CONSTRUCTION RISKS, MANAGERIAL SKILLS AND COMPLETION OF PUBLIC PRIVATE PARTNERSHIP PROJECTS IN KENYA: A CASE OF SONDU-MIRIU HYDROELECTRIC POWER PROJECT, KISUMU COUNTY

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DECLARATION

This Thesis is my original work and has not been presented for any award in any other university.

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DEDICATION

This work is dedicated to my late father John Nyangaga who showed me the essence of education.

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LIST OF ABBREVIATIONS AND ACRONYMS

ANOVA	Analysis of Variance
BOO	Built Operate Own
BOOT	Built Own Operate Transfer
BOT	Built Operate Transfer
CFC	Credit Finance Corporation
CSF	Critical Success factors
JICA	Japanese international Co-operation Agency
JPY	Japanese Yen
NGOs	Non-Governmental Organizations
NPV	Net Present Value
ODA	Oversees Development Agencies
OECD	Organization for Economic Co-operation and Development
PFI	Public Finance Initiatives
PPP	Public Private Partnership
PSP	Private Sector participation
PSP	Private Sector participation
RI	Regression Index
SMHP	Sondu-Miriu Hydroelectric Power
SPSS	Statistical Package for Social Sciences
SPV	Special purpose Vehicle
UNECE	United Nations Economic Commission for Europe
USA	United States of America
VFM	Value for Money

ABSTRACT

Public Private Partnership (PPP) projects occur as arrangements of which private parties participate in the processes of providing public infrastructure services. While PPP is a popular method of providing public projects, the method has several risks. The purpose of this study was to assess the relationship between construction risks, managerial skills and completion of PPP Projects in Kenya using Sondu-Miriu Hydroelectric Power Project, Kisumu County. The objectives were to assess the extent to which construction time overrun related risks influence completion of PPP Projects; determine the extent to which construction cost overrun related risks influence completion of PPP Projects; examine how labour related risks influence the completion of PPP Projects; establish the extent to which combined construction risks influence completion of PPP Projects and to assess the moderating influence of managerial skills on the relationship between construction risks and the completion of PPP Projects. The target population were 85 members of management at Sondu-Miriu hydroelectric power project. A sample size of 71 was obtained using Yamane formula out which a return rate of 54.9% was achieved. The study used proportionate technique to select the 71 sample size out of 85 management staff that formed the population.Questionnaires and interview guides were used for data collection. The process of analyzing data was done quantitatively using descriptive and inferential statistics, and qualitatively using content analysis. SPSS v.20 was used to aid in analysis of quantitative data. Descriptive statistics utilized in the analysis were mean, standard deviation and frequencies and percentages. Inferential statistics used for hypothesis testing through Pearson Correlation and Multiple Regression Analysis. Results showed that cost overrun related risks were highly prevalent (Mean = 3.970, SD = 0.124) and had a strong negative statistically significant relationship with completion of PPP Projects ($R = -0.682$, $p<0.05$). It was also found that labour related risks affected the completion of PPP projects (Mean = 3.777, SD = 0.373) and had a strong negative statistically significant relationship with completion of PPP Projects ($R = -0.729$, $p<0.05$) while time overrun related risks were generally average (Mean = 3.141, SD = 0.785) and had a strong negative statistically significant relationship with completion of PPP Projects ($R = -0.975$, $p<0.05$). Further, combined construction risks statistically significantly predict completion of PPP projects ($R^2 = 0.952$, $p <.001$). The results established that managerial skills did not have any moderating effect on the relationship between construction time overrun (R^2 change = 0.000; $p = .936$), construction labour related risks (R^2 change = 0.016; $p = .257$) and completion of PPP projects. However, there was a statistically significant moderating influence of managerial skills on the relationship between construction cost overrun related risks and completion of PPP projects (R^2 change = 0.007; $p = .004$).It is concluded that time overrun related risks, cost overrun related risks and labour related risks significantly negatively influence the completion of PPP Projects. Further, managerial skills statistically significantly moderate the relationship between construction cost overrun and completion of PPP projects but do not moderate the relationship between cost overrun, labour related risks and completion of PPP projects. The study recommends the collaboration of stakeholders at initial stages for accurate design.,timely approval eases of execution of the overall project and reduced costs. Similar studies should include different projects, designed and achieved through PPP.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

In the post Structural Adjustment Programmes period (1980s-1990s), crises emerged from the political and economic sphere which brought in the understanding that no individual stakeholder, state or private, and conveniently conceive and implement economic growth and development projects (Alexanderson and Hulten, 2008). Thus, an emerging trend has ben witnessd in construction involving Public Private Partnerships as a way of fulfilling public tasks. A Public Private Partnership (PPP) arrangement occurs in instances where private and the public collaborate to implement public projects. Alexanderson and Hulten (2008) assert that the principles and procedures of operating within the private sector are introduced and simulated in the administration of public projects to enhance efficiency and improve on service delivery for the public.

By definition, PPPs refer to contracts and arrangements where public and private investors jointly come together to realize a symbiotic relationship to finance, execute and deliver projects aimed at public benefit (Kucukali, 2011). Consequently, PPPs focus on mutual involvement through sharing of costs, risks as well as benefits across the two sectors arising from PPP by way of taking advantages of either side while overcoming limitations at the same time. PPP provides a mechanism for attaining social goals because through it, governments can offer incentives and resources to the right people.

The onset of PPP as a strategy in the implementation of PPPs was seen as ideal for effective economic development during 1990s (World Bank Report, 1993). Due to its perceived success, PPP is accepted and recommended worldwide as a tool for an

efficient, transparent and effective strategy that guaranteed value for money for public sector projects which had previously known persistent and consistent failure leading to disappointments. This was because the failure in the projects was attributed to wrong or poor choices of policies as well as bureaucracy (Alexanderson and Hulten, 2008). The expansion of the public sector consequently ceased to be the automatic policy preference in most developing countries (World Bank Report, 1993).

Well designed PPPs strive to bring together a variety of technical, commercial and managerial skills from private sector while at the same time it benefits from political goodwill, lower cost of capital and low risks from public sector (OECD, 2010). This helps in enhancing time, quality and cost efficiency of projects (Savas, 2000). It also helps in enhancing flexibility and effective management of public projects. In Kenya, the PPP concept is slowly gaining momentum as government enters into partnership with private investors in the process of providing public services. Sondu-Miriu hydroelectric power project venture is situated in Kisumu County. The project relies on water from River Sondu-Miriu. The venture was started by Kenya Electricity Generating Company Limited and financed by the Government of Japan.The project was to be completed by 2005 but due to delay it was completed in November 2011(Abiero, 2010).

1.1.1 Completion of Public Private Partnership Projects

PPP refers to partnership involving government institutions enter into with private investors in service delivery (Li, Akintoye, Edwards and Hardcastle, 2004). Private Sector participation (PSP) largely emphasizes on transfer of contractual obligations to private sector as opposed to putting more emphasis on opportunities in partnership (Mohr and Spekman, 1994). According to Farlam (2005), the process of engaging private sector

in the provision of public infrastructure can improve economic value in service delivery and enable the government to utilize the capabilities and expertise held by private sector. This has a positive impact on the public in terms of improving their well-being. In addition, it helps governments to share risks by transferring some to private investors who are engaged in intensive investment (Lucey, 1997).

1.1.2 Construction Risks

By definition, mamangement of risks is assessing the risks and reducing negative outcomes (PMBOK, 2013). Thus, the possible negative possibilities are identifiable and their effect estimated and mitigated before the project. Construction risks fall under the broad categories of financial, contractual, operational, and environmental (PMBOK, 2013). To date, it is widely recognized that risk management, which comprises identification of risks and design controls to address them, is a critical element in the success of PPP projects (Raz, Shenhar and Dvir, 2012). Smith, Merna and Jobling (2006) also points out that risk has emerged as a key feature of PPP contracts as it can shift the balance between conventional public procurement the PPP option (Smith, Merna and Jobling, 2006). As such, project risks must be explicitly identified and minimised by sharing, managing or transferring them to other parties involved in a contract (Akintoye and Chinyio, 2005). Fundamentally, risks are assigned to parties that are well-positioned to deal with them (HM Treasury, 2003). However, the nature of risk may be complex, and it has been argued that PPP may largely depend on the conflation of uncertainty or risk (Froud, 2003). Overall, the completion of construction projects adequately must meet the time, cost and labour parameters as envisaged in project inception and preparation to which there are risks associated.

1.1.3 Managerial Skills

The construction manager implements various components of the project, thus takes centre stage in risk identification and management. As such, there is a need for adequate and relevant managerial skills to perform such functions. Consequently, managerial skills play an effective crucial role in project implementation, including the aspect of risk management (PMBOK, 2013). In projects with major construction components disputes emerge from divergent opinions of stakeholders which in some cases conflict those of the contractor. All contractual clauses carry with them some responsibilities, which may lead to disputes (Ng and Loosemore, 2007). Despite having clauses for addressing disputes in most construction contracts, failing to resolve some disputes impact negatively on delivery. To mitigate this, there is need for managers to access accurate information as when needed so as to make decisions and plan for implementation. With information, it is possible to eliminate unpredictable circumstances and ensure flow in project implementation. It equips the manager with additional tools and aids the simplification of processes (Lucey, 2005).Studies by Karimi (2008) and Musa (1999) identify instances of inexperience among managers, poor planning, and poor communication to be among the major reasons resulting into time delays in Kenyan projects.

1.1.4 Time Overrun Related Risks

Kaming, Olomolaiye, Holt and Harris (1997) define time overrun to be delays that occur beyond the scheduled time. Keeping development projects inside timetables requires sound systems,great practices, and watchful judgment. To the aversion of proprietors, contractual workers and experts, be that as it may, of the numerous projects encounter broad postponements and subsequently surpass cost and time estimates. This problem

occurs mainly in adversarial or traditional types of contracts, which award projects to the lowest bidders and which are widely common in developing countries (Kumaraswamy and Zhang, 1995).Despite this, the complexity of public projects and environments under which they occur demand delivery with defined guidelines (Enshassi, Al-Najjar and Kumaraswamy, 2008).

For a long time, delay overruns have resulted in high costs in public projects (Abdul-Rahman *et al*., 2008; Charles and Andrew, 1990; Okpala and Aniekwu, 1988; Zaki and James, 1987). Delays, in this case, might be in form of incidents that impact the progress of projects, thereby resulting to postponements of projects. They might be caused by the unavailability of resources, bad weather or even be in form of design that hamper the completion of projects. Generally, such incidences emanate either internally or externally and they end up impacting the implementation of projects (Vidalis and Najafi, 2002).

Odeh and Battaineh (2002) evaluated the factors attributable to delays in project construction in Jordan using survey method. They established that contractors see labour efficiency as leading determinant of delays, followed closely by inadequate experience among contractors and consultants. Further, project owners interference was also attributable to delays. Aibinu and Jagboro (2002), who conducted a study on delay factors in projects. With the help of data collected from 61 construction projects in the country, an identification, assement and evaluation of risk effect of those projects. They established that delays had significant implications for project execution in the country. Chan and Kumaraswamy (2002) evaluated time reduction strategies for specified projects. Ahmed *et al.,* (2003) established that prevalent delays in construction were

excusable compensable 48 percent, followed closely by non-excusable ones at 44 percent and finally the excusable non-compensableones at 8 percent. The non-excusable delays refer to overruns that occur when contractors are responsible for managing projects. In contrast, the excusable compensable ones occur when the responsibility of managing projects is in the hands of owners or consultants.

1.1.5 Cost Overrun Related Risks

Cost overrun occurs when projects incur more than the budgeted amounts of money. Sometimes, it is referred to as excess cost above budget ceiling (Zhu and Lin, 2004). Their variation from budgeted ones can be determined by measuring the deviation between the actual amount of money incurred by contractors and contract award amounts. For comparison purposes, the values can be converted into percentages (Jackson, 1999). Koushki, AL-Rashid and Kartam (2005) examined rising costs and time overlap in the developments of private residential units in Kuwait. They established that excess costs and time overlap proportionately related to total costs. Lack of financial resources and inappropriate time allocation were some of the factors that contributed to this relationship.

1.1.6 Labour Related Risks

These risks can take different forms. However, the most visible one is a labour dispute, which might be in the form of manufactured disputes, unnecessary meetings and strikes. According to Murali and Yau, (2007), labor productivity and supply may also delay projects. Similarly, Odeh and Battaineh (2002) claim that both meetings and strikes can also delay projects.Yaw and Oluwoye (2003), on the other hand, identify labor shortage as a significant factor that hinders projects. Sadi, Asce and Muhammad (2006),on their

part identify low productivity in labor and shortage of labor as factors that delay projects. Sweis, Sweis, Abu Hammad, and Shboul (2007) identify labour shortage in terms of unskilled or semi-skilled labour as a factor that delays project completion.

In light of the above, Hendrickson and Au (2003) claim of efficient management of construction works should focus its attention on utilizing labour, equipments, and raw materials in the right way. Besides, they claim that responsible parties should evaluate labour productivity continuously and that cost control measures should be developed. The low productivity witnessed in construction is linked to internal challenges including disputes, abandonment of projects, excess budget, and time overlaps. In separate studies, Alinaitwe, Mwakali and Hansson (2007) and Kaming et al., (1997) established that variation across geographical regions is also another problem linked to labour productivity in construction.

1.2 Statement of the Problem

Introduction of PPPs may not reduce Construction risks such as time overrun related risks, cost overrun related risks and labour related risks. However, it enables public and private to share risks between them in the partnerships. A study by Okeyo,Rambo and Odundo (2015) examined the effects of contractual delay on execution of Sondu Miriu Hydro Electric power project. It established that delays in design, payments, site possession, mobilization and legal conformance made the project completion expensive and of below quality specifications and this could hamper the project in the long run.

Abiero (2010) examined the challenges that stakeholders had in the management of PPP project in the country, with emphasis on how compensation and relocation of the people

would affect the project. Studies done in Kenya show 73 percent time overlaps above schedule and 38 percent excess cost above budget among projects (Mbatha, 1986). Another study by Gichunge (2000) identified variation in work in form of extra work, was the source of risks related to delays and rising budgetary costs. Construction performance in Kenya is inadequate. Even thoughvery qualified human resources supervise projects, they end up failing (Gwaya, Masu and Wanyona, 2014).

While there occur varied influencers on completion of a PPP project, there is limited empirical evidence on how construction risks affect the completion of PPP project.Sondu-Miriu Hydroelectric Power Project is an infrastructural project that was implemented by Kenya Electricity Generating Company limited (Kengen) by the Republic of Kenya. Actual construction was started in March 1999 for the first phase which was to be completed in March 2003. Both the project cost and the project period exceeded the plan. The project was estimated to cost a total of 8,156million JPY but the actual cost was 9,088 million JPY, (Takashi, Park and Hong, 2012). Such delays and cost increase points to inherent risks and managerial shortfalls. Moreover, previous studies on construction risks have not incorporated the moderating influence of managerial skills on risk contribution to PPP implementation. Therefore, it is based on the foregoing that I undertake to establishing the influence of construction risks on completion of PPP projects in Kenya in general with a particular focus on Sondu-Miriu Hydroelectric Power Project.

1.3 Purpose of the Study

Study purpose was to establish the extent construction risks influence completion of PPP projects, and moderating influence of managerial skills in Sondu-Miriu Hydroelectric Power Project, Kisumu County .

1.4 Objectives of the Study

The study sort to achieve the following research objectives:

i. To assess the influence of construction time overrun related risks on completion of Public Private Partnership Project in Kenya.
ii. To determine the influence of Construction Cost Overrun related risks on completion of Public Private Partnership Project in Kenya..
iii. To examine the influence of Labour related risks on completion of Public Private Partnership Project in Kenya.
iv. To establish the effect of combined construction risks on the completion of Public Private Partnership Project in Kenya.
v. To assess the moderating influence of managerial skill on the relationship between construction risks and the completion of Public Private Partnership Project in Kenya.

1.5 Research Questions

The study sought and answered the following research questions:

i. What is the influence of construction time overrun related risks on completion of PPP Projects in Kenya?
ii. What is the influence of Construction Cost Overrun related risks on completion of PPP Projects in Kenya?

iii. What is the influence of Labour related risks on completion of PPP Projects in Kenya?

iv. What is the influence of the combined construction risks on the completion of PPP Projects in Kenya?

v. How do managerial skills moderate the relationship between construction risks and completion of PPP Projects in Kenya Sondu Miriu Hydroelectric Power Project?

1.6 Research Hypothesis

The study tested the following null hypothesis:

1.H_0: There is no significant relationship between construction time overrun related risks and completion of PPP Projects in Kenya

2.H_0: There is no significant relationship between Construction Cost Overrun related risks and completion of PPP Projects in Kenya

3.H_0: There is no significant relationship between labour related risks and completion of PPP Projects in Kenya

4.H_0: There is no significant relationship between construction risks and completion of PPP Projects in Kenya

5.H_0: There is no significant moderating influence of managerial skills on the relationship between construction risks and completion of PPP Projects in Kenya

1.7 Significance of the Study

Study results provide guidance for project financiers, implementers, government and other PPP bodies on key risks that may affect project delivery. Construction-related risks affect all industry players, both clients and contractors. The state, contractors, corporationsand other players in the construction industry may benefit from this study because it highlights key construction risks which, when mitigated, would augment project delivery. The information gathered and presented in this study may serve as a guideline in the decision making for the parties concerned. This is expected to provoke more research and inform further studies in this area of study. Further, contribution is made to body of knowledge to be shared in seminars, educational journals and references materials for scholars.

1.8 Assumptions of the Study

Key assumptions were that the target respondents yielded required information. Also, participants could identify and respond to the indicators of construction risks as presented in the questionnaire. This was important in this study since it would form the basis for obtaining reliable information on which to base the study findings and answer the research questions. During the study, the respondents proved to be very resourceful in terms of providing the information. Their awareness and knowledge regarding the implementation of the project provided the needed information, which was analyzed to answer the research questions as presented.

