
Project Management and Team	Full-time or part-time roles, location of project team members, lack of experience, skill, commitment and business knowledge, poor leadership, poor communication, inadequate risk management.
Technology	Missing technical data and use of unproven or non-standard technology.
External factors	Changing weather conditions, changes in legal and regulatory environment, changes in legal and regulatory environment, Approvals from governmental agencies and Political changes.

Adapted from Horine (2005): Absolute Beginners Guide to Project Management

2.6 Project Success

A project is commonly acknowledged as successful when it is completed on time, within budget, and in accordance with specifications and to stakeholders' satisfaction.

Functionally, profitability to contractors, absence of claims and court proceedings and "fitness for purpose" for occupiers have also been used as measures of project success (Takim & Akintoye, 2002).

The success of a project is also traditionally measured by time, budget, and requirements criteria. Despite the fact that this manner of measuring project success is currently subject to widespread criticism, this criteria is still often used in publications on project success in IT projects (Royal Academy of Engineering, 2004). The criticism refers to three points, which are related to the assumptions that this definition is based on: the amount of time, the budget, and the project's requirements can be set at the beginning of the project; the project's success is the same for each project stakeholder; the project's success can be determined at the moment the project has produced its deliverables. Setting time and budget limits and defining the requirements always take place at the beginning of the project, when uncertainty is at its maximum (Pinto, 2007), and it is practically impossible to set realistic limits and goals.

According to Chandra (2002), a project is said to succeed when it's in line within the trinity of time, budget and specification constrains. Success factors in a project include among other things, proper feasibility studies, and commitment to project methodology, planning, effective monitoring and evaluation. The primary focus is on the results, with time and cost overruns and project sickness (ability or inability of the project to deliver desired results) being the major performance indicators (Block & Davidson 2001).

Obviously, determining whether a project is a success or failure is intricate and ambiguous. There are three main reasons among which Belassi and Tukel (1996)

pointed out the first two. First, as mentioned by de Wit (1988) and Pinto and Slevin (1989), it is still not clear how to measure project success since project stakeholders perceive project success or failure differently. Second, lists of success or failure factors vary in numerous studies. According to a study by Muto Performance Corp, 2010 the top 10 reasons for projects failure include; changes to project scope (scope creep); inadequate resources (excluding funding); insufficient time to complete the project; critical requirements are unspecified or missing; inadequate project testing; critical project tasks are delivered late; key team members lack adequate authority; the project sponsor is unavailable to approve strategic decisions; insufficient project funding and key team members lack critical skills.

The third reason, as also remarked by de Wit (1988), is that for each project stakeholder, the objectives and their priorities are set differently throughout the project life cycle and at different levels in the management hierarchy. It is necessary that distinctions be made between project success and project management success and between project success and project performance.

It is necessary that distinctions be made between project success and project management success and between project success and project performance. Previous studies (Munns and Bjeirmi, 1996; Cooke-Davies, 2002) clarified that project success is measured against the overall objectives of the project while project management success is measured against cost, time and quality/performance. Cooke-Davies (2002) noted that the distinction between project success – which cannot be measured until after the project is completed, and project performance – which can be measured during the life

of the project is also important. However, Baccarini (1999) insists that project success is measured both in terms of product (including facilities) success and project management success.

The objectives of budget, schedule, and quality are key measures that contribute to the goal of construction project success. Chandra (1995) pointed out that project success is measured against the overall objectives of the project while project management success is measured against cost, time and quality/performance.

According to Khakina (2006) the success of a project is defined by three transaction metrics: time, budget and quality. Success will not only focus on completion but completion within the time, budget and quality constrains. Chen and Chen (2007) identified different sets of success for different project objectives. He pointed out that, these factors contribute to different facets of project success. These success factors are planning effort in project designing, planning during construction, goal commitment, project team motivation, technical capabilities an d scope.

2.7 Summary of the Literature Review and Research Gap

The literature reviewed in this study highlighted a number of studies that have been done project risk management both locally and internationally. Local studies include those Ngugi (2007) who sought to investigate the extent of foreign exchange risk in project management at ILRI. Kimilu (2005) sought to investigate and document materials quality management practices in Kenyan building industry and Mandere (2006) examined the quality management practices in large construction firms in Kenya and found that very few firms were using modern quality management practices. Omufira

(2001) found very few firms were applying TQM principles in implementation of their construction projects.

Internationally, researchers such as Alter and Ginzberg (1978), suggests the likelihood of successful project implementation can be increased by identifying and managing projects risks. Bakker et al (2009) in a study on whether risk management contributes to IT project success concludes that that risk management can only be effective in specific project situations. Kutsch and Hall (2005) indicate that knowledge of the risks does not automatically imply that this knowledge is used for managing those risks.

Other researchers who focused project risk management process include Chapman (1997), Tummala and Burchett (1999), Artto et al. (2000), Shen (1997), March and Shapira (1987), Uher and Toakley (1999), Pender (2001) and Williams (1999) and Jaafari (2001) most of who argue that today's methodologies of risk management are not sufficient for industrial and that risk management philosophy and framework must be capable of quickly re-evaluating the project's options against surprise developments and provide a systematic basis for its re-structuring.

Most studies despite having much criticism, acknowledged that the success of a project is traditionally measured by time, budget, and requirements criteria. They include Royal Academy of Engineering (2004), Pinto (2007, Chandra (2002), Block and Davidson (2001) and Takim and Akintoye (2002) among others.

The studies reviewed laid more emphasis on particular functional silos. And as such, these studies were rather limited in scope. As yet, there does not appear to be a study

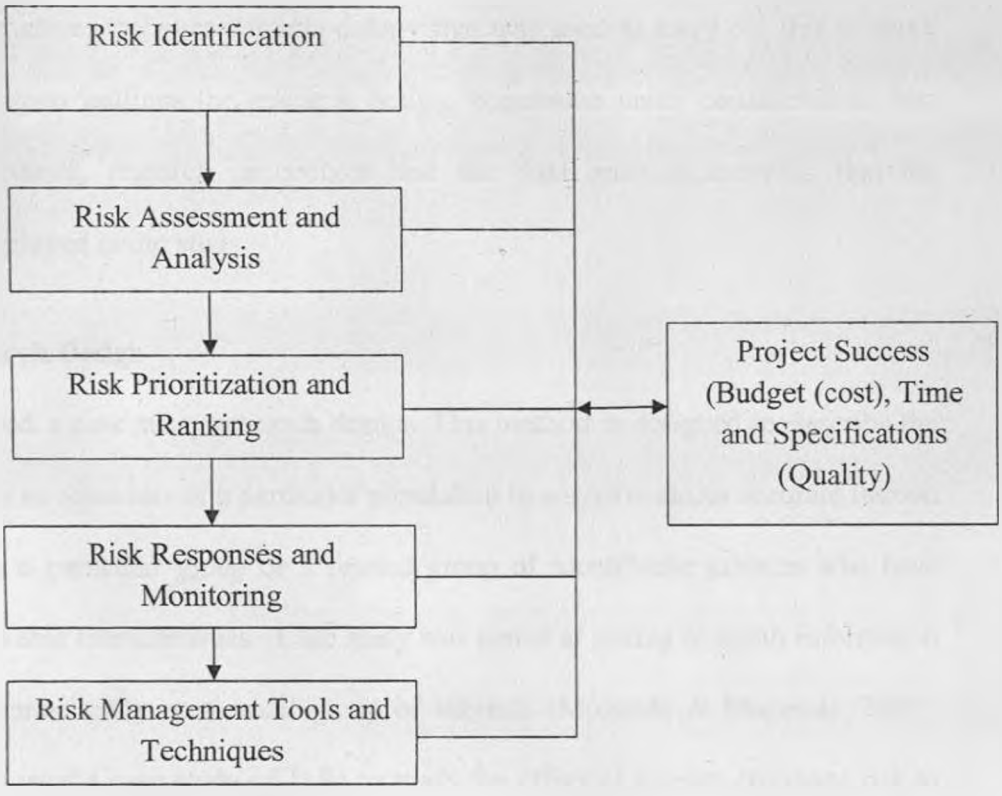
that has covered the three concepts of project risk management practices, application of these PRM practices in capital projects and the influence of these practices to project success.

2.8 Conceptual Framework

The study will be guided by the concept that project risk management practices including risk management tools and techniques influence the success of a project. These practices include carrying out a comprehensive risk identification to identify risks affecting the project, Risk assessment and analysis, carrying out risk prioritization and ranking and applying risk response strategies and monitoring the effect of these strategies in responding to the risks identified. This is achieved by efficient and effective application of risk management tools and techniques to influence the success of the project.

Fig. 2.8 Conceptual Framework

Project Risk Management Practices



Independent Variables

Dependent Variable

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the overall methodology that was used to carry out this research study. The chapter outlines the research design, population under consideration, data collection methods, research procedures and the data analysis methods that the researcher employed in the study.

3.2 Research Design

This study used a case study research design. This method is designed to describe the characteristics or behaviors of a particular population in a systematic an accurate fashion and focus on a particular group or a limited group of identifiable subjects who have similar observable characteristics. Case study was aimed at getting in-depth information about a particular entity or a small group of subjects (Mugenda & Mugenda, 2003). Ngugi (2007) used a case study of ILRI to study the effect of foreign exchange risk to project management. Similary, Makori (2011) used a case study of the Nairobi county to study the role of supply chain practices in the success of construction projects.

3.3 Justification on the Use of KAA Case Study

The KAA Act gives the mandate of management of airports in Kenya to KAA. KAA has implemented various major projects over the period from July 2009 to June 2012. The sizes and scope of these major projects have varied from projects with a contract price of Kshs. 10 M to Kshs. 4.8B. Over this period about 44 projects with a project sum of Kshs. 29.6B have/are been implemented (According to Board Technical Committee Report). The projects are implemented by various project implementation teams who

have consistently used various project risk management practices. These projects have recorded varied successes in meeting the project objectives.

In January 2011, KAA set up a Risk Management and Compliance Section in Internal Audit to assist management in developing an Enterprise Risk Management Policy Framework (ERMPF) and advice it on risk management. It is therefore expected that the adoption of the KAA ERM Policy Framework in 2011 by the KAA board and the setting up of this section will positively influence project success.

3.4 Data Collection

Primary data was collected for the purpose of this study. It was collected using interviews and a self administered structured questionnaire developed based on review of literature on project risk management and project success. The study involved interviewing project managers, project engineers, project accountants/auditor and other members of the project implementation team.

The questionnaire was piloted with three subject experts and later modified using their feedback before its final administration. This was done to cross verify the contents, structure and nature of the questions asked in the questionnaire and improve validity (Mitchell, 1996). Each section of the questionnaire contained both closed and open ended questions. For most of the sections, those surveyed were invited to score their responses using a Likert-style rating scale, with a score of 1 to 5. The likert scale was used since it is a psychometric scale commonly used in research that employs questionnaires.

The questionnaire had 4 sections; containing a general section, section B (Q 3-4) which evaluated project success by comparing expected versus actual achieved. Section C (Q 5-6) evaluated risk management practices and their influence to project success. The questionnaire was administered using a drop and pick later method.

3.5 Data Analysis

The data collected included both qualitative and quantitative data. Descriptive statistics were used to analyze the data by way of frequencies, percentages, means, variance, standard deviation and correlation analysis. Raz et al (2002) used Pearson Correlation Analysis in testing risk management and project success. A Pearson Correlation Analysis was carried out on the variables used in question 3 and 4 of the survey (success factors of the project) and question 5,6 and 7 (risk management practices used in the project). This was aimed at ascertaining whether there is a functional relationship between project risk management and project success.

Besides using correlation analysis to determine the influence of project risk management practices on project success, the study also developed a multiple regression model for the relationship between these practices with the following variables;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon)$$

Where Y is the dependent variable (project success),

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$ and β_5 – Are constants,

X_1 is the risk identification independent variable,

X_2 is the risk analysis independent variable,

X_3 is risk ranking independent variable,

X_4 is risk response and monitoring independent variable; and

X_5 is RM tools and techniques independent variable.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents data analysis and interpretations, which draws from the objectives of our study. The analyses are both qualitative and quantitative. The chapter is structured according to the questions in the questionnaire and provides discussion of the findings, their implications. Moreover the additional data and observations, gained from the survey will be as well incorporated into the discussion.