1.9 Limitation of the Study

Limitation arose as it was impossible to interview all participants of the case project. This limitation was remedied by the use of proportionate sampling technique that ensured

representativeness of the target population to avoid any biases and inclusivity of the respondents

1.10 Delimitations of the Study

The researcher adopted mixed method approach anchored on the pragmatic paradigm. This paradigm allowed the study to collect and analyze both quantitative and qualitative data and test for hypothesis. The study was delimited to interview and questionnaires as method of data collection. The questionnaires were utilized to collect quantitative data while key informant interviews collected qualitative data. The variables of the study were restricted to cost overrun related risks, time overrun related risks, labour related risks and managerial risks,and the way they influence completion of PPP projects. The study probed how construction risks, managerial skills impact implementation of PPP projects. The case project was chosen as it was an initiative designed and implemented to completion through PPP. Moreover, the completion of the case project had a massive benefit to the host community, including construction and improvement of schools in the villages, construction of boreholes for clean water and the irrigation scheme which provides employment and basic livelihood.

1.11 Definitions of Significant Terms used in the Study

Throughout the study, the following terms were utilized in the following manner.

Construction risks: Is any exposure to possible loss. According to this study, it refers to the setbacks to the completion of the project, specifically cost overrun related risks; time-overrun related risks and labour related risks.

Construction Time Overrun related risks: Is interpreted throughout the study as delays

that occur beyond completion dates. These are the risks that impact the progress of projects thereby resulting to postponement of project activities and objectives. The risks could emanate from poor site supervision, management, changes in designs from time to time, dispute among project participants, late delivery of equipment's and materials as well as poor planning.

Construction Cost Overrun Related Risks: Are the risks that emanate from costs that exceed the budget. This might be as a result of underestimation of the actual costs or inefficient planning, among other reasons. Indicators of cost overrun related risksincludeestimationofrequirements, work breakdown structures and timeliness, project design variations and resource planning. In this study, construction cost overrun refers to additional costs incurred due to delays as well as a change in material costs and design.

Labour Related Risks: Are the risks associated with human resources or workers in theconstruction project, which,according to this study,includethe Selection of employees, Supervision, excessive hours of work, wage compensation and assignment of duties.

Managerial skills: This is the capacity of those in management positions to apply efficient procedures in identifying and assessing of risks, and developing measures to respond to risks identified, communicating decisions and involvement of staff.It Is the ability to plan, schedule and supervises the execution of a construction project.In this study, managerial are technical skills, coordinating activities, continuity of staff involved, and communication within the parties.

Completion of Public Private Partnership Hydro power project– Is the lifecycle of a project where it meets the time target, budget, quality requirements, health, safety and

environment and client satisfaction. In this study, completion refers to the ultimate delivery of the project as had initially been envisaged.Completion of PPP projects is considered to include the delivery of project deliverables sufficiently and efficiently to meet the time, cost, and labour requirements.

1.12 Organization of the Study

The study consists of five chapters. Chapter one introduces the study by providing background information, statement of the problem, identify the purpose of the study, its research objectives, research questions, and hypotheses. Besides, it outlines the significance of the study, assumptions made, study limitations, delimitations as well as defines the terms utilized throughout the study.

The second chapter presents an introduction for the literature to be reviewed. It covers completion of PPP projects, Public Private Partnership Projects, time overrun related risks and delivery of PPP project, risks attributable to excess costs and delivery of PPP projects, labour attributable risks and delivery of PPP project and managerial skills and completion of PPPHydroelectric power project, theoretical and conceptual frameworks, knowledge gaps and summary of literature.

The third chapter provides the procedures followed in conducting the study in terms of the paradigm, design, target population, sample size determination, research instrument, reliability and validity of research instruments, data collection procedures and data analysis techniques. Further, the chapter present ethical considerations, operationalize of the study variables.

The fourth chapter presents the study results in terms of Questionnaire return rate, demographics of the respondents and study results for objectives outlined as the influence of construction time overrun related risks on completion of PPP Project in Kenya,the influence of Construction Cost Overrun related risks on completion of PPP Project in Kenya,the influence of Labour related risks on completion of PPP Project in Kenya, the influence of combined construction risks on the completion of PPP Project in Kenya, and the moderating influence of managerial skill on the relationship between construction risks and the completion of PPP Project in Kenya

and hypothesis testing.

The fifth chapter summarizes the study results and provides conclusions based on the resultsas well asrecommending what needs to be done to improve the study area and suggesting the areas that future studies should evaluate as well as highlighting the study contribution to related knowledge.

CHAPTER TWO
LITERATURE REVI EW

2.1 Introduction

This chapter comprises of a review of theoretical literature followed by empirical literature reviewed on construction risks, managerial skills and project completion.An overview of literature focusing on: time overrun related risks and PPP implementation, cost overrun related risks and completion of PPP hydroelectric power project, labour related risks and PPP implementation and managerial skills and PPP implementation, the theoretical and conceptual framework are evaluated to depict the link between variables and gaps in literature.

2.2 Completion of Public Private Partnership Projects

Seen as the remedy to completion of major public construction projects, this strategy has been overly popular in most projects today (UNECE, 2008). Completion of PPP projects entails the comprehensive delivery of the project within the boundaries of the planned time, budgeted costs, and without unresolved labour issues. In this study, the PPP delivery is considered to include accomplishing deliverables sufficiently and efficiently to meet the time, cost and labour requirements. Nowadays, PPP concept is becoming a popular model of executing public projects. UNECE (2008) further puts it that PPPs have become the model of executing major public projects that require a lot of money. PPP projects are aimed at finding solutions to public problems by taking advantage of resources in the hands of public sector. It thereby combines the strengths in public and private sectors to solve problems that members of public face. For the PPPs to be efficient,there is a need for them to be effective and productive in all means (Mohr and

Spekman, 1994). Thus, international organizations, governments, and private developers have appreciated and embraced the cost benefits of such arrangements hence their popularity.

Recently, there have been intense discussions at various platforms relating to the way governments can partner with private sector to provide services and infrastructures like railways, roads, water, sanitation, Housing, Harbor, and Airport (OECD, 2010). Studies depict infrastructures as essential elements for thriving economy; hence, necessitating their provision at all time to promote growth (Ismail and Ajija, 2014). This premise on the role of infrastructure in development necessitates scrutiny of PPP projects, especially their completion. Privatization and Private Sector Participation (PSP) are some of the other terms that refer to PPP activities. Nevertheless, while these terms are used interchangeably, they differ from each other.

While numerous contributors influence PPP implementation as envisaged, risks in construction may also be an influential factor. For instance, In Queensland Australia, a research by Lyons and Skitmore (2004) that evaluated the managerial contribution in engineering established that bundling responsibilities transferred risks to private partners, thereby lowered costs. In Sondu-Miriu Hydroelectric power project, there were instances where bundling of tasks as well as phases together could hamper the expecte quality of the completed tasks, as pointed out by Lyons and Skitmore (2004). Typically, there is no doubt that almost all significant projects involve some level of risk because of their complexity and expected longer investment period (Lyons and Skitmore, 2004). Further, variations in PPP projects in developing countries might occur due to variations in their constraints and risks.

The interplay of factors between an organization and the environment it operates it makes it susceptible to risks. Kartam and Kartam (2001) also explain that risks are inherent in the projects and for this reason, stakeholders in PPP projects need to manage their complexities liked taxation, market conditions, policies, capital budget, and documentation. As observed by Kartam and Kartam (2001), when project stakeholders fail to manage the complexities of the construction risks, failure is bound to occur, affecting the overall project. A study by Smith, Merna and Jobling (2006) in Ghana during the housing construction project, in which the government partnered with private sector to provide houses for the civil servants, it was found that external factors heavily impacted the project. The external factors were termed as project environment. Based on the preceding, a suitable method of managing risks involved in construction projects may depend on environmental factors.

The extent to which contractors conform to occupational safety as well as health is used as a measure of the success of a project. The study by Tipili and IIyasu (2014) on performance criteria within Nigerian construction industry noted that most important performance indicators for evaluating project performance were quality of the construction work when completed, cost incur to complete the project and time taken in the delivery of the designed project in successive order. Quality coordination and occupational health and safety take positions five and six, respectively. Tipili and IIyasu (2014) further put it that the management of safety and health faces a variety of challenges and that construction workplaces may be vulnerable to occupational illnesses and adverse effects of excessively long working hours, machines and other factors occurring along the construction process. Besides, lack of expertise was established to be

another source of danger in the projects because some of the people using tools and machines do not wear protective gadgets. He further says that Health and safety measures are inadequate and effective enforcement mechanisms of health and safety are lacking. The contractors are supposed to ensure adequate health protocols and safety guidelines to minimize occurring accidents and to maintain a healthy working environment (Tipili and IIyasu, 2014). Based on the findings of Tipili and IIyasu (2014), delays and failure to deliver project phases affects the overall project delivery hence a significant factor in the completion of PPPs.

According to consultants, setbacks in decision making; poor planning and supervision; poor communication; lack of skills among consultants; a lot of time wasted as contractors wait for sample materials and drawings to be approved are some of the factors that delay projects. Shebob, Dawood and Xu (2011),who conducted their study in Libya established that change in projects' scopes; delays in material supplies, changing prices, and inadequate skills among workers was among the main factors that delayed construction works nationally. From the owners' viewpoint, those factors included lack of skills among workers; site transfer delay from the owners to the contractor, site modification (office, workshop and lab setup); changes in the material specification. For unknown risks, there is low understanding on probability of occurrence and ultimate impact (Chileshe and Yirenkyi-Fianko, 2011). As a result, the functions of those involved in managing projects should be to foresee risks and device mechanisms to mitigate them and organize activities so that projects would be completed in good time (Gwaya, Masu and Wanyona, 2014).

Further, researchers have shown that contractors fail to make use of risk analysis techniques and instead depend on own judgments as they estimate cost and time.A study by Mousa (2005) in Tanzania has shown that project owners and consultants tend to lack innovative methods of preventing and mitigating risks. Similarly, Tipili and IIyasu, (2014) asserts that assessment of risk of rising costs an working within budget guidelines is also a for construction projects in Ugandan. This has increased project cost, delayed projects and even lessened the quality of projects. As members of the East African Common Market, the risks affecting construction projects in Uganda are identically similar to the risks in Kenya.

2.3 Construction Risks and Completion of Public Private Partnership Projects

Risks occur in project implementation inherent to financial, operational, design, and environmental. They impact quality of delivered project, time and cost demands. Construction risks are those risks affecting projects during the construction phase (PMBOK, 2013). In this case, implementation of PPP projects are affected by the construction risks during implementation result in time, cost, and labour lose. To date, it is widely recognized that risk management, which entails identification and designing address mechanisms, is a critical element in the success of PPP projects (Raz, Shenhar and Dvir, 2012). Smith, Merna and Jobling (2006) also point that risk has emerged as a key feature of PPP contracts as it can shift the balance between conventional public procurement and the PPP option (Smith, Merna,and Jobling, 2006). As such, project risks must be explicitly identified and minimized by sharing, managing or transferring them to other parties involved in a contract (Akintoye and Chinyio, 2005). Underlying consideration should be to apportion risks to entities that are well-positioned to deal with

them (HM Treasury, 2003). However, the nature of risk may be complicated, and it has been argued that PPP may largely depend on the conflation of uncertainty or risk (Froud, 2003). A study by Rwelamila (2003) on the African construction industry in Turmoil in Southern Africa showed that 80 percent of projects are not completed as scheduled due to contract forms that are not negotiated which guarantee fair risk distribution.

Different strategies can be effected to address project risks. Carbonara, Costantino, and Gunnigan (2014) probed risk management within PPP projects using a case study of a motorway sector. The study adopted a mixed-methodapproach and Delphi technique to collect and analyze the data. Delphi technique works by capturing group opinion and refining it. The Delphi technique was used with two independent panels of 15 and 30 participants. Interviews were conducted and questionnaires administered to acquire data and multiple case analyses were used. The study established that the risks of PPP motorway projects were exogenous and endogenous. As for the endogenous ones, the demand risk was the main factor that caused it during the operation phase. Accordingly, risk mitigation was identified as the most efficient method of dealing with this type of risk. Other endogenous risks that were less severe were financial closure risks, cost overruns, which were both unacceptable and undesirable. Most of the cost overruns were common during construction phases (Carbonara, Costantino and Gunnigan, 2014).

The financial risks occur during project development phase; as such, they should be addressed by individual parties. Carbonara, Costantino, and Gunnigan (2014) further found that alternative promoters were the best risk mitigation strategies. The exogenous risks may occur throughout the life cycles of PPP projects and they might be out of the control of parties involved in projects. Most of these risks dependon institutional and

financial contexts. While this study focused on both the pre-completion and post-completion face of the PPP project, the present study evaluated a project already delivered through PPP.

Laryea (2011) in a study that sought to understand the risks in tendering regarding accounting responsibility in UK and Ghanaestablished the risk to be higher among UK-based contractors. The study sought to determine whether contractors in developing countries were intuition reliance for decision making in the process of managing risks. Nworuh and Nwachukwu (2004) in a study that was conducted in Nigeria established that errors in estimation, delays in projects, bad weathers, financial failures, and industrial relations were some of the challenges that hampered construction projects in the country. These risks may be severe in certain environments. Accordingly, there is a need to understand the way contractors in different field view risks and deal with them. However, Nworuh and Nwachukwu(2004) did not bring out how the risks impact on the completion of the project. This also forms one of the objectives addressed by the study.

Too few major infrastructure projects are executed through PPPs and in sectors that are not considered as ideal according to the literature. In South Africa, Bruchez (2014) probed sustainability of PPPs in long-term infrastructure development in the country, and factors affecting proper completion and impletion of the PPP projects. It analyses what has been done in terms of PPPs in South Africa so far and to determine to what extent PPPs are, in the current situation, adequate to respond to the long-term infrastructure needs of the country. The study adopted mixed methods approach and collected data from a sample of 25 managers of various PPP project organizations by interviewing them and administering them with questionnaires. Results show that these partnerships are still far

from being such a tool in South Africa. He further argues that reforms are required to make processes and legislation simpler, to increase the public sector's capacity to deal with these partnerships and to give higher visibility and general commitment to the PPP concept among politicians, authorities and the population. He concludes that if these issues are to be resolved , partnerships would have great potential as a tool for the long-term development of South Africa's infrastructure.

Other studies have shown that critical success factors are necessary if PPPs are to be completed. Wijekoon (2006) evaluated the utilization of PPP models in Kenya in transportation and energy projects. The study analyses two case studies, namely; Kenya and Uganda Railways Concession and Kipevu II Power Project to evaluate significance of Critical Success Factors (CSFs) on project delivery. The frameworks presented at the time of execution were also taken into account. The study revealed that the CSFs influenced the successful delivery. It also established the impact of the CSFs is dependent on the framework in place at the time of implementation and the risks associated with the Project.

Sondu-Miriu Hydroelectric power Project is an infrastructural project undertaken by Kengen under the Ministry of Energy. Kengen was the implementing agency of the project. The consultants of the project were Nippon Koe Co. Ltd,Kengen obtained funding from Japanese Government The contract for design and supervision was awarded and construction contract was awarded to Konoike.Actual construction was started in March 1999 for the first phase which was to be completed in March 2003.The project cost exceeded the plan and the project period exceeded the program. The project was estimated to cost a total of 8,156million JPY, but the actual cost was 9,088 million JPY

(Takashi, Park and Hong, 2012). Also, the project was expected to completed within 67 months, but it took about 97 months. The project is located within Kisumu County and it was funded by Japanese government through the Japanese International Corporation Agency (JICA) under Oversees Development Agencies (ODA) loans. The project aimed at adding 80 extra megawatts of Electricity to the national grid (JICA, 1985).

2.4 Time Overrun Related Risks and Completion of Public Private Partnership Projects

Previous research has identified the construction phase as having a remarkable effect on budget and delays for construction works. Time overrun attributable risks are a construction-related risk attributable to an overall delay in the delivery of project phases. Ismail (2014) carried out an investigation of risks associated with factors that cause increased budgetary outflows and time overlap in construction in Malaysia and identified 35 related contributors. Besides, he utilized a structured survey questionnaire to determine the consequences of those factors on projects' life cycles. Round one assessed probability of having excess costs and time overlap with corresponding severity. He established significance occurrence of risk in construction phase (Ismail, 2014). He proceeded to conduct the second phase to determine the level of agreement with respondents to the outcomes of the first round. He established that 12 of the 35 factors were risk factors for overruns. These were poor communication; delay in material supply and limited quantities; poor flow of information among concerned parties; poor coordination; delays in approving drawings; changes that occurred frequently in projects' scopes; errors in designs; design changes; planning below par, unprofessional management of site activities and incompetent sub-contractors (Ismail, 2014).

Ismail (2014) investigated determinants of delays excess budgetary costs. Ismail (2014) did not lay emphasis on the impact of such delays and rising costs on overall project delivery. In as much as the study collected quantitative data, the method of analysis was not able to establish whether delays and the increased overhead significantly influenced implementation of the project hence the research gap. The present study focused on hydroelectric power generation projects using regression to analysis quantitative derived data from structured questionnaires for measuring influence of the delays on project delivery thus be able to fill the research gap.

In decision-making processes, accurate estimates of risks and uncertainties are essential because they help in addressing some of the challenges beforehand. Spackova (2012) useda descriptive research design where both the questionnaires and interview schedule was used to collect data. Taking the example of tunnel construction projects, the studyestablished that some of the uncertainties emanated from human and organizational factors ad unknown geotechnical conditions that were not known beforehand. Spackova (2012) proposed the adoption of reliable predictions which would estimate those factors using a probabilistic model that does not rely on expert judgments as they tend to be unreliable and biased.

Consequently, Spackova (2012) conducted a study titled ‘risk management of tunnel construction projects’using a probabilistic model to estimate the likelihood of delays in project completion. He assessed the occurrence of those risks and the impact they had on decision-making processes. The model was applied to construction projects in the Czech Republic to estimate tunnel construction time. Additionally, the likelihood of delays and failures within construction projects was predicted using database obtained from a

literature review. The findings provided deep insights for further studies, thereby, were utilized in the current study (Spackova ,2012).

The aim of the study by Spackova (2012) developed a probabilistic model for approximating construction time. The study focused on algorithm development using data from tunnel construction projects and not hydroelectric power generation projects. Moreover, the study only modelledthe construction time of the projects and not how the delays come into play in completing the projects. Quantitative and qualitative data were obtained from stakeholders of the completed Sondu-Miriu power project to fill the gap. Rather than use a probabilistic model, the present study used regression analysis to establish risk influence on construction execution.