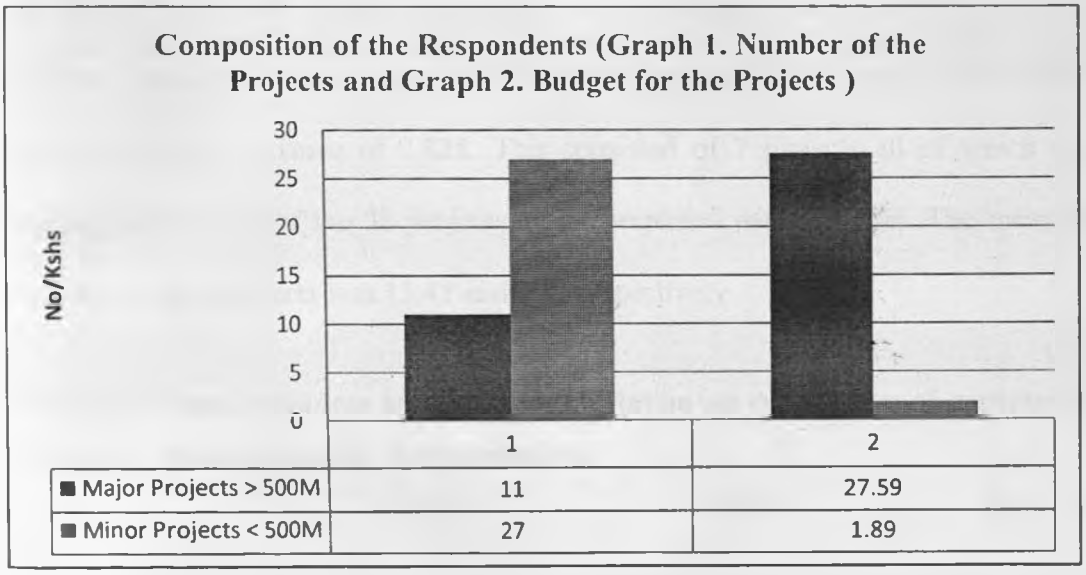
4.2 Response Rate

Out of the targeted 44 respondents, 38 successfully responded by completing the questionnaire, thus achieving a response rate of 86% as depicted in Figure 4.1. The response rate was considered statistically sufficient for further analysis. Of the 38 respondents, 27 (74%) projects had been completed while 11 (26%) projects were being implemented as at 30 June 2012.

We further categorized the respondents into major and minor capital projects. Major projects consisted of projects with a budget of Kshs. 500M which were considered to as extremely large-scale investment projects. The period of implementation of these projects ranged between 12 to 36 months. These projects which were typically complex attracted a lot of public attention because of substantial impacts on communities, economy, environment, and budgets. There were 11 major projects from the respondents with a combined budget of Kshs. 27.59B. Minor projects were projects costing between Kshs. 10M and Kshs. 500M with a period of implementation between 2 and 12 months. The projects did not attract much public interest as compared to the major projects. This

category consisted of 27 projects with a total budget of Kshs. 1.89B. The categorization of the respondents allowed for generalization of the results from the findings.

Figure 4.2: Composition of the Respondents (Number and budget for the projects)



Source: Survey Data, 2012

4.3 Project Details and Project Success

The success or failure of the project is measured against the time, cost and technical performance (quality) dimensions. The respondents were asked to indicate the expected and actual data on the three project success metrics (cost, time and quality). This helped the researcher to establish the variances between the actual and expected. Further the researcher sought to establish whether there existed any patterned relationship between PRM and project success by correlating data in this section with data from question five on application of project risk management practices to the specific projects. Means, standard deviations and variances for the various projects were calculated, analyzed and presented in Table 4.3

From the analysis it was established that most projects had exceeded the budgeted costs with a mean and variance of 40.73 and 5.34 respectively. Most projects which exceeded the budget were within the 15% variation of quantities limit allowed by the Procurement and Disposal Act 2005. The projects whose cost was above budget were 21 of the 38 projects. Projects that were completed below the budgeted cost were the least with a mean 4.50 and a variance of 0.828. This consisted of 7 projects all of which were ongoing projects. 10 of the 38 projects were completed within budget. The mean and variance of these projects was 15.41 and 1.82 respectively.

Table 4.3: Mean, variances and standard deviation on comparison of expected v/s actual cost, time and quality for the projects

	COST			TIME			QUALITY		
	$\bar{X}$	δ	δ^2	$\bar{X}$	δ	δ^2	$\bar{X}$	δ	δ^2
Actual <Expected Cost/Time/Quality	4.50	0.91	0.828	3.04	1.48	2.194	5.20	1.320	1.744
Actual= Expected Cost/Time/Quality	15.41	1.35	1.8225	5.70	1.04	1.086	3.80	1.082	1.177
Actual >Expected Cost/Time/Quality	40.73	2.31	5.3361	17.85	2.86	8.1796	2.40	0.736	0.546

Source: Source: Survey Data, 2012

Most projects were also completed behind schedule with a mean of 17.85 and variance of 2.86 as compared to those within time or ahead of schedule. Most of these projects which were ahead of schedule majorly consisted of ongoing projects. The mean and

variance of the projects which were completed within time was 5.70 and 1.09 respectively. The bulk of these projects were ongoing at the time of the research.

On quality, most projects did not meet quality requirements in terms of meeting technical and customer specifications. Majority of the projects had recorded complaints from end users and customers. The mean of the projects which did not meet quality standards was 5.20 as compared to those that met quality specifications of 3.80 while the mean for the projects which had exceeded the specifications was 2.40 with a variance of 0.546.

4.4 Project Success Factors

There are a number of factors that determine the success of a project. These factors include meeting quality specifications, completing the project within budget and completing the project on schedule among others. In a Likert scale of 1-5, the respondents were required to indicate the level of importance of project success factors to their projects. A level of 1 indicated that the success factor was the least important to the project while a level of 5 indicated that the success factor was most important to the project. This was done in order to determine which factor was important for specific projects given that they varied in context. Table 4.4 shows the rankings of these project success factors.

Table 4.4: Project Success Factors as indicated by the Project Implementation Teams

	Project Success Factor	Mean	Std. Deviation
a.	Completing the project within budget/cost	4.48	0.48795
b.	Meeting all the specifications in the terms of reference/contract/or bill of quantities	4.32	0.51640
c.	Meeting quality specifications	4.22	0.56061
d.	Meeting of user/customer and technical specifications	3.92	0.99043
e.	Achieving KAA's business objectives	3.90	1.08233
f.	Completing the project on-schedule	3.82	1.0734

Source; Survey Data, 2012

From the analysis above, the respondents indicated that that completing the project within budget was the most important success factor for their project with a mean of 4.48 followed by meeting all the specifications in the contract/tender and or bill of quantities with a mean of 4.32. Completing the project within schedule was the least important with a mean of 3.82.

4.5 Extent of Application of Project Risk Management Practices to the Project

In a Likert scale of 1-5, the respondents were required to indicate the extent of application of project risk management practices to their projects including risk identification, risk analysis and ranking, risk response and monitoring and use of risk management tools and techniques. A level of 1 indicated that the risk management practice was the least used in the project while a level of 5 indicated that the risk

management practice was extensively used in the project. This was done in order to determine which risk management practice was extensively used in the project. Results are presented in the table below;

Table 4.5 (a): Extent of application of project risk management practices to the projects

Risk Management Practice	Mean	Std. Deviation
Risk Identification	3.584	0.48795
Risk Analysis	3.164	0.5164
Risk Ranking/Prioritization	3.332	0.6734
Risk Response and Monitoring	3.462	0.99043
Risk Management Tools and Techniques	3.058	0.46061

Source: Survey Data, 2012

Data was further analyzed on the basis of major and minor projects. Findings are presented in Table 4.5 (b) and Figure 4.5 below.

Table 4.5 (b): Extent of application of project risk management practices to the major and minor projects

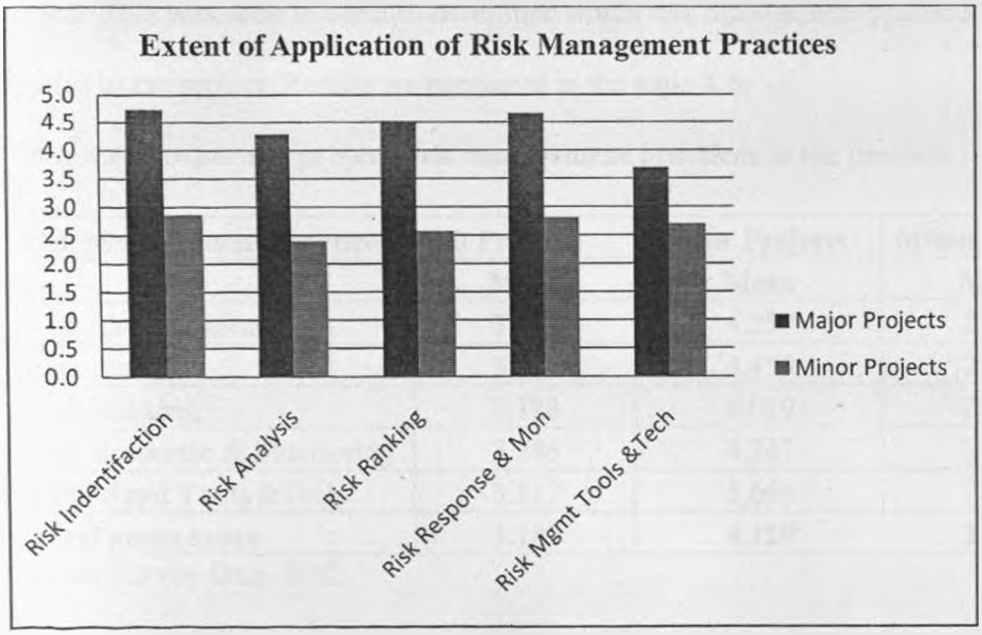
Risk Management Practice	Major Projects	Minor Projects
	Mean	Mean
Risk Identification	4.727	2.867
Risk Analysis	4.295	2.402
Risk Ranking/Prioritization	4.520	2.574
Risk Response & Monitoring	4.653	2.820
Risk Management Tools &Techniques	3.693	2.700

Source: Survey Data, 2012

It can be seen that the general extent of application of the five risk management practices was relatively moderate. However, further analysis of application of the risk management practices was very low for minor projects with an average mean score of between 2.40 and 2.86 while that for major projects was high at an average score of between 3.69 and 4.72. Risk identification and risk response and monitoring was the

predominant risk management practice used for both the major projects recording a mean score of 4.72 and 2.86 as compared to the least used practice of using risk management tools and techniques with a mean score of 3.69 for major projects and risk analysis in minor projects with a mean of 2.40.

Figure 4.5: Extent of application of project risk management practices to the major and minor projects



Source: Survey Data, 2012

Summarizing the findings in Table 4.5 above, the study concludes that while the use of risk management practices is relatively low, major projects which are considered higher uncertainty projects tend to apply them to a greater extent than minor projects since major projects are perceived as higher risks projects.

4.6 How well Project Risk Management Practices were applied to the Projects

In a Likert scale of 1-5, the respondents were required to indicate the extent to which they agreed on how well the project risk management practices were applied to their projects. A level of 1 indicated that the respondent strongly disagreed on how well the risk management practice applied to their project while a level of 5 indicated that the responded strongly agreed that risk management practices were well applied to their project. This was done in order to determine which risk management practices were well applied to the project. Results are presented in the table 4.6;

Table 4.6: Proper use project risk management practices in the projects

Risk Management Practice	All Projects	Major Projects	Minor Projects
	Mean	Mean	Mean
Risk Identification	3.158	4.250	2.713
Risk Analysis	3.224	4.455	2.722
Risk Ranking	3.128	4.039	2.757
Risk Response & Monitoring	3.286	4.247	2.895
Risk Mgmt Tools &Tech	3.117	3.656	2.898
Total mean score	**3.183**	**4.129**	**2.797**

Source: Survey Data, 2012

From the table above, respondents for major projects felt that PRM practices were well applied to their projects with a mean score of 4.13 while those of the minor projects felt that these practices were not well applied to their projects. These respondents disagreed with the statements with a total mean score of 2.80. Further analysis revealed that most of the risk management practices were not applied to the minor projects.

4.7 Project Risk Management Practices and Project Success

Do risk management practices have any effect on project success? To test this question we calculated the correlation between the extent of the use of PRM practices and the

three dimensions of project success (budget/cost, time/schedule and quality). The results are summarized in the Table 4.7.

The major finding from Table 4.7 is that all risk management practices are positively correlated with project success which included delivering the project within budget, within the time schedule and meeting the quality requirements specifications. Carrying out risk identification has the highest positive correlation with budget of 0.413 followed by a positive correlation of 0.402 between risk response and monitoring with budget. Use of RM tools and techniques has the least positive correlation with quality of 0.024.

Table 4.7: Correlation between risk management practice and project success

	Budget	Time	Quality
Risk Identification	0.413	.296	.202
Sig. (p-Values)	0.389	.376	.274
Risk Analysis	.119	.152	.217
Sig. (p-Values)	.365	.041	.309
Risk Ranking	.103	.213	.335
Sig. (p-Values)	.435	.616	.098
Risk Response & Monitoring	.402	.347	.260
Sig. (p-Values)	.063	.011	.045
RM Tools & Techniques	.143	.260	.024
Sig. (p-Values)	.274	.045	.034

Source: Survey Data, 2012

4.8 Multiple Regression Analysis

In addition, the study conducted a multiple regression analysis so as to determine the relationship between the project success and four variable factors on food for work project. To be able to quantify the reliability of the estimates the research made assumption of linearity, the assumption of independence (Durbin Watson test indicated a result of 2.123 meaning that there was no auto-correlation between the residual values), the assumption of constant variance (there was no outliers in the independent variables as the results were less than 0.50) and the assumption of normality (sample size was more than 30; hence met the central limit theorem). These assumptions were met to a significant extent as the results obtained were consistent to the assumptions made and hence positive.