An extensive construction project is generally a large system combined with many factors, management levels, relations and participants. As such, diverse management risks may arise out of it because of diversity in targets, people and resources and even interests that might differ in some instances. Thus, Xie and Yang (2010) conducted a study on the practical steps and methods utilized to manage risks in such projects in China. They established various systems of managing risks from Grey Evaluation and used a case study to depict the extent of such measures. Both questionnaires and interview schedule were used. Descriptive and inferential statistics were used for the analysis of data. The result indicated that the method was capable of reflecting greyness, fuzziness and randomicity of data in the organization of sophisticated projects,thereby highlighted the importance of reasonable and scientific method of evaluating risks.

The study by Xie and Yang (2010) focused on risk analysis based on an existing model of

Grey to categorize its effects on various stakeholders. However, the study did not explore the influence of risks on completion of construction projects. Moreover, the study generalized by looking at construction-related projects and not completed hydroelectric power projects hence the research gap. The present study filled the gap in knowledge by using a mixed-method approach, collecting quantitative and qualitative data from a completed hydroelectric power project to be able to fill this gap.

Normally, the blueprint of period required for building and operating projects before transferring in such concessions (BOT) is critical to sound financial consideration and delivery (Ye and Tiong, 2003). Different designs are utilized to reflect various risk control measures used in a project. A single-period concession necessitates for risks to be presumed whereas a two-period one in some instances is best in reducing risk exposures based on incentive schemes.This explains why Ye and Tiong (2003) utilized the Monte Carlo simulation in establishing net present value (NPV), NPV-at-risk and variance for varied structures in concession modalities. The intention was to help the government and concessionaires to understand rewards and risk exposures. The study evaluated the impact of project characteristics on the design of the concession period with a view to evaluating the viability of those designs. It established that concession period that were organized well were able to develop 'win-win' solutions for parties involved in project implementation. Whereas Ye and Tiong (2003) focused on design concession period, the study did not probe the influence of delays on delivery of Hydroelectric power PPPs. Moreover, the study focused on major build-operate and transfer projects (BOT) using developed Monte Carlo simulation to evaluate NPV at risk. The present study adopted descriptive survey methods to determine the influence of time delays leading to overrun

attributed risks on the completion of PPP projects by involving stakeholders of the completed Sondu-Miriu hydroelectric power project.

Both public and private sectors should establish efficient strategies for allocating risks to negotiate effectively in PPP contracts (Ke, Wang and Chan, 2010). Consequently, Ke, Wang and Chan (2010) evaluated the methods utilized in china to allocate risks equitably among Chinese PPP projects. The study used comparative methods to analyze this issue, and it identified three types of risks: organizational and coordination, exclusive right and change in law as the most prominent types of risks in those projects. The study was based on computational risk management modelling and focused on proposed risk allocation based on a change in law, competition, organization and coordination risks. However, the study did not consider how time delays influence PPP project completion.

Because of financial, political, and social factors, projects of construction related in varying geographically areas across the world are vulnerable to delays (Mohamed, 2015). The delays can be avoided if the sources of those factors would be identified. Mohamed (2015) evaluated delay genesis in Sudan using a quantitative design. A questionnaire administered to beneficiaries, consultants and contractors and comprising of a list of factors that delayed projects was the main tool. Respondents indicated their opinion on 5 points Likert scale. Data revealed that fluctuation in prices for construction materials, inaccurate time and cost estimates, negative social impacts, materials shortage, and litigation were some of the factors that delayed projects. Besides, too much pressure from projects' stakeholders, disputes among participants and declines in revenues were among the risks that were associated with delays in project delivery. Risk mitigation measures were found to include quality cycles, joint risk management, information

sharing and Total Quality Management (TQC).

2.5 Cost Overrun Related Risks and Completion of Public Private Partnership Projects

As projects' sizes increase so do their complexity. Accordingly, the ability to manage risks depends on the measures taken beforehand to prevent unwanted outcomes.In Sweden, Osipova (2008) investigated some of the steps that were utilized to minimize risks in procurement projects. Osipova (2008) noted that construction-related risks significantly impacts the construction projects in the country because it affected the quality, time and costs of those projects. However, he observed that how risks was shared was essential to project completion. Osipova (2008) undertook to demonstrate the way risks management processes had changed in Sweden. Accordingly, it obtained its data from nine construction companies and utilized surveys and interviews to gather data from consultants, contractors and project owners. The findings showed that there was no iterative method of managing risks among the companies that were included in the study. Therisks were high during the program phase, and it was likely to impact project completion negatively. Despite this, the study observed that parties involved in executing projects could cooperate to work together to minimize risks. The sharing of risk is determined by the way contract documents are developed. Osipova's study sought to evaluate the different ways that can be utilized to manage risks in procurement processes.

It identified 9 construction projects that had been completed recently using data from consultants, contractors and project owners. The finding showedthat most of the projects lacked an iterative approach to managing risks. The partnership ensures cooperation between stakeholders through shared risk allocation during project execution. Osipova

(2008) identified 9 projects that were ongoing in Sweden and focused on procurement options as the cause of risks. However, the study did not investigate costoverrun related risks in PPP projects, especially hydroelectric power projects. The present study identifies the absence of research on cost overrun related risks as the research gap and uses qualitative and quantitative data from project stakeholders. The case study is of a completed hydroelectric power project, and regression modeling to quantify how the rise above budget costs impact delivery.

Risks can increase losses by increasing costs, undermining the quality of projects, and even delaying delivery of designed works. Tipili and Ilyasu (2014) highlighted that the main challenge that faced construction in Nigerian was timely delivery and cost compliance. Tipili and Ilyasu (2014) sought to determine the likelihood of delays occurring and risk factors. The study utilized questionnaires which were self-administered by the participants to acquire. About 78 questionnaires were issued, but only 58 of them were completed and returned. The probability of score was categorized in three levels namely low, high and medium thereby ANOVA was utilized to evaluate the likelihood of occurrence.

Nonetheless, the time and cost related risks were identified as likely to occur more than others and even impact project completion. Environmental factors had the least weight indicating that they were unlikely to affect project completion and even had the least impact on projects. Tipili and Ilyasu (2014) laid emphasis on probability of risk occurrence and not how the specific risks influence project delivery.

Further, the study's population included experts from the construction industry and not

stakeholders in an already completed project, thus leaving a research gap. The present study collects qualitative and quantitative data from stakeholders of the completed case project to establish the influence of incresead cost on project completion with regression used to quantify the influence.

Adhikari (2011) conducted a study to determining the sustainability of hydroelectric power in Nepal, India. The quantitative method was utilized to conductthe study and even simplify the main themes. The analysis was based on a literature revie,developed by the Nepalese government and NGOs in hydroelectric power projects. The parameters that sustained those projects were based on Nepal context. However, the study by Adhikari (2011) faced two main challenges: 1) the data lack some form of reliability because it was collected from different sources, and 2) it was a bit hard to obtain updated information. Despite these challenges, the study concluded that sustainability of those projects was above acceptable levels. Nonetheless, Nepal needed to develop more sustainability measures to reach the international ones. The assessment by Adhikari (2011) focused on the sustainability of hydroelectric power projects but not the effect of the excess costs above budget ceilings influence project implementation.

Frimpongs, Oluwoye and Crawford (2003) evaluated about 26 factors that caused cost overruns and established that difficulties in obtaining monthly payments from project owners were the main factor that caused project delays as viewed by consultants and contractors. Despite the variance in viewpoints from the different groups of people who were interviewed, there were some form of unanimity in the ranking of the factors. Accordingly, it was evident that poor management of contracts, escalation of material prices, difficulties in procurement of raw materials, lack of technical expertise, and

challenges in monthly payments were some of the major factors that delayed water projects in Ghana.

Mweresa (2013) investigated the impact of high prices in construction. Overall, the design revealed the major contributors of rising costs for public buildings, outline guidelines to safeguard the financiers against rising costs as a result of extended preliminaries/time related costs and to identify problems and put in place cost reduction mechanisms. Obtained data was analyzed quantitatively by descriptive methods in the form of frequencies and percentages. Eight factors, namely work definition, bureaucracy in government, risk allocation; timeliness; requirements' interpretation, resource planning,inefficient preparation and contractors' inabilities had notable impacts on overruns. Most of the projects included in the analysis had delays of between 4.6 percentand 53.4 percent,whereas their excess costs above budget varied from 9.4 percent to 29 percent. Mweresa (2013) focused on risks resulting in cost overruns but not the excess cost above budget ceiling on overall project delivery, which are the focus of this study.

Moreover, qualitative data was not obtained and analyzed to gauge the views of various stakeholders on the rising cost above budget on overall project completion. The present study adopts mixed method approach using purposive sampling to obtain qualitative data and quantitative data from stakeholders in the case study project. Further, the present study used regression analysis for influence of excess cost on project delivery thus fill the emerging research gap.

Sondu-Miriu Hydroelectric Power (SMHP) projectwas delayed and one of the factors that

contributed to this delay was delayed payments by the funding partners (JICA). Okeyo, Rambo and Odundo (2015) evaluated the effect that delayed payments had on contractors in project completion. They addressed themselves to the risks of delayed payments over other factors that delay projects from completing on time. To achieve this objective, they adopted a causal-comparative design to collect primary data from 39 senior personnel in the management team in May 2011. The study established that delayed payments reduced productivity, altered work schedules (69.2%); extended time and acceleration (69.2%); and even prevented projects from completing before the allocated time (53.8%).

2.6 Labour Related Risks and Completion of Public Private Partnership Projects

Labour productivity is anchored on various factors affecting overall project delivery. To achieve the desired benefits that are anticipated from every construction project and ensure that the project is successful, then productivity factors should be controlled to minimize their adverse effects on labor (Soham, 2013). Consequently, there is need for factor identification in mega construction projects, especially those under PPPs (Attar, Gupta and Desai, 2012).

The practice in construction is that project managers outsource a large portion of their tasks to sub-contractors as a way of minimizing costs while increasing efficiency to work within the scheduled timelines (Ghoddousi and Hosseini, 2012). This method is prevalent in the industry since it encourages the subcontractor to improve workforce. Attar, Gupta and Desai (2012) observes that it is upon the sub-contractor to source for laborers. It negotiates remuneration terms consistent with the amount of work done thus their focus is on speedy completion of work for cost savings.

Studies that categorize risk factors of labour productivity have been conducted. In one such study, Abdul Kadir *et al.,* (2005) investigated factors of efficiency in housing projects. Participants ranked 50 project-related factors. From the data obtained, indices were computed for the factors which were used for ranking. The study identified among other factors, material shortage, site congestion, slow response to issues of concern, late issuance of permission to relevant authorities, equipment shortage, poor weather conditions and claim certificates as some of the factors that risk labor productivity. Although Abdul Kadir et al., (2005) considered identification of determinants of labour productivity; it did not dwell into labor-related risks.

Moreover, the impact of labour related risks towards implementation of PPP projects were not investigated. Further, the study was conducted in Malaysian construction without any attention to PPPs. Consequently, the present study adopts inferential statistics using a regression model to evaluate labour related risks, including wage compensation, excessive hours of work,and selection of employees and assignment of duties on completion of hydroelectric power generating project delivered through PPP to fill the research gap.

Five highest-ranking problems in labour related risks are weather conditions, equipment breakdowns, and deficiencies in drawings, material shortage, and site conditions. Zakeri, Olomolaiye and Gary (2010) evaluated determinants of labor productivity in construction in Iran. The factors investigated by Zakeri, Olomolaiye and Gary (2010) included work, weather, safety, equipment, inspection delays, lack of materials, and site conditions. With the help of the relative index ranking technique, the study identified the most risk factors for labour productivity. From the study by Zakeri, Olomolaiye and Gary (2010), it

emerged that the prevailing wars and political conditions in the area influence labour productivity as well as other construction factors.

Moreover, the study focused on general problems causing increased period for delivering projects. However, there was no consideration of labour related risks associated with the completion of the PPP projects. Consequently, the present study collects both qualitative and quantitative data from various stakeholders, including engineers, project managers, and labourers involved in the case project, which is a post-project assessment of a PPP hydroelectric project in Kenya and not Iran.

Research has shown that environmental factors, non-project contributors, human resources, managerial activities and organizational factors are determinants of labour risks in construction projects and the overall completion of PPPs. In Nigeria, Olabosipo, Ayodeji and Owolabi (2011) investigated the factors negatively affecting construction labourers' performance, focusing on environmental factors, external, management and organizational factors. The study was a survey that comprised of 12 factors, which included poor communication, late information, poor specification, work that is out of sequence, unfair wages, bad weather, lack of training and retraining. Statistical techniques were utilized to analyze various perspectives of the labourers and contractors. It was established that poor wage allocation and demotivation were among the major factors that negatively influenced labour. Further, inadequate training (RI = 0.84), inclement weather (RI = 0.71) and poor communication (RI = 0.79) affected the performance labour.

Despite the findings of the study by Olabosipo, Ayodeji and Owolabi (2011) indicating

that unfair wages were a labour factor affecting the project, it did not determine the effect of such wage compensation on project execution. Moreover, the study focused on the entire construction industry in Ogun State, South of Nigeria, and not a specific project thus generalized the problems of labour. The present study adds on the findings of the study by Olabosipo, Ayodeji and Owolabi (2011) by including the government agencies, financers and other stakeholders while collecting qualitative and quantitative information to determine the labour related risks and their quantifiable effect on case project implementation.

Elsewhere, the labour performance of the crew, supervision of projects, difficulties in construction, accurate estimates, design details and availability of skilled labour were postulated as factors affecting completion of PPPs. In Sri-Lanka, Wijekoon (2006) conducted a study that evaluated factors that affected labour productivity within a bridge construction projects. The study adopted a questionnaire survey divided into two sections where participants were to rate the factors influencing completion of the project in the first section and indicated whether the factors adversely affected the construction of a bridge in the next section. Whereas Wijekoon (2006) collected only quantitative data using questionnaires, it did not capture qualitative information that could not be quantified. Moreover, the focus of Wijekoon (2006) was on bridge construction projects and not hydroelectric power project. Consequently, the present study includes, on-site injuries, workman compensation insurance policies as well as wages as the labour related risks in PPP projects. The present study included views of financers, contractors, engineers, and other stakeholders by use of interview schedules and questionnaires to establish the effect of labour attributable risks on project delivery.

Similarly, work overtime, delays in payments, rework, poor estimates, schedule pressures, lack of motivation among workers, material shortage, and high cost of foreign labour affect directly project completion. In another research, Durdyeu and Mbachu (2012) investigated factors that constrained labor productivity using a Turkmenistan case. The questionnaires for data collection from research participants was a 5 level Likert. The questionnaire consisted of 28 questions that addressed issues that affected labour productivity. Using descriptive survey method, the study canvassed the views of subcontractors, contractors and project managers in Turkey. Multi-attribute analysis technique revealed that non-project factors significantly impact labour productivity. The internal constraints affected labor productivity up to 67 percent of onsite issues that influenced productivity. A study by Durdyeu and Mbachu (2012) generalized constraints to project completion in Turkey. Further, this research was in Turkmenistan-Turkey and explored a series of 28 factors measured from the perspective of contractors through surveys sourced via email correspondents. .The present study adopts a case study design of a completed project collecting views of government agencies, project managers, engineers, contractors and labourers to articulate the effect of labour related risks including occupational injury insurance cover, site accidents and deaths, wage rate and selection of employees on the completion of PPPs.

Even though many studies have been conducted on factors that influence labour productivity, the fact remains that many issues are yet to be addressed; hence, the need for further studies (Soekiman et al, 2009). The factors are different in developing countries. Similarly, Olabosipo, Ayodeji and Owolabi (2011) suggested that factors that influence labour productivity are not constant, meaning that they vary from one country

to the other. Besides, they vary from one project to the other and even depend on prevailing circumstances.

The great influence of construction industry on development and creation of job opportunities in Kenya is evident. Njogu (2015) agrees with this opinion, thereby acknowledges the immense role it plays in national development. Despite these claims, studies conducted over the last few years have demonstrated construction projects in the country as underperforming. This has resulted in increased interest among mechanisms that evaluate measures for evaluating risks. The study focused much of its attention on likelihood of construction risks occurring and the impacts they had on projects' safety, cost and quality.

The study targeted registered contractors in the country thereby samping 190 in strata. One person was selected from each category of respondents. Twenty three (23) risk factors were identified as some of the factors that affected project delivery. Although Njogu (2015) investigated the extent to which construction risks affected project delivery, it did not focus on a specific completed project. The present study adopts a completed hydroelectric power project where respondents were purposively sampled. Moreover, the present study narrows down on the delay attributable risks, costs overrun related risks and labour related risks.

2.7 Managerial skills and Completion of Public Private Partnership Projects

Projects involving construction works result in disputes arising from the activities, actions and decisions from the various stakeholders implementing the project as they may duffer with views of the contractor. All contractual clauses carry with them some

responsibilities, which may lead to disputes (Ng and Loosemore, 2007). Despite having dispute resolution framework in most contracts, failing to conclusively address the disputes negatively impact project implementation. It is necessary that managers in charge of construction have accurate information which is relevant and at the right time to ensure prior planning and make sound decisions. Information will ensure predictability of the project activities and phases to ensure efficiency in the construction process (Lucey, 2005). Other studies by Karimi (2008) and Musa (1999) identify poor communication, poor planning, lack of enthusiasm, and inexperience among project managers as some of the factors leading to delays and increased costs within Kenyan projects.

Management of various risks is applicable in different areas ranging from evaluating the different ways of addressing business plans and allocating budgets to managing delays in project completion. These processes help in justifying decisions and promoting accountability within projects. Euripides (2008) conducted a study whose focus was on risk management that could be utilized by modern enterprises to minimize risks within constructional work. The intention was to identify the factors that caused such projects to fail.

According to Euripides (2008), risk management is not only beneficial to large-scale projects, but it also applies to all projects, including those concerned about procuring items. Euripides (2008) evaluated extensive bibliographies, results and data of companies involved in construction project disasters. Although the study by Euripides (2008) examined risk management as the shortcomings of large scale construction projects, it did not evaluate how management skills account for project delivery in PPPs. The present

study used quantitative data obtained from key stakeholders in an already completed PPP project as well as qualitative data to be able to establish the effect of cost overruns and completion of projects.