Table 4.8: Coefficients of the risk management practices on the success of projects

Mode	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Sig. (p-Values)
	B	Std. Error	Beta	B	Std. Error	
(Constant)	1.469	1.279		2.243	.040	
Risk Identification	.541	.577	.255	.938	.363	0.612
Risk Analysis	.148	.621	.489	1.848	.084	0.346
Risk Ranking	.122	.520	.061	.235	.817	0.237
Risk Response	.292	.235	.337	1.245	.232	0.485
RM Tools & Tech	.169	.129	.096	.786	.065	0.257

The equation ($\mathbf{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon}$) becomes:

$Y = 1.469 + 0.541X_1 + 0.148X_2 + 0.122X_3 + 0.292X_4 + 0.169X_5$

Where Y is the dependent variable (project success), X_1 is the risk identification independent variable, X_2 is the risk analysis independent variable, X_3 is risk ranking independent variable, X_4 is risk response and monitoring independent variable while X_5 is RM tools and techniques independent variable.

According to the regression equation established, taking all factors (risk identification, analysis, ranking, response and tools and techniques) constant at zero, the project success will be 1.469. The data findings analyzed also show that taking all other independent variables at zero, a unit increase in risk identification will lead to a 0.541 increase in project success. A unit increase in risk ranking will lead to a 0.148 increase in project success; a unit increase in risk ranking will lead to a 0.122 increase in project success; a unit increase in risk response and monitoring will lead to a 0.292 increase in project success while a unit increase in RM tools and techniques will lead to a 0.169 increase in project success. This infers that risk identification and risk response and monitoring contribute more to project success.

4.8 Discussion of the Findings

The study sought to establish the extent of application of project risk management practices such as risk identification, risk analysis and ranking, risk response and monitoring and use of risk management tools on Kenya Airports Authority capital projects and the influence of these practices on the success of these projects.

The study adopted the case study of the Kenya Airports Authority which has implemented 44 projects which constituted this study's targeted population. The projects had been implemented over the 3 years period from July 2009 to June 2012. Primary data was collected for the purpose of this study. It was collected using interviews and self administered structured questionnaires. Descriptive statistics were used to analyze the data by way percentages, means, variance, standard deviation, correlation analysis and multiple regression analysis.

Out of the targeted 44 respondents, 38 successfully responded by completing the questionnaire, thus achieving a response rate of 86%. Of the 38 respondents, 27 (74%) projects had been completed while 11 (26%) projects were being implemented as at 30 June 2012. We further categorized the respondents into major and minor capital projects. Major projects consisted of projects with a budget of Kshs. 500M which were considered to as extremely large-scale investment projects. The period of implementation of these projects ranged between 12 to 36 months. These projects which were typically complex attracted a lot of public attention because of substantial impacts on communities, economy, environment, and budgets.

On project success the study established that most projects had exceeded the budgeted costs with a mean and variance of 40.73 and 5.34 respectively. Most projects which exceeded the budget were within the 15% variation of quantities limit allowed by the Procurement and Disposal Act 2005. Most projects were also completed behind schedule with a mean of 17.85 and variance of 2.86 as compared to those within time or ahead of schedule. Most of these projects which were ahead of schedule majorly

consisted of ongoing projects. On quality, most projects did not meet quality requirements in terms of meeting technical and customer specifications. Majority of the projects had recorded complaints from end users and customers.

The extent of application of the five risk management practices was relatively moderate. However, further analysis of application of the risk management practices was very low for minor projects with an average mean score of between 2.40 and 2.86 while that for major projects was high at an average score of between 3.69 and 4.72. Risk identification and risk response and monitoring was the predominant risk management practice used for both the major projects recording a mean score of 4.72 and 2.86 as compared to the least used practice of using risk management tools and techniques with a mean score of 3.69 for major projects and risk analysis in minor projects with a mean of 2.40.

Respondents for major projects felt that PRM practices were well applied to their projects with a mean score of 4.13 while those of the minor projects felt that these practices were not well applied to their projects. These respondents disagreed with the statements with a total mean score of 2.80. Further analysis revealed that most of the risk management practices were not applied to the minor projects.

From correlation analysis, the study found risk management practices to be positively correlated with project success which included delivering the project within budget, within the time schedule and meeting the quality requirements specifications. Carrying out risk identification had the highest positive correlation with budget of 0.413 followed

by a positive correlation of 0.402 between risk response and monitoring with budget. Use of RM tools and techniques has the least positive correlation with quality of 0.024

The study developed a regression equation which established that, taking all factors (risk identification, analysis, ranking, response and tools and techniques) constant at zero, the project success will be 1.469. The data findings analyzed also show that taking all other independent variables at zero, a unit increase in risk identification will lead to a 0.541 increase in project success while a unit increase in risk response and monitoring will lead to a 0.292 increase in project success which implies that risk identification and risk response and monitoring contribute more to project success. The level of significance (p-values) of risk identification and risk response and monitoring were found to be the highest at 0.612 and 0.485 respectively.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMEDATIONS

5.1 Introduction

This chapter presents the summary of the research findings; conclusion and recommendations. The conclusions were drawn from the findings of the study in line with the study objectives by looking into the influence of project risk management practices on the success of the capital projects.

5.2 Summary of Findings

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. This phenomenon is also reflected in KAA were major projects have not been completed on time, budget/cost or met quality and design specifications.

KAA has implemented various major projects over the period from July 2009 to June 2012. The projects are implemented by various project implementation teams who have consistently used various project risk management practices; as such the projects have recorded varied successes in meeting the project objectives. KAA also adopted an ERM Policy Framework in 2011 and set up a risk management section to advice on risk management. It's expected that these actions will/have led to accelerated project success.

This study adopted the case study of the Kenya Airports Authority in an effort to establish the influence of project risk management practices on success of capital

projects. The study therefore sought to establish to what extent project risk management practices are applied to KAA major projects and whether these practices and techniques influence the success of these projects.

Primary data was collected for the purpose of this study. The targeted population was 44 projects which constituted all projects implemented by KAA over the 3 years period. It was collected using interviews and a self administered structured questionnaire. Each section of the questionnaire contained both closed and open ended questions. For most of the sections, those surveyed were invited to score their responses using a Likert-style rating scale, with a score of 1 to 5.

Descriptive statistics were used to analyze the data by way of percentages, means, variance, standard deviation, correlation analysis and multiple regression analysis. This was aimed at ascertaining whether there is a functional relationship between project risk management and project success. Besides using correlation analysis to determine the influence of project risk management practices on project success, the study also developed a multiple regression model for the relationship between these practices with project success as the dependent variable and risk identification, risk analysis, risk ranking, risk response & monitoring and RM tools and techniques as the dependent variable.

The purpose of risk management is to prepare for project risks and to take measures to deal with the occurrence of unexpected and undesired events. While most of the project implementation team members agree that risk management is a good idea it seems that risk management practices have not been widely applied to projects. From the findings,

risk management practices have been widely applied in major projects which were considered to be complex as these projects attracted a lot of public attention because of substantial impacts on communities, economy, environment, and budgets. The rate of application of these risk management practices in the major projects recorded a mean score of 4.401 of the maximum mean score of 5. This implied that risk management practices were widely and extensively applied in the major projects. The minor projects which constituted 71% (27 of the 38 respondents) recorded a mean score of 2.704 implying that risk management practices were not widely extensively applied.

The extensive application of risk management practices in major projects was attributed to a dedicated team (Risk Management Unit) which provided advisory on project risk management. These major projects were majorly funded by donor organizations including the World Bank, the AFD, the European Union and the African Development Bank (ADB) which have consistently required beneficiaries to put in place project risk management plans as part of project implementation. Risk management planning was also a condition in the financing agreement. Additionally, these projects were considered complex, high uncertainty projects and were perceived as high risk projects. A mean score of 3.320 was obtained on the extent of application of risk management practices to the entire project portfolio implying that these practices were moderately applied.

While there are plenty of risk management practices, tools and techniques available, many project implementation teams did not often use them. Some of practices which were not applied included appointment of project risk manager, developing a risk register for the project and continuously reviewing this register, ranking of the risks to

ensure more effort is focused on high risks among others. This notwithstanding, analysis of the data collected revealed that some risk management practices were widely used. Risk identification and risk response and monitoring recorded the highest mean score. Some of the widely used project risk management practices included risk identification through analysis of the internal and external environment, brainstorming, interviewing and expert judgment. The most widely used risk response strategies included competitive bidding, due diligence, taking of insurance covers, and retaining part of the contract sum on every payment and have a long defect liability period.

Project risk management seems to be effective in contributing to project success. From the analysis of the data collected, it was proved that risk management has a positive correlation with project success. Projects which had consistently applied risk management practices produced less surprises as all the stakeholders had been prepared on the uncertainties in the project implementation. The project implementation teams had also taken steps to reduce the impact and the likelihood of the unavoidable events in the project implementation. Multiple regression analysis on risk management practices and project success produced a positive result implying that application of risk management practices to projects contribute to project success. Thus we can conclude that the higher the use of project risk management practices the higher the project success.

5.3 Conclusions

The objectives of this study was to establish the influence of project risk management practices on the success of projects by establishing the extent of application of project risk management practices in projects at the KAA and determining the relationship

between project risk management practices and the success of capital projects implemented by the KAA.

After considering the results from the study, the following conclusions can be deduced. First, risk management practices are mostly applied to complex, huge investment, high uncertain and more risky projects. The higher the uncertainty, the higher is the risk and the higher is the extent of the use of risk management practices. While this is so, even low uncertainty projects suffer delays, project budget overruns and poor quality products and their success is not guaranteed. These projects too can benefit from risk management application that will improve their success rate.

Most projects had applied risk management practices such as risk identification and risk response and monitoring. Risk analysis and prioritization and use of risk management tools and techniques recorded a low mean score as compared to risk identification and risk response strategies. Despite this high mean score, most of the projects recorded delays, project budget overruns and complaints from users and customers implying that risk management should be viewed as a project management process with the five variables consistently applied. Risk analysis and ranking allows project managers to emphasis more on high probability, high impact risks. Other risk management practices which were not applied on these projects included appointing a project risk manager and continuously reviewing the risk matrix/register throughout the life of the project.

While correlation relationship does not proof causality, the strong positive correlation factor between project risk management practices and project success factors and the positive regression model confirms that risk management practices (independent

variables) if consistently applied on a project increases the rate of the project success (dependent variable).

5.4 Recommendations

The finding of this study has implications for public sector projects and programs. Public sector projects just like any other projects should be completed on time, on budget and in good quality. In order to achieve this goal, attention must be placed in consistently applying risk management practices to increase the rate of project success.

While there are a number of project risk management practices available many project managers are still reluctant to apply them in their projects. It seems risk management has not been fully internalized in project management just like work breakdown structure, scheduling, critical path analysis or project procurement planning. Part of this problem may be due to lack of awareness and over-optimism. Organizations must realize that projects are risky undertakings that do not always end as planned and tend to suffer unexpected outcomes such as delays and overruns. Organizations should prepare for these unexpected outcomes by carrying out a systematic risk management planning and implementation. Project risk management should become part of the culture in project management activity and routine component in any project plan and review activity.

There's need to create more awareness on project risk management practices. Additional tools and risk management practices need to be developed and tested to determine which tools works best in different scenarios and environments. This will ensure that risk management improves project performance and success.

5.5 Limitations of the Study

Although limited in scope, this study demonstrates some significant phenomena about the use of and effectiveness of project risk management practices. This study used the case study of capital projects at the Kenya Airports Authority. Ideally in such a study, one would wish to conduct a survey of the public sector capital projects in Kenya but such a procedure was not be possible owing to time and financial constrains.

KAA as a public sector entity may have circumstances and factors which are different from other public entities which makes the findings of the study not readily generalized to other public entities. However, care was taken to ensure high response rate to increase representativeness of the sample to make the findings more reliable.

5.6 Suggestions for Further Study

This study has a number of limitations that can be addressed in future research. The data used in this study limits generalization to other public sector projects. A confirmatory analysis using a large sample gathered across the public sector is required for greater generalization of the influence of project risk management practices to the success of capital projects.

Finally, since there are various risk management practices and tools available, further research is needed to find out what works best in what circumstances and environments.

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APPENDICES

Appendix 1: Introduction Letter

University of Nairobi,
School of Business,
P.O. Box 30197-00100,
Nairobi.
2 October 2012.

Dear Respondent,

I am a postgraduate student at the University of Nairobi, School of Business. I am conducting a research on "Project Risk Management Practices on the Success of Capital Projects at the Kenya Airports Authority". This is in partial fulfillment of the requirements for the Master of Business Administration Degree.

Kindly fill the attached questionnaire to the best of knowledge. The information will be used purely for academic purposes and will be treated with strict confidence. A copy of the final report will be availed to you on request.

Your assistance will be highly appreciated. Thank you.

Yours faithfully,

Bernard, S Musyoka
MBA Student

Nyamwange, S.O
Research Supervisor

Appendix 2: Research Questionnaire

I am conducting a research on "Project Risk Management Practices and the Success of Capital Projects at the Kenya Airports Authority". This study is being carried out in part fulfillment of the requirements for the award of a Master of Business Administration Degree of the University of Nairobi. Kindly fill this questionnaire to the best of your knowledge.