Interational, management of risk is a relatively emerging problem among the Chinese construction companies (Jia, 2010). In China, Jia (2010) assessed the techniques utilized in the country to manage risks among international projects and analyze the characteristics of those projects and even proposed practical measures to counter risks likely to occur during project implementation. The study was based on data on existing projects, thus identified risks arising in different projects. The data was mostly qualitative obtained from project managers and various stakeholders. However, the study did not obtain quantitative data, thus it was not able to rank how the individual risks affect project implementation. Moreover, the influence of managerial skills in relation to PPP projects especially hydroelectric power projects were not investigated leaving a gap. The present study focuses on time overrun related risks, cost overrun related risks and labour related risks and their influence on completion Sondu-Miriu Hydroelectric power project. The present study collected quantitative data from stakeholders in the project as well as qualitative data using interviews. Regression of the variables was applied in establishing the influence of each risk on project delivery thus filling the gap.

A deeper understanding of risk management is needed right now to help in improving projects' output. In Sweden, Osipova (2008) concentrated on managing risks within construction projects. The study evaluated 9 projects that were completed within the country over a short period. The study established that there lacked an iterative method of managing risks within the projects that were included in the study. For this reason, the

challenge should be addressed if risk management is to improve. The above challenge was mainly evident within the program phase; thereby, it had a great impact on the completion of projects. A lot of interest and activities were in the production phase. One notable thing was that risks were rarely communicated effectively within the processes of executing projects. Osipova (2008) further pointed out that design projects allowed contractors and architects to interact more within early phases, thereby were effective at managing risks. Partnership, in this case,enabled both parties to cooperate and address risks jointly.

Risk identification, classification and prioritization have been identified to be equally as important as managerial skills on completion of hydroelectric power projects. Sohrabinejad and Rahimi (2015) conducted a study that sought to determine the way risks were determined, prioritized and classified within a case study project. The study aimed to identify risks that were prioritized within construction projects. It proposed a hierarchical method utilized in the project and proposed a model that could be utilized to address those risks. Expert opinions were utilized to brainstorm ideas and risks were classified by experts into eleven classes of risks. The study established that the model that was proposed was effective at decision making more than traditional method that was utilized in such projects. The model put emphasized on quality of complete works, duration of completion as well as the overall cost. The study in Iran by Sohrabinejad and Rahimi (2015) focused on risk identification, classification and prioritization leaving out the aspect of managerial skills on project completion. The present study fills the gap by adopting a descriptive survey collecting data from stakeholders in the completed project.

Experts must work as a team for any project to fulfil its objectives. However,

teambuilding and staff continuity is considered the work of the project manager. Gido and Clement (2003) emphasized the need for multi-disciplinary approach to include various experts for successful implementation. Effective project teams should clearly understand projects' objectives and have clear expectations for parties involved in completing projects and even their responsibilities within those projects. In addition, they tend to develop high levels of trust, degree of cooperation and result orientation. Kumaraswany and Zhang (2001) stated that failure in projects results from inappropriate arrangements, inadequate legal frameworks and lack of coordination. Risk is viewed differently by various stakeholders, efficient governance systems are critical in risk management (Abednego and Ogunlana, 2006). Some of the challenges that are faced by public sector in project management include inefficient allocation of responsibilities among contracting parties and inaccuracies in specifying requirements.

Similarly, Githenya, and Ngugi, (2014) assessed issues related to project planning, control and competencies in project planning within the Kenyan construction projects. The study utilized descriptive statistics and questionnaires to collect the data from project managers. Target population was the managers who manage housing projects within Nairobi County. The control measures were found to be highly correlated (76.6%) to implementation. Accordingly, the study recommended that project managers needed to take control measures within their housing projects as they implemented them.

2.8 Theoretical Framework

PPPs have different meanings to different scholars. Some of them view them as new tools of governance that are aimed at replacing the traditional methods of contracting. Others view them as a new language within public management and one that is aimed at

reorganizing the delivery of services within the public sector (Linder, 1999). The study is grounded on contingency and principal-agent theories.

2.8.1 Contingency Theory

The term “contingency”depicts the way environment, which is an external source of risk, relates with systems to influence activities within organizational systems (Longenecker and Pringle, 1978). Accordingly, contingency theory focuses on improving the effectiveness of organizations to respond to uncertainties in performance. Contingency theory focuses on addressing the unforeseen challenges and events in the implementation of projects. Its novelty as acknowledged by Steiner (1979) focuses on adapting new methods identified for specific activities and structures that are appropriate for organizations. Contingency theory recognizes a range of contextual variables (time overrun related risks, cost overrun related risk, labour related risks) as influencing implementation. This study looks at the risks and interactionsbetween them onthe completion of PPP Sondu Miriu Hydroelectric Power Project. Each of these risks may impact the project; hence, the contingency theory is suitable at evaluating their influences on project completion.

Panthi, Ahmed and Ogunlana (2009) attributes uniqueness of construction projects to the almost impossibility in risk estimation. For this reason, it might not be possible to develop and apply the necessary risk management strategies. For instance, it is not possible to estimate the level of variation in the project that may impact project quality, time and costs. Accordingly, it is necessary to utilize contingency theory in construction projects as a way of minimizing variations that might occur during project implementation. Even though different risks are evaluated in this study, special attention

is given to contingency cost. Delays and excess costs are influential in construction works; as such, they might influence their lifetime. Normally, these types of projects have extensive biding processes that require a competitive estimation of appropriate costs. This explains the importance of contingency theory in such works.

2.8.2 Principal-Agent Theory

Principal-agent theory was developed by Eisenhardt (1989) to addresses a risk-sharing problem called agency problem. The agency problem arises when agents with differing opinions are involved in project management (Jensen and Meckling, 1976). This theory focuses much of its attention on ubiquitous agency-relationship that delegates work to another party (Eisenhardt, 1989). The theory attempts to portray the link between parties using contract as a metaphor (Jensen and Meckling, 1976). Thetheory presumes that if both parties involved in project management would maximize utility, then the agent would focus on maximizing its interests as opposed to maximizing the interests of the project owner (Jensen and Meckling, 1976).

The theory is most effective in contract determination because it makes unique hypotheses about information, organizations and people. It presumes that principals and agents act in their own best interests because they focus on maximizing their own welfares. Agents, on their part, possess a lot of information that may not be readily available to principals. For this reason, it identifies two challenges, namely adverse selection and moral hazard to efficient contractual performance. Moral hazard claims that agents do not put excessive efforts to tasks agreed upon, meaning that agents might be shrinking. On the other hand, adverse selection concerns itself with possible misrepresentation (Eisenhardt, 1989). It presumes that agents might claim to possess

skills they do not possess so that they can be hired or contracted for the job. This type of flaw occurs because principals are not able to verify that agents possess the skills they claim to possess (Eisenhardt, 1989).

Two problems might arise out of this theory. One of them is that conflicting goals between both parties might affect the extent to which projects might be implemented (Eisenhardt, 1989). The second one is that risk sharing might be affected by the attitudes of both parties. Accordingly, the preference of risks between them might result to different actions as each of them attempt to act in its own best interests. The theory thereby focuses much of its attention on contractual obligations developed between both parties to maximize benefits (Nilakant, 1994). The theory presumes that goal conflict is developed by the extra information that agents possess. This is presumed to result to information asymmetry (Waterman and Meier, 1998).

Out of the goal conflict, it is presumed that agents wish to maximize their gains, whereas principals wish to pay the least for the services. Accordingly, governments wish to offer as many services,whereas contractors focus on minimizing costs. Because of this, it has now become a challenge to strike a balance between the interests of both parties, especially in public sector. The information asymmetry assumption is an important one in the principal-agent model. It simply means that agents enjoy better access to information than project owners (Waterman and Meier, 1998). The asymmetric distribution of information gives rise to principal-agent problem. The challenge now is to address this challenge to help both parties benefit from projects in the right way. When the issue is addressed, principals can monitor progress in projects for the sake of improving the way organizations perform.

2.9 Conceptual Framework

This is a diagrammed model depicting the way variables interact and relate within a study (Ngechu, 2006). Figure 1 is the framework derived.

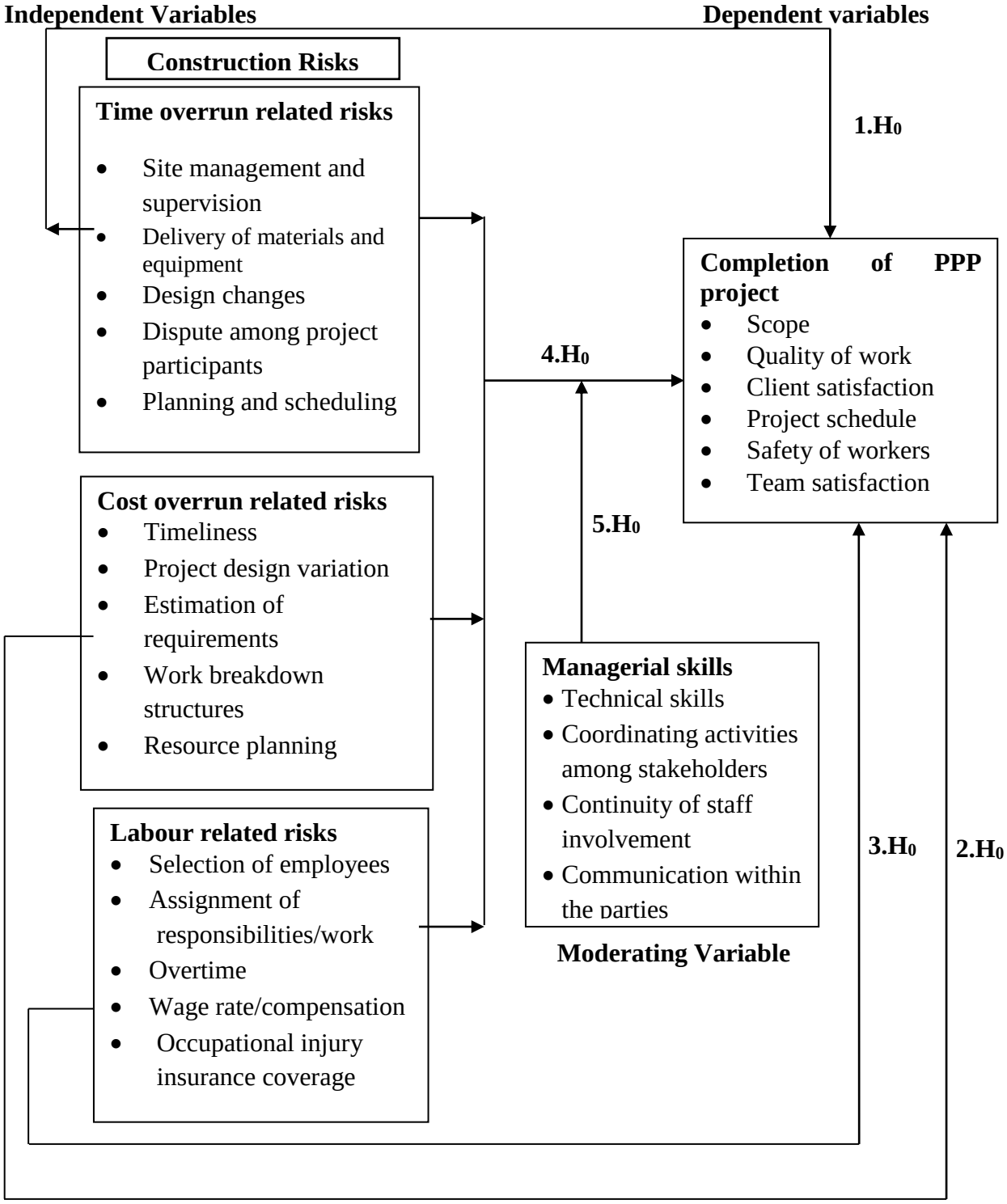


Figure 1: **Conceptual Framework for Construction Risks and Completion of PPP Project**

The independent variables are types ofconstruction risks in public-private projects. The dependent variable in Figure 1 is the completion of the hydroelectric power project,which is shown as the scope of the work, quality in the delivered work, satisfaction of project beneficiaries, timelines, the safety of workers and team satisfaction. The framework shows a probable association between the causal factors and the effect. However, this relationship is influenced by moderating variables such as technical skills, coordinating activities among stakeholders, continuity of staff involvement and communication within the parties.

Time overrun related risks refers to challenges that affect the timely delivery of various project components. Usually, they occur due to site management and supervision, delivery of material and equipment's, design changes, disputes among project participants, and planning and scheduling.

Costsoverrun related risks manifest in the project based on the budgeted amounts. The overall contract amount is affected, leading to increased costs of the project items. The cost variations and increase occur due to timeliness, project design variations, estimation of requirements, work breakdown structures as well as resource planning.

Labour related risks in this study relate to challenges and costs implication associated with human resources involved in PPP Hydroelectric Power Projects. Specifically, the process of selecting employees, assignment of responsibilities/work, overtime, wage rate/compensation and occupational injury insurance coverage

2.10 Summary of Literature Review

Reviewed empirical studies based on thematic issues on the study objectives which are; time delays and PPP implementation, cost overrun related risks and PPP execution, labour related risks and PPP delivery and managerial skills and completion of PPPs. In time delay attributable risks and completion of PPPs, the reviewed studies such as Spackova (2012), Xie and Yang (2010), Ye and Tiong (2003) Ke, Wang and Chan (2010 and Mohamed (2015) focused on mainly risk management on other construction projects and not the PPP hydroelectric power projects. Most of these studies, modeled construction time was discussed. Reviewed studies such as Osipova (2008); Alexanderson and Hulten (2008); Tipili and Ilyasu (2014), Adhikari (2011) and Okeyo, Rambo and Odundo (2015) looked at chances of risk emerging on project implementation and not particularly the influence of excess cost attributable risks on implementation.

Kucukali (2011); Takashi, Park and Hong (2012) and Salah and Moselhi (2016) mainly focused on only the host community and not stakeholders in the project. The present study seeks to fill the methodological gap using qualitative and quantitative data, respectively, from project stakeholders. Some of these studies also focused on only risk identification using an analysis model, with little emphasis on the effect of such risks on project delivery.

On managerial skills and completion of PPP projects, Euripides (2008) conducted a study that focused on projects that were considered troubled because they did not have sufficient risk management strategies. This study examined existing data, results and found that risk management had diverse applications that ranged frm alternative activities

of business plans and budgets, to extension in completion deadlines delays in project completion and management of overruns in costs. The method of analysis was not able to quantify the scale of each risk. The present study used quantitative data obtained from key stakeholders in an already completed PPP project as well as qualitative data to establish the effect of construction risks and completion of projects. Jia (2010) also assessed risk management techniques for international construction companies. However, the study did not obtain quantitative data, thus was not able to rank the effect of te risks on the projects. Moreover, the influence of managerial skills in relation to PPP projects especially hydroelectric power projects were not investigated leaving a gap in risk. The present study focused on time overrun related risks, cost overrun related risks and labour related risks and their influence on project completion.

2.11 Knowledge Gaps

Table 2.1: ***Summary of Empirical Literature Review***

Variable	Author(Year)	Title of the study	Methodology	Findings	Knowledge gap
Time Overrun related risks	Spackova (2012)	Risk management of tunnel construction projects	• Used Descriptive research design • Both questionnaires and interview schedules were used • Applied probabilistic model using existing database to estimate delay • Used Descriptive statistics for the analysis	The model provided a helpful input in the probabilistic forecasts of time within infrastructure pr ojects	Used data from tunnel construction projects and not hydroelectric power generation projects Only modelled construction time of the projects and not the influence of time related delays that affected project completion.
	Xie and Yang (2010)	A Study on Management Risk Evaluation System of Large-Scale Complex Construction Projects	• A case study design based on Grey systems evaluation • Interview schedules and questionnaires were used • Descriptive and inferential statistics were utilized to analyze quantitative data	The method identified the fuzziness of risk information within the management of large-scale projects; hence, made risk evaluation methods more reasonable and scientific.	Was based on existing model of Grey systems with a view to categorizing its effects on various stakeholders but did not explore the influence of various risks on completion of construction projects Focused on construction related projects and not a case of completed hydroelectric power generation projects

Variable	Author(Year)	Title of the study	Methodology	Findings	Knowledge gap
	Ye and Tiong (2003)	The effect of concession period design on completion risk management of BOT projects	• Use of Monte Carlo Simulation on database from construction projects • Both questionnaires and interview schedules were used • Descriptive and inferential statistics for the analysis of quantitative data	A concession period that is designed in the right way is able to develop a 'win–win' solution for governments and project promoters	Focused on categorizing risks for various stakeholders and not influence of risk on completion. Used Monte Carlo simulation and not descriptive survey using primary data
	Ke, Wang and Chan (2010)	Equitable Risk Allocation in Chinese Public–Private Partnership Power Projects	• Cross-sectional study design • Questionnaires used • Descriptive statistics for the analysis of quantitative data	Three risks, which include organization and coordination, exclusive rights and change in law, had different allocations.	was based on computational risk management modeling and focused on proposed risk allocation but did not consider time related risk and its influence on project completion.
	Mohamed (2015)	A Study of Project Delay in Sudan Construction Industry	• Cross-sectional study design • Both questionnaires and interview schedules were used • Quantitative design Target population was clients, consultants and contractors • Data collected using questionnaires.	The main causes of delay in project completion were shortages in materials, changes in materials' prices, errors that occur during project implementation, and errors in time and cost estimation The effects of the delays were losses, cost and time overrun, litigations and negative social impacts	Only collected quantitative data thus lacked qualitative aspect. Focused on the causes of delay without looking at the impact that time attributable risks had on project delivery.