Section A: Biographical Details

1. What is your Job Role?

Project Manager [ ]

Project Engineer [ ]

Member, Project Implementation Team [ ]

Clerk of Works [ ]

Risk Auditor [ ]

Other: Specify..... [ ]

2. How long have you been involved in project implementation?

Below 2 years ☐

Between 2 and 5 years ☐

Over 5Years ☐

Section B. Project details and project success

3. Please indicate the major projects in KAA that you were/are currently involved in. Indicate the project estimated/budgeted cost of completion against actual cost, expected completion time against actual time and ability of the project in meeting the quality specifications.

	COMPLETION TIME		COST		QUALITY*	
Project	**Expected**	**Actual**	**Budgeted**	**Actual**	**Expected**	**Actual**

*Quality – Meeting of user/customer and technical specifications and/or absence of complaints or defects.

4. In a scale of 1-5, indicate the level of importance the following project success factors were to your project?' where 1 indicates least important and 5 indicate most important.

	Project Success Factor	5	4	3	2	1
g.	Meeting quality specifications	[ ]	[ ]	[ ]	[ ]	[ ]
h.	Completing the project on-schedule	[ ]	[ ]	[ ]	[ ]	[ ]
i.	Completing the project within budget/cost	[ ]	[ ]	[ ]	[ ]	[ ]
j.	Meeting of user/customer and technical specifications	[ ]	[ ]	[ ]	[ ]	[ ]
k.	Meeting all the specifications in the terms of reference/contract/or bill of quantities	[ ]	[ ]	[ ]	[ ]	[ ]
l.	Achieving KAA's business objectives	[ ]	[ ]	[ ]	[ ]	[ ]

Section C: Risk Management practices tools and techniques applied to the project.

5. Kindly indicate the extent to which the following project risk management practices were applicable in your project(s) on a 5-point scale where; 1= Not Applied and 5= Very Great Extent.

	Risk management practice	5	4	3	2	1
	Risk Identification					
a.	Risk identification process was carried out at the inception of the project to identify both internal and external factors affecting the project.	[ ]	[ ]	[ ]	[ ]	[ ]
b.	Tools and techniques used to identify these risks, included; review of documentation, brainstorming, interviews expert judgment etc.	[ ]	[ ]	[ ]	[ ]	[ ]
	Risk Analysis					
c.	For all the risks identified the likelihood and impact of the risk was assessed.	[ ]	[ ]	[ ]	[ ]	[ ]
	Risk Ranking					
d.	The risks identified were ranked depending on their significance to the project.	[ ]	[ ]	[ ]	[ ]	[ ]

	Risk management practice	5	4	3	2	1
e.	The risks were ranked from low/negligible risks to major/critical risks.	[ ]	[ ]	[ ]	[ ]	[ ]
	Risk Responses and Monitoring					
f.	We had open and effective communication channels in the project team, the contractors, suppliers, client and other project stakeholders.	[ ]	[ ]	[ ]	[ ]	[ ]
g.	The risk management plan developed from analysis of risks affecting the project was communicated to all stakeholders.	[ ]	[ ]	[ ]	[ ]	[ ]
h.	Strategies were developed to manage the risks identified.	[ ]	[ ]	[ ]	[ ]	[ ]
i.	Some of the strategies deployed included taking insurance covers, performance guarantees, and retention sum and defect liability period.	[ ]	[ ]	[ ]	[ ]	[ ]
j.	Risk management was always part of the agenda in the project's progress meetings.	[ ]	[ ]	[ ]	[ ]	[ ]
k.	A risk matrix was developed for the project.	[ ]	[ ]	[ ]	[ ]	[ ]
l.	The risk matrix was reviewed and updated throughout the life cycle of the project.	[ ]	[ ]	[ ]	[ ]	[ ]
m.	We undertook continuous performance improvement through learning and innovation.	[ ]	[ ]	[ ]	[ ]	[ ]
	Risk Management Tools and Techniques					
n.	A risk register/matrix was developed incorporating the risks identified, controls, responses and residual risks.	[ ]	[ ]	[ ]	[ ]	[ ]
o.	A project risk manager was appointed to advice and/or manages the risks in the project.	[ ]	[ ]	[ ]	[ ]	[ ]
p.	The risk register/matrix was continuously reviewed by the project team/project manager.	[ ]	[ ]	[ ]	[ ]	[ ]

6. In a scale of 1 to 5, please indicate the extent to which you agree with each of the following statements in relation to how well the project risk management practices were

applied to your projects. Mark with a tick (√) against the most applicable response. Where; 1= strongly disagree and 5= strongly agree.

		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	Risk management practice/tool	**5**	**4**	**3**	**2**	**1**
	Risk Identification					
a	Risk identification process was carried out at the inception of the project to identify both internal and external factors affecting the project.	[ ]	[ ]	[ ]	[ ]	[ ]
b	Various tools and techniques were used to identify these risks, including; review of documentation, brainstorming, interviews expert judgment etc.	[ ]	[ ]	[ ]	[ ]	[ ]
	Risk Analysis					
c	For all the risks identified the likelihood and impact of the risk was assessed.	[ ]	[ ]	[ ]	[ ]	[ ]
	Risk Prioritization					
d	The risks identified were ranked depending on their significance to the project.	[ ]	[ ]	[ ]	[ ]	[ ]
e	The risks were ranked from low/negligible risks to major/critical risks.	[ ]	[ ]	[ ]	[ ]	[ ]
	Risk Responses					
f	We had open and effective communication channels between us the contractors, suppliers, client and other project stakeholders.	[ ]	[ ]	[ ]	[ ]	[ ]
g	The risk management plan developed from analysis of risks affecting the project was communicated to all	[ ]	[ ]	[ ]	[ ]	[ ]

		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	Risk management practice/tool	5	4	3	2	1
	stakeholders.					
h	The strategies used for managing risks including taking insurance covers, performance guarantees, and retention sum and defect liability period were sufficient.	[ ]	[ ]	[ ]	[ ]	[ ]
i.	Risk management was always part of the agenda in the project's progress meetings.	[ ]	[ ]	[ ]	[ ]	[ ]
j.	A risk matrix was developed for the project.	[ ]	[ ]	[ ]	[ ]	[ ]
k	The risk matrix was reviewed and updated throughout the life cycle of the project.	[ ]	[ ]	[ ]	[ ]	[ ]
l.	A project risk manager was appointed to advice on risk management.	[ ]	[ ]	[ ]	[ ]	[ ]
	Risk Management Tools and Techniques					
a	A risk register/matrix was developed incorporating the risks identified, controls, responses and residual risks.	[ ]	[ ]	[ ]	[ ]	[ ]
b	A project risk manager was appointed to advice and/or manages the risks in the project.	[ ]	[ ]	[ ]	[ ]	[ ]
c	The risk register/matrix was continuously reviewed by the project team/project manager.	[ ]	[ ]	[ ]	[ ]	[ ]
d	There was adequately trained human resources to manage the project and the risks identified(adequate human capital)	[ ]	[ ]	[ ]	[ ]	[ ]

SECTION D: General Section

1. In your opinion, what three measures would you consider important for improving project risk management practices in order to enhance the success of your project(s)?