Variable	Author(Year)	Title of the study	Methodology	Findings	Knowledge gap
Cost Overrun related risks	Osipova (2008)	Risk management in construction projects: a comparative study of the different procurement options in Sweden	• Cross-sectional research design • The study involved nine construction projects • Used questionnaire, interviews and surveyto collect data from contractors, project owners and consultants	There were no iterative approaches in risk management. This was a weakness among the current procurement processes particularly during programme phases where the impact was great	The study did not investigate cost related risks in PPP projects especially hydroelectric power projects. Qualitative data was not collected No case study of completed project
	Alexanders and Hulten (2008)	Prospects and pitfalls of public-private partnerships in the transportation sector	• Used theoretical concepts • Empirical experience from previous studies	The min risks of PPP projects were related to forecasts and estimation of market development among other factors.	The focus of the study was on transportation sector mainly in Europe The study investigated the risks with relation to contract design but did not focus on time related risks in hydroelectric power generation projections
	Tipili and Ilyasu (2014)	Evaluating the impact of risk factors on construction projects cost in Nigeria	• Descriptive and expo-facto design • Questionnaires were issued to professionals in construction industry • Data was analyzed using descriptive statistic and analyses of variance	There was a disparity in the ranking of impact and occurrence among the group Environmental risk factor had lower weighted risk because it was less likely to occur. Risks related to time and costs were likely to occur more and impact projects	Emphasised on probability of risk occurence without looking into the effect of each risk on completion. The study population included experts and professionals in the construction industry and not stakeholders in an already completed project

Variable	Author(Year)	Title of the study	Methodology	Findings	Knowledge gap
	Adhikari (2011)	Sustainability Analysis of Hydroelectric power In Nepal	Based on literature review Adopted case studies	The sustainability score was above the accepted level.	Adhikari (2011) focused on sustainability of hydroelectric power projects but did not evaluate the impact of cost related risk on PPP project completion.
	Okeyo, Rambo and Odundo (2015)	Effects of Delayed Payment of Contractors on the Completion of Infrastructural Projects	• A causal-comparative design • Primary data obtained from 39 senior management staff from contractual parties. • Kendell's coefficient of concordance	The study established that delayed payments had significant impact on project completion because they resulted to inefficiencies and decreased productivity (71.8%); increased costs (71.8%); resulted to re-sequencing and re-scheduling of works (69.2%); and even time extension (69.2%); and even prevented projects from completing on time (53.8%)	The study was on payment delays and execution of construction projects, it did not look at the overall cost as a risk to completion of PPP projects The study ranked the possible causes delay in payment and not other cost related risks.
Labour related risks	Kucukali (2011)	Risk assessment of river-type hydroelectric power plants using fuzzy logic approach	• Descriptive survey, with both qualitative and quantitative • Both questionnaires and interview schedules were used	The study established that site geology among other environmental related challenges were among the major risks in project completion	The model cannot be used to rate time, cost and labour related risks and their influence on project implementation hence the gap filled.

Variable	Author(Year)	Title of the study	Methodology	Findings	Knowledge gap
	Shome and Roy (2016)	In Fourteenth AIMS International Conference on Management	• A household survey in three villages. • The study used purposive sampling to 184 who were directly affected by the construction project from a population of 937 households in the two villages. • Structured questionnaires were administered to the respondents	There is a socioeconomic and environmental cost, labor related cost, involved in constructing large dams like, income, deforestation, noise effluence and depletion in soil fertility, but people are also aided with employment and infrastructure development through road construction and better drinking water facility	Focused on only the host community and not stakeholders in the project. The present study filled the gap by using both interviews and questionnaires to collect qualitative and quantitative data respectively from project stakeholders
	Salah and Moselhi (2016)	Risk identification and assessment for engineering procurement construction management projects using fuzzy set theory	• Mixed methods and probability theories. • Case study with numerical example	Extensive research has been conducted within qualitative and quantitative assessment, but little has been done on risk identification. Consequently, the study proposed a new method that was developed to identify risks. The method was based on micro risk breakdown structure and even a new method known as preventive root cause and effective remedial	Focused on risk identification using an analysis model. However, there was no attempt to quantify the effect of such risks on completion of construction projects which is the focus of the present study

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, methodology for executing the research is outlined. It includes research paradigm, research design, the target population from which the sample was drawn, determining the size of the sample and techniques for obtaining the sample, instruments utilized to collect the data, methods used to test the instrument's validity and reliability, techniques to collect and analyze the data as well as ethical issues observed to ensure that the study was conducted in the right way as well as the variables as operationalized for this study.

3.2 Research Paradigm

This study was based on pragmatic paradigm which focuses on the research problem (Tashakkori and Teddie, 1998), which in this study was the completion of Sondu-Miriu Hydroelectric Power Project. Its focus thereby was on what worked well for the project in relation to the research problem (Greene, 2007; Patton, 1990, Rossman and Wilson, 1985). Pragmatists believe that since world is not an absolute entity, understanding it requires the use of different ways of gathering and analyzing data. This calls for the use of different methods and techniques for generating information. This gives researcher freedom to use both descriptive and inferential data analysis techniques and provides opportunities to integrate a variety of theoretical perspectives (Patton, 1990). Datta (1994) argue that pragmatism is the best method that justifies the use of mixed methods.

3.2.1 Research Design

The study utilized both descriptive survey research design and correlation research design. The design enables information to be collected without manipulating the environment (Shield and Rangajaran, 2013) and involved both qualitative and quantitative research methodologies in enabling measurements of central tendency and analysis of correlations between multiple variables using Pearson product Moment correlation and multiple regression. This informed the choice of design.

3.3 Target Population

Population for this research was derived from management staff of the case project totaling 85 people obtained from the contracting parties, which are 24 members of KenGen who is the Employer, 24 Engineers (Nippon Koei Co. Ltd), 31contractor (Konoike-Sinohydro) 6 financiers (JICA). The participants in this study were selected from those who have adequate knowledge of construction risks on completion of PPPs. Target population is presented in Table 3.1.

Table 3.1: ***Target Population***

Category of population	**Target Population**
Contractor	31
Employer	24
Engineer	24
Financiers	6
Total	**85**

3.4 Sample Size and Sampling Procedure

The subsequent sub-section outlines the sampling procedures and sample size utilized in the study.

3.4.1 Sample Size

Sampling helps in reducing the time and cost incurred in the process of conducting a study (Babbai, 2004).Kerlinger (1973) defines a sample as a set of individuals picked from a population and which is intended to mirror the population characteristics. Yamane (1967) formula was used to find the study's sample size at 95% confidence level.

Where n represented the sample size,

N was the population size,

e was the precision level

$$n = \frac{N}{1 + N(e)^2}$$

The selected population was 85. Therefore, the formula yields a sample size (n) = 71.

. Therefore, substituting in the formula we have:

$$n = \frac{85}{1+85\ (0.05)^2} = 71$$

3.4.2 Sampling Technique

Stratified random sampling technique was used to select 71 respondents from different strata. Using the management organization charts of the contracting parties, a sample frame was constructed for the number of staff within the management levels as shownin Table 3.2. A sampling interval was determined by dividing the total number of staff at the management levels by the desired sample.

Table 3.2: ***Sampling technique***

Category of Population	Target Population	Sample Size = s/85x71
Contractor	31	26
Employer	24	20
Engineer	24	20
Financiers	6	5
Total	**85**	**71**

From within each stratum, participants were selected using random sampling. In this case, the potential respondent pool was identified using unique numbers assigned to them. The numbers for each stratum: contractor, employer, engineer and financier were enumerated onto cut papers and folded before being shaken in a box. The papers were picked randomly until the sufficient number for the stratum was achieved. The picked numbers were the respondents for study picked randomly without bias.

3.5 Research Instruments

The study used both quantitative and qualitative data from the respondents of Sondu-Miriu Hydroelectric Power Project. Quantitative data was collected by use of questionnaires while interview guides were used to collect qualitative data.These are further explained in the following sub-themes.

3.5.1 Questionnaires

The questionnaire was structured in accordance with the study's objectives, and the tools were selected on the basis of the nature of the study. The questionnaire comprised of Section A, that focused on respondents' characteristics, Section B: Construction Time Overrun Related Risks, Section C: Construction Cost Overrun Related Risks, Section D: Labour Related Risks, section E: Managerial skills, and F:

Completion of PPP Hydroelectric Power Project. The use of questionnairesallowed forcomparative analysis of information from diverse contracting parties.

For construction risks questionnaire, the study used a Likert summated rating method. In a Likert scale, the respondents place themselves in a continuum and persons score are summed up and the resulting total used as an index of that person's attitude, perception and knowledge on influence of construction risks on project completion. Likert scale contains statements in different attitudinal scales. A five-point scale was utilized throughout the study. Respondents expressed their view towards each of the items in various subtitles by ticking only one response. This Likert scale enables study to calculate mean scores and standard deviation, which was then compared. The self-administered questionnaires had covering letters/letters of consent to explain the purpose of survey.

3.5.2 Interview Guide

Key informant guide was the second instrument administered to organization heads. This group of respondents were chosen due to the relevance of their expertise and information regarding the implementation of PPP projects (Mugenda, 2012). The guide allowed for in-depth discussions that may have been left out by the question. Appointments were made with school the heads of the various participating organizations, incases where instant meetings were not possible as a result of daily obligations. The interview guide had open questions allowing for a range of responses without limitation enabling the researcher to probe and interact with the respondent on the items.

3.5.3 Pilot Testing of the Instruments

This process is important in developing a questionnaire because it helps in identifying possible errors (Booth, 1995). A pilot study determined the reliability of the instrument that is, their dependability, accuracy and adequacy. The instruments were pilot using a similar PPP project at Oluch Kimira in Homabay County. The project was chosen for piloting because it had a similar contract arrangement structure with research case project. This is because Mugenda and Mugenda (2003) recommends that 10% of the expected sample sufficing for pilot testing. They were requested to fill the forms and return after two weeks. These people were sampled using random sampling method because statistical conditions were less important at this point (Cooper and Schindler, 2003).The intention was to help in refining questions to ensure that research participants would not encounter problems answering them. The pilot sample obtained randomly included two contractors, two employers, two engineers, one financier. This was 10 percent of the 71 respondents as Mugenda and Mugenda (2003) recommends .

3.5.4 Validity of the Instrument

Measurement of validity ensures that the results obtained once the data is analyzed are representative of phenomenon under study (Mugenda, 2008). Content validity was achieved through supervisors guiding in establishing how accurate the questions in the instruments captured the conceptualized variables. All items in the instruments were reviewed and the accuracy by which they addressed the research objectives and issues assessed. Construct validity is concerned about the degree of accuracy of inferences made from theoretical constructs made in the study. It focused on how questions are constructed in terms of clarity, vagueness and instructions to the

respondents for guidance. This was also validated by the supervisors. In this way, the content validity of the interview guides was ascertained.

3.5.5 Reliability of the Instruments

This deals with how instruments can provide results that can be replicated (Schneider, White and Paul, 2003). Cronbach alpha was applied to ascertain reliability. The threshold for considering an instrument reliable is An Alpha (α) = 0.7 where $\alpha > 0.7$ is reliable with those below, not being reliable (Burns and Grove, 2007). Cronbach Alpha (α) was ideal to test the reliability of the questionnaire used in this research due to the Likert format in 5 sections for each variable. The pilot data was correlated using SPSS for each scale to return the reliability the reliability output is summarised in Table 3.3.

Table 3.3: ***Reliability of the Instruments***

Variables	N	Items	Items Deleted	Reliability
Construction Time Overrun	39	10	3	0.742
Construction Cost Overrun	39	6	1	0.630
Labour Related Risks	39	7	2	0.809
Managerial Skills	39	12	4	0.710
Completion of Construction Project	39	6	2	0.830
Average Reliability	**39**	**41**	**12**	**0.744**

From the summary table on reliability, construction time overrun scale had a reliability coefficient of $\alpha = 0.742$, construction cost overrun scale $\alpha = 0.630$, labour related risks $\alpha = 0.809$, managerial skills $\alpha = 0.710$ and completion of construction projects $\alpha = 0.830$. The instrument had an overall coefficient $\alpha = 0.744$ thus reliable based on Alpha > 0.7 (Mugenda, 2003).

3.6 Data Collection Procedures

With the final approved proposal, application for research permit from the National

Council of Science, Technology and Innovation (NCSTI) was sought.The researcher procured a permit to conduct the research from the NCSTI, and Innovation and KenGen to conduct the study in their project. The study's purpose was explained to respondents and consent soughtfor their agreement to participate, and in case the participant refuses to comply, there were no penalties. The researcher recruited two research assistants and two data quality managers. They were all university graduates with experience in conducting qualitative and quantitative research. The research staff was taken through three-day training on understanding data collection tools, procedures and etiquette of research. The researcher distributed questionnaires to respondents were collected for data analysis and processing. To ensure that they were filled in the right way, all the questions were cross-checked to ensure that they were filled fully. In addition, follow-ups were conducted to ensure that no single questionnaire was lost or even misplaced. This helped in increasing the response rate. All the questionnaire items were labeled for purposes of confidentiality and anonymity as respondents were referred to by code numbers. The selection of the participants for the interviews wasbased on their administrative and strategic management role on the project. The respondents were contacted for an appointment or where necessary phone interviews were carried out considering nature of their schedules.

3.7 Data Analysis Techniques

This study applied quantitative techniques corroborated with qualitative analysis in synthesis of data collected. The first step in analyzing quantitative data entailed processing the data and editing relevant fields as a way of minimizing possible bias. This was followed closely by data coding, entry, transformation, interpretation, analysis, and cleaning (Nachmias and Nachmias, 1996). The findings were compared

and contrasted with those from empirical studies to determine the way they agreed with existing body of knowledge.

3.7.1 Descriptive Statistics

Descriptive statistics were utilized to summarize the results.The analysis used were mean,measures of central tendency,composite mean,standard deviation to test the variability of opinions. and relationship among various variables. The Statistical Package for Social Sciences (SPSS. v. 20) program was utilized to aid analyze the data. Correlation and regression was used to establish relationships between variables.

3.7.2. Inferential Statistics

The second data analysis stage was to formulate inferences about a population based on results obtained on samples to enable generalizations or inferences to be drawn. Statistical inference in this study, therefore,evaluated whether research findings weremade by chance or even allow deductions made from the sample. To do this, hypotheses wereformulated to test how two or more variables are related to each other. Correlation analysistestedthe null hypotheses $H_0$1, $H_0$2and $H_0$3usingPearson Product Moment Correlation coefficient (r). The (r) evaluated the statistical significance of the slope that depended on the degree of association between various variables as applied in this study. The value of r ranges between -1 and +1 with +1 being a perfect correlation. To measure the portion of variance in dependent variable that could be elaborated by independent variables, (r) was utilized to predict the significance and strength of relationship between construction risks and PPP project completion.

Multiple regression analysis was utilized to determine the relationship between construction time, construction cost and labour related risks on project completion.

The ANOVA enabled inspection of significance of difference among variables from different samples. The tests were conducted at 95% confidence level with margin errors of 5%. The fifth research question was evaluated using multiple regression analysis as depicted in Table 3.4.

Table 3.4: ***Test for Hypotheses***

Research Objective	Hypothesis	Tools of Analysis	Model	Reject/Accept
To assess the extent to which construction time overrun related risks influence completion of Sondu Miriu Hydroelectric power Project	**$H_0$1:**Time overrun related risks does not significantly influence completion of Sondu Miriu Hydroelectric power Project	Inferential (Simple Linear Regression)	$Y = \beta_0 + \beta_1 X_1 + \varepsilon_1$ Y is completion of PPP X_1= time overrun related risk β_0, β_1 co-efficient of variables ε_1 error term	Reject when p>0.05 Accept when p≤0.05
To determine the extent to which Construction Cost Overrun related risks influence completion of Sondu Miriu Hydroelectric power Project	**$H_0$2:**Cost Overrun related risks do not significantly influence completion of Sondu Miriu Hydroelectric power Project	Inferential (Simple Linear Regression)	$Y = \beta_0 + \beta_2 X_2 + \varepsilon_2$ Y is completion of PPP X_2= cost overrun related risk β_0, β_2 co-efficient of variables ε_2 error term	Reject when p>0.05 Accept when p≤0.05
To assess the extent to which Labour related risks influence the completion Sondu Miriu Hydroelectric power Project	**$H_0$3:**Labour related risks does not significantly influence the completion of Sondu Miriu Hydroelectric power Project	Inferential (Simple Linear Regression)	$Y = \beta_0 + \beta_3 X_3 + \varepsilon_3$ Y is completion of PPP X_2= labour related risks β_0, β_3 co-efficient of variables ε_3 error term	Reject when p>0.05 Accept when p≤0.05
To evaluate the extent to which construction risks influence the completion Sondu Miriu Hydroelectric power Project	**$H_0$4:**Construction risks does not significantly influence the completion of Sondu Miriu Hydroelectric power Project	Inferential (Multiple Regression)	$Y = \beta_0 + \beta_4 X_4 + \varepsilon_4$ Y is completion of PPP X_4= construction risks β_0, β_4 co-efficient of variables ε_4 error term	Reject when p>0.05 Accept when p≤0.05
To evaluate the moderating effect of managerial skills on the link between construction risks and the completion of Sondu Miriu Hydroelectric power Project	**$H_0$5:**Managerial skills do not moderate the link between construction risks and the completion of Sondu Miriu Hydroelectric power Project	Inferential (Multiple Regression)	$Y = \beta_0 + \beta_i X_i + \beta_j M + \beta_k X_i Z + \varepsilon$ β_0, β_j, β_i, β_k is coefficients M= moderating variable X_i= Independent Variable XZ= Interaction Term	Reject when p>0.05 Accept when p≤0.05

3.7.2 Correlation Analysis

Table 3.5: ***Variables and Indicators***

Variable		**Indicators**
Dependent Variable	Completion of Public-Private Partnership Projects	• Scope • Quality of work • Client satisfaction • Project schedule • Safety of workers • Team satisfaction
Independent variable (Construction Risks)	Construction time overrun related risks	• Site management and supervision • Delivery of materials and equipment • Design changes • Dispute among project participants • Planning and scheduling
	Construction Cost Overrun related risks	• Timeliness • Project design variation • Estimation of requirements • Work breakdown structures • Resource planning
	Labour Related Risks	• Selection of employees • Assignment of responsibilities • Overtime work • Wage compensation • Occupational injury insurance coverage
Moderating Variable	Management Skills (M)	• Technical skills • Coordinating activities among stakeholders • Communicationwithin parties • Continuity of staff involvement in the project

3.7.3 Regression Analysis

The models for regression adopted in data analysis are presented in subsequent sub-sections.