(a) .....

(b) .....

(c) .....

2. What recommendations would you make that will improve project management in Kenya Airports Authority?

.....

.....

Thank You.

Appendix 3: Capital Projects at KAA as at 30 June 2012

No	Project Title	Details/ Status	Amount
A	**JKIA and HQ Projects**		
1	JKIA PACKAGE 1: Expansion of passenger terminal facilities and other associated facilities.	Contractor: China Wu Yi. Contract period: 18 Months. Complete.	3,689,135,973
2	JKIA PACKAGE 2: Construction of terminal 4 building, parking garage, grade parking and associated works	Contractor: M/S China National Aero Technology International Engineering Corporation (CATIC). Ongoing.	4,811,305,799
3	JKIA pavements rehabilitation and Runway Capacity at JKIA Package 4a	Consultant: NACO (for feasibility studies and detailed design). Ongoing	4,831,943,237
4	Construction of Remote stands complete with fuel hydrant Package 4b	Contract awarded in November 2011. To take 17 Months. Ongoing.	2,592,099,924
5	Fencing of other Airports: JKIA, Moi, Wilson and Kisumu Airports.	Kisumu Airport: Estimated cost Ksh.23million. Ongoing.	23,453,500
6	Flight information display system installation at MIA	Complete	55,922,016
7	Business Automation Project – ERP Project	Contract awarded to INDRA Sistemas. Ongoing	534,902,972
8	Supply of an Airport Operational Database (AODB)	Contract awarded to INDRA Sistemas at Ongoing.	50,678,900
9	Security Perimeter intrusion detection system, for JKIA, MIA, WAP & KAP	Ongoing.	516,984,015
B	**Other JKIA Projects**		
10	Fencing for Embakasi Land	Contracted awarded. Approval of delayed by the City Council. Ongoing.	28,325,100
11	Refurbishment and Improvement of VIP 3	Contracted awarded to M/S AlfaTec Complete.	10,267,560
12	External works at state pavilion	Contracted awarded to M/S Toshe Engineering. Complete	11,236,540
13	Cargo Building Works	Refurbishment of flat roof by M/S Flooring and Interiors. Complete	29,768,980
14	CCTV project in JKIA	Complete - Terminated	34,604,476
15	Rehabilitation of Airfield Ground Lighting System (AGLS)	The contracts were awarded to Magnate Ventures. Ongoing	302,811,080
C	**Moi International Airport**		

No	Project Title	Details/ Status	Amount
16	Construction of pavement rehabilitation.	Tender documents to the World Bank for No Objection. Ongoing	4,450,000,000
17	Emergency Airfield Lighting Equipment	Complete.	26,345,700
18	1400 KVA Standby Generator	Complete	30,125,460
19	Rehabilitation of T1 washrooms MIA	Complete	28,329,780
20	CCTV Project in MIA	Complete	24,880,649
B	**Eldoret International Airport**		
21	Terminal building roof rehabilitation	Awarded to Alfa Tec. Completed.	12,564,900
22	Remote control for airfield lighting	Completed.	10,568,900
23	CCTV Project and FIDS in EIA	Completed.	12,692,599
E	**Wilson Airport**		
24	Fire station shed & offices relocation	Awarded to Magnet Venture. Complete.	30,125,560
25	New Taxiway (Kilo) and Rehabilitation of Pavements at WAP.	Awarded to Samar Construction. Complete.	84,781,789
26	Sewerage & Storm water Drainage Rehabilitation Project	Awarded to Northern Construction. Ongoing.	32,000,000
F	**Kisumu Airport**		
27	Upgrading of Facilities at Kisumu Airport	Contractor: M/S China Overseas Engineering Group. Complete.	2,952,000,000
28	Upgrading of Facilities at Kisumu Airport - 300 M extension	Project Complete.	900,000,000
29	Upgrade of Kisumu Airport - Parallel Taxiway and Cargo Apron	Works to commenced in February 2012 for 15 months. Ongoing.	1,700,000,000
30	Relocation of Usoma School Phase 1	Awarded to Flooring and Interiors Ltd. Complete. Complete.	19,121,625
G	**Malindi Airport**		
31	Construction of Terminal Building	Awarded to Dickways Construction ruction of ATC Tower. Complete.	162,100,000
32	Relocation of substation and ducting and rehabilitation of airfield lighting	Awarded to Magnate Ventures. Complete.	54,152,129

No	Project Title	Details/ Status	Amount
H	**Ukunda Airstrip**		
33	Runway Safety Works	Awarded to Metrical Agencies. Complete.	12,664,373
I	**Manda Airstrip**		
34	Terminal building	Contractor: Dickways Const. Complete.	148,000,000
35	Urgent pavement repairs	Contractor: Afrispan Construction Ltd. Complete.	10,000,000
36	Extension and strengthening of Runway.	Awarded to A A Bayusuf. Ongoing.	250,000,000
J	**Isiolo Airport**		
37	Restoration of original aircraft pavement at Isiolo Airport	Awarded to M/S Kundan Singh Ltd Complete	609,870,899
K	**Airstrips**		
38	Lodwar Airstrip Runway resurfacing & Fencing	Contract awarded to Ogle Construction. Contract commencement date 01/03/2011. Complete	94,506,203
39	Kitale Airstrip Rehabilitation Works	Construction of Terminal Building. Runway rehabilitation. Ongoing	46,769,008
40	Eldoret Airstrip Rehabilitation Works Construction of VIP Lounge.	Awarded to Bowen Construction. Ongoing.	12,250,000
41	Garissa Airstrip Portable airfield lighting	Delivery of emergency lights in August 2011. Complete.	10,000,000
42	Kakamega Airstrip Runway Resurfacing	Contract awarded to Kiu Construction, Started 24/02/2011. Complete	73,733,213
43	Embu Airstrip Rehabilitation	Awarded to Sinoe Construction Commenced 28/03/2011. Complete	137,509,642
44	Nyeri Airstrip Rehabilitation	Contract was awarded on 15 Dec 2010 for 5 Months to S S Mehta. Complete	154,350,149
	Total		**29,612,882,651**

Source: Kenya Airports Authority Capital Projects Report as at 30 June 2012. A report submitted to the Board Technical Committee.