Direct Effects Model

This was given by the equation:

$$y = \beta_0 + \beta_i X_i + \epsilon$$

Where;

Y - Dependent Variable (Completion of construction PPP projects)

β_0 - Constant Term

β_i - Beta Coefficients of Construction risks

X_i - Predictor variables (Construction Risks) and i=1, 2, 3

ϵ - Error Term

Moderation Effect Model

This was given by the equation:

$$y = \alpha_0 + \alpha_1 X + \alpha_2 M + \alpha_3 X * + \mu$$

Where;

Y - Dependent Variable (Completion of construction PPP projects)

α_0 - Constant Term

α_1 - Beta Coefficient of Composite Construction risks

α_2 - Beta Coefficient of the moderating variable (Managerial Skills)

α_1 - Beta Coefficient of the interaction term

X - Composite construction risks

M - Moderating variable (Managerial Skills)

Ƶ - Mean centred values of the moderating variable

μ - Error Term

3.7.4 Hypotheses Tests

Based on the three hypotheses generated the following correlation models were applied for objectives one, two and three

1.H_O: Construction time overrun related risks do not significantly influence completion of PPP projects in Kenya.

Completion of PPP Projects = *f* (construction time overrun related risks, random error)

$$Y_1 = \beta_0 + \beta_1 x_1 + \varepsilon_1$$

2.H_O: Construction Cost Overrun related risks do not significantly influence completion of PPP projects in Kenya.

Completion of PPP Projects= *f* (Construction Cost Overrun related risks, random error)

$$Y_2 = \beta_0 + \beta_2 x_2 + \varepsilon_2$$

3.H_O: Labour related risks do not significantly influence completion of PPP projects in Kenya.

Completion of PPP Projects= *f* (Labour related risks, random error)

$$Y_3 = \beta_0 + \beta_3 x_3 + \varepsilon_3$$

Multiple regression analysis was applied to predict a criterion from a predictor variable and testing hypothesized relationships between predictors and a criterion. The analysis process was applied to the fourth and fifth research questions.

4.H_O: Combined construction risks do not significantly influence completion of PPP projects in Kenya.

Completion of PPP Projects = *f* (construction related risks, random error)

$$Y_4 = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \varepsilon_4$$

Where:

Y = Completion of PPP projects

$\beta_{0=}$ Constant Term

$\beta_1, \beta_2, \beta_3$ =Coefficients for independent variables

X_1 = Construction time overrun related risks

X_2 = Construction cost related risks

X_3 = Labour related risks

ε_4 = Error term

Further, management skills, which was considered to be the moderator variable, werepresumed to determine the magnitude of the link and degree of association between construction risks and completion of Sondu Miriu Hydroelectric Power Project.

Management skills act asa special type of independent variable in a moderating variable capacity. The relationship between construction time overrun related risks, construction cost overrun related risks and labour related risks, and the completion of Sondu Miriu Hydroelectric Power Project were developed into a multiple regression model to test the null hypothesis that:

5.Ho: Managerial skills do not significantly moderate the relationship construction risks and completion of PPP projects in Kenya.

Completion of PPP Projects = *f* (construction related risks, managerial skills, random error)

$$Y = \beta_0 + \beta_i X_i + \beta_j M + \beta_k X_i M + \varepsilon$$

Where:

$\beta_{0=}$ Constant Term

$\beta_{j=}$ Coefficient of moderator

$\beta_{i=}$ Coefficient for independent variable either X_1, X_2 or X_3

β_k= Coefficient of interaction term

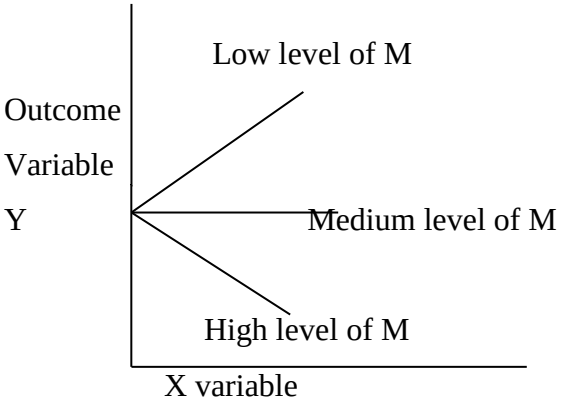
Xi= Independent Variable

M= moderating variable

XM= Interaction Term

$\beta_{0,}$ $\beta_{j,}$ $\beta_{i,}$ β_k

Management skills in the above equation played a moderating role. Moderation is the effect that is introduced by a variable in a study as a result of moderating impact (Little, Bovaird and Widaman, 2007). When moderating impact is measured in a continuous basis, the impact is modelled by developing new variables in the product of variables with X being the variable that is moderated and M the one that is moderating the effect. The interaction XM is then introduced into the analysis once the main effect has been determined. When the effect of XM is more than that of X, then the Y is said to be dependent or influenced by the effect of M.



If $\beta_k$is statistically significant then M moderated the relationship between Y and X.

3.8 Ethical Considerations

Recommended ethically accepted research practices were maintained and safe guarded in this study right from the planning process to the analysis and interpretation of the study's findings. Accordingly, research assistants were equipped with the necessary skills they required to execute the study in the right way. They were informed of the importance of being flexible to the respondents during data gathering in terms of time. The main issues that were of great concern to the study were confidentiality, privacy and informed consent. To ensure that the study was carried out in the right way, then the consent of respondents was obtained from them even before the process of collecting data from them was initiated. This entailed introducing them to the study by explaining the study's purpose, asking them to take part in it on a voluntary basis, and interviewing those who agreed to take part in it. The consent form outlined the level of confidentiality that would be observed throughout the data collection and analysis process. It assured them that the responses that they would provide in questionnaires would not be shared with unauthorized people and that data analysis would be carried out in the right way without referring to them suing their names or identifying variables. Furthermore, they were notified that they had the right to pull out from the study if they wished to do so at any given time without being victimized for it.

3.9 Operationalization of the Variables

Table 3.6 presents the operationalization of the variables that include their respective indicators, research design, and research approach and analysis tool.

Table 3.6: Operationalization of Variables

Objectives	Variables of the study	Indicators	Measurement	Measurement scale	Research Approach	Data Analysis Techniques	Tools of Data Analysis
	Completion of PPP Project	▪ Scope ▪ Quality of work delivered ▪ Client satisfaction ▪ Project schedule ▪ Safety of workers ▪ Team satisfaction	▪ Extent of scope ▪ Rating of quality ▪ Rating of timeliness ▪ Rating scheduled completion ▪ Rating workers safety	• Ordinal	• Quantitative • Qualitative	• Descriptive statistics • Thematic content analysis	• Mean, percentage, frequency and standard deviation
To assess the extent to which time overrun related risks influence completion of Sondu-Miriu Hydroelectric Power Project	Construction time overrun related risks	▪ Site management and supervision ▪ Planning and scheduling ▪ Design changes ▪ Dispute among project participants ▪ Delivery of materials and equipment's	▪ Increase cost due to management and supervision ▪ Cost increase from poor scheduling ▪ Cost overrun from dispute	• Ordinal	• Quantitative • Qualitative	• Descriptive statistics • Inferential statistics • Thematic content analysis	• Mean, frequency, percentage and standard deviation • Pearson Moment Correlation and regression Analysis
To investigate the extent to which Cost Overrun related risks influence completion of Sondu-Miriu.	Construction Cost Overrun related risks	▪ Timeliness ▪ Project design variation ▪ Resource planning ▪ Estimation of requirements ▪ Work breakdown structures	▪ Delays in task completion ▪ Delays due to design changes ▪ Delays due to poor estimates ▪ Delays due to work	• Ordinal	• Quantitative • Qualitative	• Descriptive statistics • Inferential statistics • Thematic content	• Percentage, standard deviation, frequency and mean • Pearson

Objectives	Variables of the study	Indicators	Measurement	Measurement scale	Research Approach	Data Analysis Techniques	Tools of Data Analysis
Hydroelectric Power Project			breakdown			analysis	Moment Correlation and regression Analysis
To examine the extent to which Labour related risks influence completion of Sondu-Miriu Hydroelectric Power Project	Labour related risks	▪ Selection of employees ▪ Assignment of responsibilities ▪ Wage rate/compensation ▪ Over time work ▪ Occupational injury insurance coverage	▪ Rating challenges in employee selection ▪ Rating risks experienced in assignment of responsibilities ▪ Rating risks incurred in staff remuneration ▪ Rating risks due to site injury	• Ordinal	• Quantitative • Qualitative	• Descriptive statistics • Inferential statistics • Thematic content analysis	• Frequency, percentage, mean, standard deviation • Pearson Moment Correlation and regression Analysis
To assess the moderating influence of managerial skill on the relationship between construction risks and completion of Sondu-Miriu Hydroelectric Power Project	**Moderating Variable :**Managerial Skill	▪ Technical skills ▪ Coordinating activities among stakeholders ▪ Communication within the parties ▪ Continuity of staff involvement in the project	▪ Rating technical skills among managers ▪ Rating the extent coordination by managers ▪ Rating the extent of communication between managers and stakeholders	• Ordinal	• Quantitative • Qualitative	• Descriptive statistics • Inferential statistics • Thematic content analysis	• Frequency, percentage, mean, standard deviation • Pearson Moment Correlation and regression Analysis

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATIONS AND DISCUSSIONS

4.1 Introduction

Chapter four presents the study's findings using themes emerging from the study variables. The presentation include: questionnaire response rate, demographic characteristics and test for statistical assumptions, are provided. Further, construction time overrun attributable risks and PPP project completion, construction costs overrun attributable risks and PPP project delivery and labour attributable risks and PPP execution as well as if managerial skills moderate the interaction of construction risks and PPP project delivery were also analyzed.

4.2 Questionnaire Return Rate

Out of a target population of 85 potential respondents, the study sampled 71 using Yamane formula for sample size determination. The target population was mainly composed of senior institutional managers and project engineers. Out of the 71 sampled respondents, 39 were accessed and subsequently completed the research questionnaires as well as providing interviews based onresearch questions. Thus the response return rate was 54.93%. Since the respondents were senior managers for the organizations participating in the project, the return rate was deemed acceptable for the research. In social science research, when the rate of response is at least 50%, it is practical to meet research analysis thus acceptable. (Saunders, Lewis and Thornhill, 2003).

4.3 Demographic Characteristics of the Respondents

There is need to ascertain the distribution of respondents based on specific background and demographic factors. This would ensure adequate representation of views of various stakeholders in the study project. As such, background and demographic information was captured and analyzed that included; distribution of respondents by participating organizations, role organizations in the project, duration worked in the participating organization, level of academic qualification and professional training of the respondents. See Table 4.1.

Table 4.1: ***Respondents' Distribution by Demographic Characteristics***

Participating Organizations	**Frequency**	**CF**	**%**
Kengen	12	12	30.8%
JICA	3	15	7.7%
Sinohydro/ Konoike	13	28	33.3%
Nippon Koei	11	39	28.2%
Total	**39**		**100.0%**
Role	**Frequency**	**CF**	**%**
Employer	12	12	30.8%
Financier	3	15	7.7%
Engineer	13	28	33.3%
Contractor	11	39	28.2%
Total	**39**		**100.0%**
Duration worked in organization	**Frequency**	**CF**	**%**
1 – 2 years	14	14	35.9%
3 – 5 years	12	26	30.8%
6 – 8 years	6	32	15.4%
8 - 10 year	5	37	12.8%
Above 10 Years	2	38	5.1%
Total	**39**		**100.0%**
Academic Qualification	**Frequency**	**CF**	**%**
Diploma	5	5	12.8%
Graduate	24	29	61.5%
Post Graduate	10	39	25.6%
Total	**39**		**100.0%**
Professional Training	**Frequency**	**CF**	**%**
Administration	4	4	10.3%
Accounting	2	6	5.1%
Engineering	28	34	71.8%
Finance	3	37	7.7%
Procurement	2	39	5.1%
Total	**39**		**100.0%**

In Table 4.1, it is shown that, in terms of participating organizations, participants were almost equally distributed across the 4 organizations with JICA 3(7.7%), the least represented. Kengen 12(30.8%), Sinohydro/Konoike 13(33.3%) and Nippon Koei 11(28.2%) were almost equally represented. Thus, it was possible to obtain representative views from the participating organization to enable drawing of conclusions.

Similarly, the study found that the employer 12(30.8%), financier 3(7.7%), engineer 13(33.3%) and contractor 11(28.2%) were adequately represented in the study. Thus information obtained was representative of stakeholders in PPPs allowing reliable deductions and generalization on the study variables.

In terms of duration worked in their respective organizations, the results depict that although most of the respondents 14(35.9%) reporting having been serving at those particular establishments for only between 1 and 2 years, a cumulative majority 25(64.1%) had worked for at least 3 years in these organizations. Specifically, 12(30.8%) had been in their organization for between 3 and 5 years, 15.4% for between 6 and 8 years, 5(12.8%) for between 8 and 10 years while 2(5.1%) had worked for more than 10 years. The results show participants were able to understand their operations that would give reliable information for the study.

On academic qualification, the study respondents had adequate academic qualification to be able to take part in the implementation of the case project. A large proportion of study participants 24(61.5%) were graduates with another 10(25.6%) having post graduate qualification while only 5(12.8%) with diploma. Therefore, execution would be as planned if level of education was to go by.

Further, majority of the study participants 28(71.8%) had engineering training while 4(10.3%) had training in administration. This is a reflection of the extensive need of engineering expertise in the construction work. Administration training is required in the management of works. Further, there were participants who had professional training in accounting 2(5.1%), finance 3(7.7%) and procurement 2(5.1%). The results show adequate representation of required training for the project.

4.4 Tests for Statistical Assumptions

For data modeling, there are required statistical assumptions for various analyses and for the data collected. Likert type data was assembled to answer research questions and hypotheses. Thus, tests for parametric analysis, regression analysis, correlation analysis, and collinearity were conducted and presented in the subsequent sub-sections.

4.4.1 Using Parametric Tests in the Analysis

Since the data collected was on Likert Scale and thus ordinal, it was important to meet some conditions to allow for parametric analysis, including Mean, Standard Deviation. From the response return rate, there were 39 responses (n = 39). Since n>30, it allows for parametric analysis as the population sample distribution is normal. Moreover, the data was measured on fiveordinal levels of measurement, ranging from one to five, as outlined in the third chapter. Further, on managerial skills scale, the data was also measured a five level order, thus allowing for parametric analysis.

4.4.2 Correlation and Regression Analysis

In order to conduct correlation and regression analysis, there is a need to have at least 30 data points (n ≥30). In our case, there were 39 data points (n=39). Further, one of

the variables needs to beon a continuous scale. However, the data collected in the study was measured on Likert scale, thus ordinal. Consequently, to obtain continuous data, summated scores were obtained for each variable as measured by their respective scales. Thus, construction time overrun related risks scale had 10 for low and 50 for highest score for the 10 items, construction cost overrun related risks had six as its lowest value with 30 being highest in the measure for six items, labour related risks had seven as base value and 35 as the apex for seven items, managerial skills had 12 as minimum score and 60 as maximum onefor 12 items whereas completion of construction project had six as the low value with 30 being the top most value for the 6 items on the scale.

4.4.3 Correlation Matrix

Correlation analysis was conducted between the four predictors (moderating variable included). This was to establish whether there was a high correlation between the predictors. See Table 4.2.

Table 4.2: ***Correlation Matrix between Predictors***

Variables		Construction time overrun related risks	Construction cost overrun related risks	Labour Related Risks	Managerial skills
Construction time overrun related risks	Pearson Correlation	1			
	Sig. (2-tailed)				
	n	39			
Construction cost overrun related risks	Pearson Correlation	0.674**	1		
	Sig. (2-tailed)	0.000			
	n	39	39		
Labour Related Risks	Pearson Correlation	0.738**	0.509**	1	
	Sig. (2-tailed)	0.000	0.001		
	n	39	39	39	
Managerial skills	Pearson Correlation	-0.433**	-0.033	-0.385*	1
	Sig. (2-tailed)	0.006	0.842	0.016	
	n	39	39	39	39

**. The values are significant at0.01 levels (2-tailed).
*. The values are significant at 0.05 levels (2-tailed).

The correlation matrix depicts that the predictors had moderately low correlation with only labour related risks and construction time overrun related risks having a correlation R = 0.738. However, this is still below 0.8 and thus not an indicator of multi-collinearity. Consequently, we conclude from the correlation matrix that there was no multi-collinearity among the predictors in this study.

4.4.4 Multi-Collinearity and Collinearity Diagnostics

Multicollinearity arises when predictors are highly correlated. This implies that one of the predictors is statistically significantly predicted by the other. Correlations of more

than 0.75 indicate possible multicollinearity. Multicollinearity results in difficulty in interpreting regression coefficients. Thus since regression was a major analysis in this study, it was necessary to test for multi-collinearity.

Further collinearity diagnostics was conducted using Variance Inflation Factors (VIF) for the regression co-efficient of the variables. See Table 4.3 for VIF values.

Table 4.3: Collinearity Diagnostics

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	35.22	2.262		15.57	.000		
Construction time overrun	-0.594	0.045	-0.874	-13.06	.000	0.278	3.594
Construction cost overrun	-0.089	0.053	-0.087	-1.675	.103	0.460	2.172
Labour Related Risks	-0.004	0.043	-0.005	-0.102	.919	0.448	2.234
Managerial skills	0.088	0.042	0.089	2.088	.044	0.678	1.475

a. Dependent Variable: Completion of construction project

VIF values range from 1 with no upper limit. However, VIF values between 1 and 5 show moderate correlations which are acceptable in analysis.From the table, VIF values are between 1 and 5 indicating moderate correlation. Thus, there are no multi-collinearity effects from the predictors.

4.5 Completion of Public Private Partnership Projects

The variable of focus in this investigation was PPP project implementation. The dependent variable was measured using a 6- item using the 5-point Likert scale.

Responses were sorted and the corresponding frequency with their representative percentage determined. Mean for each item was computed with the standard deviations also determined. See Table 4.4.

Table 4.4: ***Completion of Public Private Partnership Projects***

Statement	**SD**	**D**	**N**	**A**	**SA**	**Mean**	**SD**
1. I am satisfied with the overall outcome of the project	2 5.1%	1 2.6%	5 12.8%	17 43.6%	14 35.9%	4.03	1.04
2. I am satisfied with the quality of the work	3 7.7%	2 5.1%	6 15.4%	15 38.5%	13 33.3%	3.85	1.18
3. The project was completed within a reasonable timeframe	17 43.6%	10 25.6%	3 7.7%	5 12.8%	4 10.3%	2.21	1.40
4. During the work, there were no potential safety hazards that were not addressed	6 15.4%	8 20.5%	4 10.3%	10 25.6%	11 28.2%	3.31	1.47
5. The construction project was completed without unnecessary interruption	10 25.6%	16 41.0%	7 17.9%	2 5.1%	4 10.3%	2.33	1.22
6. The construction project was completed in strict adherence to the safety requirements	12 30.8%	13 33.3%	4 10.3%	6 15.4%	4 10.3%	2.41	1.35
Composite Mean and Standard Deviation						**3.021**	**0.810**

On Table 4.4 regarding statement 1 that "*I am satisfied with the overall outcome of the project*" showed that from 39 participants, 17(43.6%) agreed, 14(35.9%) strongly agreeing while 5(12.8%) being neutral to the statement thus neither agreeing nor disagreeing. Notably, 3(7.7%) of the study participants cumulatively disagreed that the project outcome met their expectations showing that to a low extent, the project was not satisfactory. Thus, in terms of completion of construction project, the outcome was satisfactory to a larger extent as indicated by the respondents who were

also the key participants in the project. With item mean above composite mean for completion of PPPs (Mean = 3.021, SD = 0.810), the projects participants were adequately satisfied with the overall project outcome with the view being divergent as the item SD = 1.04 was greater than the composite SD = 0.810.. These results correspond to those of Tipili and IIyasu (2014) who found that most important performance indicators for evaluating project performance were construction time, cost and quality of projects once completed.

Similarly, on the statement that " *I am satisfied with the quality of the work*" Results showed that among the 39 participants, 15(38.5%) agreed satisfaction with project work quality, 13(33.3%) strongly agreeing while 6 (15.4%) were neutral 2(5.1%) showed absolute disagreement and 3(7.7%) strongly disagreed. Since the item mean of the statement that am satisfied with quality of work (Mean = 3.85, SD = 1.18),was greater than the composite mean for completion of PPPs (Mean = 3.021, SD = 0.810), the projects participants were adequately satisfied with the quality of work with the view being divergent as the item SD = 1.18 was greater than the composite SD = 0.810. This shows high satisfaction with quality of work implemented.

Conversely basing on statement that "*the project was completed within a reasonable timeframe*"out of 39 respondents , 17(43.6%) strongly disagreed that the project was completed within a reasonable timeframe, 10(25.6%) disagreed,3(7.7%) were neutral, 5(12.8%) agreed and 4(10.3%) strongly agreed. Thus, overall, 27(69.2%) of the participants were of the opinion that the project did not complete within the expected time frame.. This result shows that there were general delays in completion of works which led to failure for timely execution as indicated by line item mean(Mean = 2.21, SD = 1.40), which was lower than the composite mean (Mean = 3.021, SD = 0.810).

Further the view was divergent as the line item deviation SD=1.40 being higher than the composite SD =0.810.

On the statement that "*during the work there were no potential safety hazards that were not addressed"*showed that of all participants, 11(28.2%) showed absolute strong agreement, 10(25.6%) were in agreement, 4(10.3%) were neutral, 8(20.5%) disagreed with the remaining 6(15.4%)strongly disagreed. Thus majority of respondents 21(53.8%) cumulatively agreed that they did not witness cases of potential safey hazards not mitigated. However, 14(35.9%) of the participants cumulatively disagreed of unaddressed hazards with another 4(10.3%) neither agreeing nor disagreeing. Overall, the view on unadressed potential hazards was average with line item mean (Mean = 3.31, SD = 1.47) being above composite mean, (Mean = 3.021, SD = 0.810). with the opinion divergent among the participants The results show that there are significant potential safety hazards which emerged during the construction project. To corroborate this, Kartam and Kartam (2001) explains persistence of risks in PPP projects thereby, stakeholders need to manage complexities that emanate from taxation, market conditions, policies, technical processes, and capital budget.

Similarly, on the statement that "*the construction project was completed without unnecessary interruption*"results showed that within the participanst, 10(25.6%) strongly disagreed, 16(41.0%) disagreed with the statement while 7(17.9%) were neutral with 2(5.1%) agreeing and 4(10.3%) strongly agreeing. Results showed that there were unnecessary delays in project delivery. This was seen as high number of participants 16(41.0%) disagreed that the construction project was completed without unnecessary interruption, while 10(25.6%) strongly disagreed. Results showed that

there were unnecessary interruption in project execution with line item mean (Mean = 2.33, SD = 1.22) which was lower than the composite mean (Mean = 3.021, SD = 0.810). This opinion was divergent as the line item standard deviation SD=1.22 was above composite SD =0.810. Lyons and Skitmore (2004) found that the process of bundling responsibilities transferred a lot of risks to private partners.

The results further show that regarding "*the statement that the construction project was completed in strict adherence to the safety requirements"* among the 39 participants, 12(30.8%) strongly disagreed, 13(33.3%) disagreed while 4(10.3%) were neutral to the statement. Further 6(15.4%) were in agreement and 4(10.3%) showed strong agreement with the statement. This shows that a cumulative 25(64.1%) of the respondents consider that the work was not completed in strict adherence to the safety requirements while a cumulative 10(25.7%) of the participants agreed that the project was completed in strict adherence to safety requirements while significant 4(10.3%) neither agreeing nor disagreeing. This emerged from the difference in the composite mean (Mean = 3.021, SD = 0.810) and the line item mean (Mean = 2.41, SD = 1.35) which was significantly lower, showing that the case project was completed in strict adherence to the safety requirements as the requirements were largely ignored Further the view was divergent as the line item standard deviation SD=1.35 was above composite SD =0.810. On a similar note Tipili and IIyasu (2014) also asserted that assessment of risk of rising costs and project implementation within stipulated budget is also prevalent in Ugandan construction industry.

4.6 Construction Time Overrun Related Risks and Completion of Public Private Partnership Projects

Research objective one probed influence of delay attributable risks on PPP project

delivery within the case project. Consequently, data to measure construction time overrun was obtained and modeled to ascertain the association using regression and correlation statistical analysis. Subsequent themes present the outcome.

4.6.1 Construction Time Overrun Related Risks and Completion of Public Private Partnership Projects

Construction time overrun was evaluated basing on a 10- item five level scale. Thus, the emerging data was summarized and aggregated in terms of response frequency and corresponding percentage with reference to each item. Further, for each item, the mean value and deviations about the mean (SD) were determined. See Table 4.5.

Table 4.5: ***Construction Time Overrun Related Risks and Completion of Public Private Partnerships***

Statements	SD	D	N	A	SA	Mean	SD
1. Supervisory practices during project work led to delays in project completion	16 41.0%	12 30.8%	7 17.9%	3 7.7%	1 2.6%	2.00	1.08
2. The project work plan was not adequate.	11 28.2%	14 35.9%	8 20.5%	4 10.3%	2 5.1%	2.28	1.15
3. There were delays in delivery of materials and equipment which affected the completion of the project	2 5.1%	3 7.7%	5 12.8%	12 30.8%	17 43.6%	4.00	1.17
4. There were schedule delay during project construction as a result of inadequate planning	4 10.3%	5 12.8%	4 10.3%	16 41.0%	10 25.6%	3.59	1.29
5. Design changes interfered with construction project schedule	3 7.7%	1 2.6%	7 17.9%	17 43.6%	11 28.2%	3.82	1.12
6. Design process took longer than anticipated and this affected the time scheduled for project completion.	3 7.7%	4 10.3%	4 10.3%	13 33.3%	15 38.5%	3.85	1.27
7. Delays in resolving disputes interfered with construction schedule	1 2.6%	2 5.1%	4 10.3%	20 51.3%	12 30.8%	4.03	0.93
8. Delay in preparation and approval of drawings interfered with construction schedule	0 0.0%	16 41.0%	23 59.0%	0 0.0%	0 0.0%	2.59	0.50
9. Incomplete designs lead to delays in commencement and completion of various sections of the project	6 15.4%	9 23.1%	18 46.2%	6 15.4%	0 0.0%	2.62	0.94
10. There were Scheduling errors which led to contractor delays	0 0.0%	21 53.8%	11 28.2%	7 17.9%	0 0.0%	2.64	0.78
Composite Mean and Standard Deviation						**3.141**	**0.785**

From table 4.5 regarding statement "*supervisory practices during the project work led to delays in project completion"* results showed that among the participants, 16(41.0%) strongly disagreed while 12(30.8%) disagreed.. However, 7(17.9%) of the

respondents were neutral while 3(7.7%) showed agreement and 1(2.6%) indicated strong agreement. This gives a total of 28(71.8%) of respondents who believe that delay in construction of the project were not due to supervisory practices. Thus, the supervisory practices during project work did not amount to delays as the line item meam (Mean = 2.00, SD = 1.08) was lower than the composite mean,(Mean = 3.141, SD = 0.785) indicating that supervisory practices was not a dominant contributor to delay in project execution with the participants views being divergent. This shows that there were noticeable delays attributable to supervisory practices during the project although this was not significant. Further the view was divergent as the line item deviation SD=1.08 exceeded composite SD =0.785.

This opinion was shared by managers who were interviewed during the study who provided an explanation regarding the nature of delays. One of the managers said that:

> *"Community agitation led to stalling of the project since the community did not initially embrace the project. Consequently, the community was setting high demands to be met in terms of compensation and integration of community members to benefit from the project through supplies to the project and employment opportunities. [Interview: Manager 3, 19 May, 2018]."*

As for the statement that "*the project work plan was not adequate*" ,the results showed that high proportion of participants, 14(35.9%) disagreed while 11(28.2%) strongly disagreed.. However, there was a considerable 6(15.4%) who cumulatively agreed that the project work plan was not adequate. Further,8(20.5%) of the respondents were neutral,Overall it was found that the project work plan was adequate contrary to the expectation that the plan was inadequate (Mean = 2.28, SD = 1.15). Compared against the composite mean of 3.141 (SD = 0.785), work plan was

not a contributing factor in delays in completion as it had little effect. This was revealed as the overall response to the statement that the project work plan was not adequate, was a disagreement This shows that although project plans did not cause noticeable delays in completion, they were not that perfect, thus leaving doubt into the minds of some of the project participant .The view was divergent as the line item deviation SD=1.15 being above composite SD =0.785.

On the statement that "*there were delays in the delivery of materials and equipment, which affected the completion of the project*,results"results showed that of the total participants, 17(43.6%) strongly agreed while 12(30.8%) agreeing. This shows that, among the project participants, delay in material supply had a significant effect in project execution as reported by a cumulative 29(74.4%) of the study respondents. However, 5(12.8%) of the respondents cumulatively disagreed that the delay in material supply affected project execution, while 4(10.3%) were neutral regarding this statement. It was found that .there were delays in to have the equipment and material on site, which affected the completion of the project indicated by line item mean (Mean = 4.00, SD = 1.17) being over the composite (Mean = 3.141, SD = 0.785). (Mean = 4.00, SD = 1.17). The view was divergent as the line item response score deviation SD=1.17 being above the established variable composite SD =0.785.

On the statement that "*there were schedule delays during project construction as a result of inadequate planning"*, results showed that from the pool of participants, 16(41.0%) agreed that there were schedule delays while 10(25.6%) strongly agreed.However 4(10.3%) strongly disagreed while 5(12.8%) were in disagreement. Item mean (Mean = 3.59, SD = 1.29), was above the composite (Mean = 3.141, SD = 0.785), The overall opinion points to the conclusion that there were schedule delays

during the project construction as a result of inadequate planning. These results agree with those of Shebob, Dawood and Xu (2011) who pointed to substandard skills, varying material cost, material delivery delay and scoe variations were among the main factors that delayed project completion in Libya.

For the statement that "*design changes interfered with construction project schedule"* ,results showed that of all participants, 17(43.6%) agreed with the statement while another 11(28.2%) strongly agreed. Cumulatively, 28(71.8%) of the respondents agreed that design changes during the construction project interfered with the project schedule and thus, completion. Of the remaining 11(28.2%), 4(10.3%) cumulatively disagreed that design changes interfered with construction project schedule while 7(17.9%) were neutral. The design changes interfered with construction project schedule as indicated in item line mean (Mean = 3.82; SD = 1.12) which is higher than the composite mean (Mean = 3.141, SD = 0.785). It also indicates that design changes during implementation of the project was frequent that it highly affected execution. The results are concurrent to those of Ismail (2014) who identified 12 risk factors that resulted to time overruns. The factors included inadequate planning; incompetent sub-contractors; poor site managements; changes in project designs; poor coordination between different parties; slow flow of information; material shortage; maerial delivery delay; delays in project approvals and changes in projects' scopes.

On the statement that "*design process took longer than anticipated and this affected the time scheduled for project completion"*, results showed among the participants, 15(38.5%) strongly agreed while 13(33.3%) of the respondents agreed. This gave an overall 28(71.8%) of the respondents who acknowledged the design process took longer thus affecting the overall timelines. However, 7(18.0%) of the respondents

cumulatively disagreed that design process took longer than anticipated and this affected the time scheduled for project completion while 4(10.3%) were neutral. This divergent view could be attributed to participants involvement in post-design activities as indicated by the line item mean (Mean = 3.85, SD = 1.27) which is higher than the composite mean (Mean = 3.141, SD = 0.785). .On the contrary, Tipili and IIyasu (2014) observed that delays and failure to deliver project phases affect the overall project delivery hence a significant factor in the completion of PPPs.

On the statement that "*delays in resolving disputes interfered with the construction schedule",*results showed that delays in resolving disputes interfered with the construction schedule to a greater extent with the item line mean(Mean = 4.03, SD = 0.93) significantly higher than the composite value (Mean = 3.141, SD = 0.785) It showed that dispute resolution was a greater challenge to project execution. Among participants, majority 20(51.3%) agreed that the delays in resolving disputes among stakeholders interfered with the construction schedule while another 12(30.8%) report strong agreement thus 32(82.1%) of participants showed agreement that, indeed, delays in resolving disputes interfered with the construction schedule. Of the remaining 18%, 3(7.7%) cumulatively disagreed while the other 4(10.3%) were neutral as to whether delays in resolving disputes interfered with the construction schedule. The divergent view could be due to participants who were never in conflict or in minimal conflict during the construction period. On the contrary, Ke, Wang and Chan (2010) noted that there were three risks, which included coordination risks, competition, and changes in law.

On the statement that "*delay in preparation and authorization of drawings interfered with construction schedule',*results showed that of all participants 16(41.0%) showed

disagreement while 23(59.0%) were neutral. The extent to which delay in preparation and authorization of drawings interfered with construction schedule was low as indicated in the item line mean (Mean = 2.59, SD = 0.50) which is lower than the composite mean (Mean = 3.141, SD = 0.785). The results show most of the participants 23(59.0%) were undecided and thus neutral. Comparatively, 16(41%) outrightly disagreed regarding the statement. This shows that there were minimal delays in preparation and authorization of drawings, thus did not interfere much with the scheduling of activities in the construction project and eventual completion.

On the statement that "*incomplete designs lead to delays in commencement and completion of various sections of the project"*, 6(15.4%) strongly disagreed,21(53.8%) disagreed, while 18(46.2%) were neutral.Further 6(15.4%) agreed with the statement. Results showed that incomplete designs were not a cause for delays in commencement and completion of various sections of the project as indicated by the line item mean (Mean = 2.62, SD = 0.94).which is higher than the composite mean (Mean = 3.141, SD = 0.785). There were minimal cases of incomplete designs delaying the commencement and completion of various sections of the project. However, majority 18(46.2%) were neutral regarding the statement, an indication that incomplete designs either did not cause delays or caused delays in execution of spefic project tasks. The results are supported by those of Mohamed (2015) who found that the major delay genesis included errors that emerge at construction, the negative effects of unnecessary litigation, time and cost overruns, changes in prices of raw materials, poor estimates made in time and shortages of materials.

On the statement that "*there were scheduling errors which lead to contractor delays"*

results showed that scheduling errors were not the cause for contractor delays as the respondents generally disagreed with the statement that there were Scheduling errors, which led to contractor delays as indicated by the line item mean (Mean = 2.64, SD = 0.78) which is lower than the composite mean (Mean = 3.141, SD = 0.785). It shows that scheduling errors did not significantly impact project delivery. Majority of staff at the case project 21(53.8%) disagreed that there were Scheduling errors, which led to contractor delays. However, 7(17.9%) agreed that there were Scheduling errors, which led to contractor delays. Significantly though, 11(28.2%) of the respondents were neutral as to whether there were Scheduling errors, which led to contractor delays.. The managers attributed scheduling errors during the project to financing structure which meant that funds were availed late for the aspects of the project. Specifically, one manager said that:

> *"Financing structure of the project led to delays in accomplishing scheduled tasks. This emerged as money for various project phases were remitted way past the scheduled time. The materials and labour could not be paid for in time leading to overall time extension for delivery [Interview: Manager 6, 11th June, 2018]"*

4.6.2 Correlation Between Time Overrun Related Risks and Completion of Public Private Partnership Projects

To determine the relationship between construction time overrun attributable risks and implementation of PPP projects, correlation was employed. Since the variables were measured on the ordinal Likert for individual items, there was need for conversion to continuos data for the analysis. Therefore, the sum of scores for each participant was obtained in the specific scales such that, construction time overrun scale had 10 as base value and 50 as peak for the items while completion of construction project scale had 6 as lowest value and 30 as the highest value for the 6 items in the scale. The

resulting scores formed paired data points. See Table 4.6.

Table 4.6: ***Correlation Analysis Between Time Overrun Related Risks and Completion of Public Private Partnership Projects***

Variables		Construction time overrun related risks	Completion of construction project
Construction time overrun related risk	Pearson Correlation	1	
	Sig. (2-tailed)		
	n	39	
Completion of construction project	Pearson Correlation	-0.975**	1
	Sig. (2-tailed)	0.000	
	n	39	39

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

Output Table 4.6 depicts a strong negative relationship (R = -.975) being statistically significant ($p < .001$, $p \leq 0.05$). The implication being that, statistically as construction time overrun increases, PPP project execution declines significantly. With the strong negative correlation, time overrun related risks have a greater impeding effect on PPP project implementation. This is occasioned by the basis that time overrun leads to an overall delay in timelines, thus affecting the project overrun cost. The delay and pressure that emerges may also lead to a compromise in project deliverables quality.

4.6.3 Regression Analysis for Time Overrun Related Risks on Completion of Public Private Partnership Projects

To determine how construction time overrun attributable risks influence PPP project execution, the two variables were modeled through regression. Sum of scores for items in each scale for individual participants was determined to obtain a continuous range of scores. Thus, the minimum score on the construction time overrun related risks scale was 10 with the maximum being 50 while the minimum score on the completion of construction projects scale was 6 with the maximum score being 30.

Thus, 39 paired data points resulted and analysed. See Table 4.7.

Table 4.7: ***Regression Analysis for Time Overrun Risks and Completion of Public Private Partnership Projects***

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.975[a]	0.951	0.950	0.560

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	224.8	1	224.8	717.7	0.000[b]
	Residual	11.59	37	0.313		
	Total	236.4	38			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	38.95	.782		49.78	0.000
	Construction time overrun related risk	-0.663	0.025	-0.975	-26.79	0.000

a. Dependent Variable: Completion of construction project

b. Predictors: (Constant), Construction time overrun

It was found that construction time overrun related risks accounts for 95.1% (R square = .951) in the completion of construction project. Analysis model showed statistical significance as F (1, 37) = 717.7 [$p < .001$, $p \leq .05$]. Hence from regression, construction time overrun related risks significantly contribute to 95.1% of resulting variation in PPP projects.

This shows that, when construction time overruns related risks changes by one positive unit, completion of construction project declines by 0.663. Thus, construction time overrun related risks negatively affect completion of construction of PPPs to a

value equal to 0.663 as revealed through main effects. On its own, when time overrun related risks are considered in completion of construction of PPP projects, they have a significantly greater effect of delaying the project.

4.6.4 Testing of Hypothesis One

Hypothesis one was designed to test if there were significant relationship between construction time overrun related risks on completion of PPP projects in Kenya. Thus, the null hypothesis was stated as:

> **H_0:** There is no significant relationship between time overrun related risk and completion of Public Private Partnership Project in Kenya.

Since there was a strong negative correlation between the variables, r (38) = -0.975 ($p<.05$) with regression showing that construction time overrun related risks explained up to 95.1% [R square = .951, F (1, 37) = 717.7, $p \leq .05$]. This implies that construction time overrun attributable risks significantly influence PPP project execution. Therefore, we reject the null hypothesis that *Time overrun related risk does not significantly influence PPPs execution in Kenya,* and accept the alternative hypothesis, which is *Time overrun related risk significantly influences PPP execution.* This is because times overrun attributable risks affect project schedules and timelines, leading to increased costs, which affect the overall project budget.

4.7 Construction Cost Overrun Related Risks and Completion of Public Private Partnership Projects

Research objective two probed influence of rising costs attributable risks on PPP project delivery within the case project. Consequently, data to measure construction cost overrun was obtained and modeled to ascertain the association using regression and correlation statistical analysis. Subsequent themes present the outcome.

4.7.1 Construction Cost Overrun Related Risks and Completion of Public Private Partnership Projects

Construction cost overrun was evaluated basing on a 5- item five level scale. Thus, the emerging data was summarized and aggregated in terms of response frequency and corresponding percentage with reference to each item. Further, for each item, the mean value and deviations about the mean (SD) were determined. See Table 4.8.

Table 4.8: ***Construction Cost Overrun Related Risks and Completion of Public Private Partnership Projects***

Statement	SD	D	N	A	SA	Mean	SD
1. The contractor was unable to complete certain aspects of the project resulting into outsourcing some services	3 7.7%	2 5.1%	5 12.8%	16 41.0%	13 33.3%	3.87	1.17
2. Emerging tasks during the project affected the timelines leading to increased project cost	1 2.6%	3 7.7%	6 15.4%	14 35.9%	15 38.5%	4.00	1.05
3. The changes in design during construction resulted into additional costs thus raising the overall project cost	2 5.1%	1 2.6%	3 7.7%	15 38.5%	18 46.2%	4.18	1.05
4. Design variation resulted in the need for more experts hence raising the overall project costs.	2 5.1%	2 5.1%	7 17.9%	12 30.8%	16 41.0%	3.97	1.14
5. Work breakdown structure during the project necessitated involvement of many sub-contractors leading to increased project cost	1 2.6%	2 5.1%	7 17.9%	16 41.0%	13 33.3%	3.97	0.99
Composite Mean and Standard Deviation						**3.970**	**0.124**

With reference to Table 4.8, statement that "*the contractor was unable to complete certain aspects of the project resulting into outsourcing some services"*results showed that out of total participants, 16(41.0%) were in agreement that the contractor was

unable to complete certain aspects of the project resulting in outsourcing some services while 13(33.3%) strongly agreed. With 29(74.3%) of the study respondents identifying that the contractor was unable to complete certain aspects of the project resulting in outsourcing some services, this reveals a dominant problem during case project execution. However, 10(25.6%) of participants were not of the opinion that the contractor was unable to complete certain aspects of the project resulting in outsourcing some services with 3(7.7%) strongly disagreeing, 2(5.1%) disagreeing while 5(12.8%) being neutral. This shows that there were none or little contractor delays in some aspects of the construction project. However, the effect of contractor being constrained to complete certain project parameters resulting into outsourcing some services was low as indictaed by the line item mean (Mean= 3.87, SD = 1.17) which is lower than the composite mean (Mean = 3.970, SD = 0.124).. The view was divergent as the line item deviation about mean SD=1.17 was above composite SD =0.124.

On the statement that "*emerging tasks during the project affected the timeliness leading to to increased project cost"*, results showed that among the participants, 15(38.5%) strongly agreed while 14(35.9%) agreed that emerging tasks during the project affected the timelines leading to the increased project cost. However, a significant 6(15.4%) were neutral regarding this statement, although 4(10.3%) cumulatively agreed with the statement. it influences positively the timelines leading to increased project cost as indicated by the item line mean (Mean = 4.00, SD = 1.05) which is higher than the composite mean (Mean = 3.970, SD = 0.124), showing that the problem of emerging tasks emerged frequently during project execution. The implication was that as the tasks emerged during the project, additional costs were incurred thus ultimately resulting into increased project costs. Similarly, Okeyo,

Rambo and Odundo (2015) established that delays in payments affected project completion by reducing efficient processes and production (71.8%); increasing time attributable costs (71.8%); re-scheduling works (69.2%); extending time (69.2%); and preventing projects from completing before allocated time (53.8%).

The view was shared by managers who participated in the study. In this case one of the managers said that:

> *"Time related risks resulted into delays in completing the project thus leading to delay to enjoying the benefits of the project as planned. The delay, which was by 4 years led to an overall cost overrun of 4 KES 4 billion, thus lowering the cost benefit value of the project." [Interview: Manager 2, 28th May, 2018]*

On the statement that "*the changes in design during construction resulted into additional costs thus raising the overall project cost"* results showed that within the participants, 18(46.2%) strongly agreed as15(38.5%) agreed. However, 3(7.7%) cumulatively disagreed that changes in design during construction resulted into additional costs for the project with another 3(7.7%) being neutral. Results shows that there were changes in design during construction which resulted into additional costs thus raising the overall project cost as indicated by the item line mean (Mean = 4.18, SD = 1.05) which is higher than the composite mean (Mean = 3.970, SD = 0.124). It also shows that the changes occurred and significantly impact project execution. However, the changes in design had an overall effect of increasing the project costs.

On the statement that "*design variation resulted in the need for more experts hence raising the overall project costs"* results showed that for participants, 2(5.1%) showed strong disagreement ,2(5.1%) reported disagreement while 7(17.9%) were neutral with 12(30.8%) agreed and 16(41.0%) indicated strong ageement. Results showed

that design variation resulted in the need for more experts hence raising the overall project costs as indicated in the item line mean (Mean = 3.97, SD = 1.14) which is the same as composite mean (Mean = 3.970, SD = 0.124) The results agree with those of Mweresa (2013) who revealed that there were eight factors that acted as underlying ones to overruns. The factors included bureaucracy,risk allocation, timeliness; work definitions; requirements' interpretation; planning; and inabilities among contractors.

On the statement that "*work breakdown structure during the project necessitated the involvement of many sub-contractors leading to increased project cost*",results showed that among the pool of participants, 1(2.6%) strongly disagreed ,2(5.2%) disagreed while 7(17.9%) were neutral to the statement. Further 16(41.0%) agreed and 13(33.3%) showed strong agreement. Results also indicated work breakdown structure during the project necessitated the involvement of many sub-contractors leading to increased project cost as inficated by the item line mean (Mean = 3.97, SD = 0.99). The challenge was found to be occurring significantly in comparison to composite mean, (Mean = 3.970, SD = 0.124). This implies that based on the magnitude of the project, there was a need for breakdown to facilitate completion. However, the breakdown implied the need for more sub-contractors hence increased costs. Overall, it was found that that there were costs overrun resulting from delays, design changes, use of sub-contractors as well as emerging tasks (Mean = 3.970, SD = 0.124). This emerged as the mean falls at a rating equal to 4. The cost overrun affects completion of the project.

Similarly, one of the managers observed that:

> *"In the final analysis, time overrun occurring at the stage of project implementation led to rising cost due to changing prices. This is because prices of materials and cost of labour changes with*

time due to inflation on various factors of production. Thus, the initial estimates on costs of materials and labour were overtaken by prevailing market prices during the last stages of project which were out of the initial project schedule." [Interview: Manager 4, 2nd July, 2018]

4.7.2 Correlation Analysis between Cost Overrun related Risks and Completion of Public Private Partnership Projects

To determine the relationship between construction cost overrun attributable risks with project execution through PPP, correlation was used. Since the variables were measured on the ordinal Likert for individual items, there was need for conversion to continuos data for the analysis. Therefore, the sum of scores for each participant was obtained in the specific scales such that, construction time overrun scale had 5 as base value and 25 as peak for the 5 items while completion of construction project scale had 6 as lowest value and 30 as the highest value for the 6 items in the scale. The resulting scores formed paired data points. See Table 4.9.

Table 4.9: ***Correlation Analysis Between Cost Overrun Related Risks and Completion of Public Private Partnership Projects***

Variables		Construction cost overrun related risks	Completion of construction project
Construction cost overrun related risks	Pearson Correlation	1	
	Sig. (2-tailed)		
	n	39	
Completion of construction project	Pearson Correlation	-0.682**	1
	Sig. (2-tailed)	0.000	
	n	39	39

**. Values are significant at 0.01 levels (2-tailed).

Output Table 4.9 depicts a strong negative correlation (R^2 = -.682) the two variables which was statistically significant ($p < .001$, $p \leq 0.05$). The implication being that, statistically as construction cost overrun increases, PPP project execution declines significantly. On a similar note, Tipili and Ilyasu (2014) found that the risk related to time and cost was likely to occur and even affect project completion more. In contrast, environmental risk factors had the least weighted risk meaning that they were unlikely to occur and even affect project completion significantly. Cost overrun related risks imply that there is a need for additional funding for the project, which may always be difficult to secure. The difficulties encountered in securing more funds for additional costs affect completion due to emerging disputes and compromise on the quality of deliverables.

4.7.3 Regression Analysis of Cost Overrun Related Risks on Completion of Public Private Partnership Projects

To determine how construction cost overrun attributable risks influence PPP project execution, the two variables were modeled through regression. Sum of scores for

items in each scale for individual participants was determined to obtain a continuous range of scores. Thus, the minimum score on the construction cost overrun was 5 with the maximum being 25 while the minimum score on the completion of construction projects scale was 6 with the maximum score being 30. Thus, 39 paired data points resulted and analysed. See Table 4.10.

Table 4.10: ***Regression Analysis of Cost Overrun Related Risks and Completion of Public Private Partnership Projects***

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.682[a]	0.465	0.450	1.849

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	109.9	1	109.9	32.153	0.000[b]
	Residual	126.5	37	3.418		
	Total	236.4	38			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	34.83	2.960		11.77	0.000
	Construction cost overrun related risks	-0.694	0.122	-0.682	-5.670	0.000

a. Dependent Variable: Completion of construction project

b. Predictors: (Constant), Construction cost overrun related risks

It was found that construction cost overrun related risks results into 46.5% (R square =0.465) of difference in PPP project implementation. Modeled output had statistical

significance with F (1, 37) = 32.153 [p < .001, p ≤ .05]. This shows that from regression, construction cost overrun related risks contribute to 46.5% of existing difference in completion of construction of PPPs.

This shows that, when construction cost overrun related risks change by one positive unit, completion of construction project declines by 0.694. Thus, risks of excess costs beyond budget allocation negatively affect implementation of PPPs to a score of 0.694 as revealed by main effects. Results agree with those of Rwelamila (2003) who showed that 80% of projects are not completed as scheduled due to contract forms that are not discussed to determine agreeable risk apportioning modalities.

4.7.4 Testing of Hypothesis Two

Hypothesis two was developed to test if there was a significant relationship between risks attributable to construction cost overrun and PPP execution stated as:

> **H_0:** There is no significant relationship between construction cost overrun related risks and completion of Public Private Partnership Projects in Kenya

Since the association between the variables was strongly negative, r (38) = -0.682 (p<.05) with regression showing that construction cost overrun related risks explained up to 46.5% [R square = .465, F (1, 37) = 32.153, p ≤ .05]. This implies that construction cost overrun significantly influences the implementation of PPPs. Therefore, null hypothesis does not prevail that *there is no significant relationship between risks attributable to construction cost overrun and execution of PPP projects in Kenya* and accept the alternative hypothesisthat *there is significant relationship between construction cost overrun attributable risks and completion of PPP execution in Kenya.*

The relationship shows that when there are higher chances and occurrences risks associated with construction costs, delivery of PPP projects is significantly negatively affected. This is because the cost overruns related risks results into additional project cost not envisaged in the initial budget as well as the time due to emerging disputes on the costs as well as sourcing for additional funds.

4.8 Labour Related Risks and Completion of Public Private Partnership Projects

Research objective three probed influence of risks attributable labour on PPP project delivery within the case project. Consequently, data to measure labour related risks was obtained and modeled to ascertain the association using regression and correlation statistical analysis. Subsequent themes present the outcome.

4.8.1 Labour Related Risks and Completion of Public Private Partnership Projects

Construction labour related risks was evaluated basing on a 7- item five level order. Thus, the emerging data was summarized and aggregated as response frequency and corresponding percentage with reference to each item. Further, for each item, the mean value and deviations about the mean (SD) were determined. Summary for all the 7 items. See Table 4.11.

Table 4.11: ***Labour Related Risks and Completion of Public Private Partnership Projects***

Statements	SD	D	N	A	SA	Mean	SD
1. Some employees and experts assigned specific tasks failed to complete their assignment thus affected completion	2 5.1%	3 7.7%	4 10.3%	14 35.9%	16 41.0%	4.00	1.15
2. Site injuries and deaths occurred during the project which necessitated payouts and compensations to workers	1 2.6%	3 7.7%	2 5.1%	16 41.0%	17 43.6%	4.15	1.01
3. There was poor work organization in assigning specific responsibilities which affected the project completion	7 17.9%	9 23.1%	8 20.5%	5 12.8%	10 25.6%	3.05	1.47
4. Overtime work aimed at achieving timelines affected the productivity of the labourers thus project quality	4 10.3%	3 7.7%	5 12.8%	21 53.8%	6 15.4%	3.56	1.17
5. Assigning tasks to inexperienced supervisors affected the delivery of the project	2 5.1%	2 5.1%	6 15.4%	12 30.8%	17 43.6%	4.03	1.14
6. Changing labour demands during the project execution led to increased wages	3 7.7%	1 2.6%	7 17.9%	19 48.7%	9 23.1%	3.77	1.09
7. There were cases of go slow and job boycotts due to issues of wages and compensation	3 7.7%	4 10.3%	4 10.3%	12 30.8%	16 41.0%	3.87	1.28
Composite Mean and Standard Deviation						**3.777**	**0.373**

With reference to results in Table 4.11 on statement that "*some employees and experts assigned specific tasks failed to complete their assignment thus affected completion,the results shows that some employees and experts assigned specific tasks*

failed to complete their assignment thus affected completion" results showed that of all the participants, 16(41.0%) strongly agreed with the statement while 14(35.9%) agreed. Thus, 30(76.9%) of the respondents cumulatively agreed that some employees and experts assigned specific tasks failed to complete their assignment thus affected completion. However, 5(12.8%) of participants were cumulatively in disagreement while 4(10.3%) neither agreed nor disagreed, The item line mean (Mean = 4.00, SD = 1.15) was above composite mean (Mean = 3.777, SD = 0.373) indicating that delay in completion of tasks was prevalent thus labour aspects affecting timelines of activities.,thus implying that there were no failures by employees or experts to complete tasks assigned to them. On the contrary, Abdul Kadir *et al.,* (2005) highlighted among other factors, material outages, site congestion, delayed payments, equipment shortage, poor weather conditions, claim certificates and slow responses from site staffs as factors of affecting labour productivity.

On the statement that "*site injuries and deaths occurred during the project, which necessitated payouts and compensations to workers*", results showed among the participants, 16 (41.0%) agreed ,17(43.6%) strongly agreed while 2(5.1%) were neutral. on the statement. However, 4(10.3%) of the study participants cumulatively disagreed that site injuries and deaths occurred during the project, which necessitated payouts and compensations to workers which was due to working in various sections which had no or little effect of the site injuries and deaths. Overall, it was found that site injuries and deaths occurred during the project which necessitated payouts and compensations to workers with the item line mean (Mean = 4.15, SD = 1.01) where item mean was significantly above composite mean (Mean = 3.777, SD = 0.373). This shows that site injuries and deaths were frequent thus noticed by the participants.

On the statement that "*there was poor work organization in assigning specific responsibilities which affected the project completion"*,results showed that there was a divided opinion as to whether there was poor work organization in assigning specific responsibilities which affected the project completion as the item mean (Mean = 3.05; SD = 1.47) was neutral compared to the composite mean (Mean = 3.777, SD = 0.373). This emerged as almost equal proportion of respondents cumulatively agreed 15(38.4%) as well as cumulatively disagreed 16(41.0%) with a significant 8(20.5%) being neutral. This shows that poor work organization in assigning specific responsibilities was not a major labour related risk in execution of case project thus did not affect the completion of the project. Further, even though work organization and assigning of specific responsibilities was witnessed in some areas of the case project, it was not greatly significant to affect delivery.

On the statement that "*overtime work aimed at achieving timelines affected the productivity of the labourers thus project quality"*,results showed that high proportion of participants 21(53.8%) agreed that overtime work aimed at achieving timelines affected the productivity of the labourers thus project quality while another 6(15.4%) strongly agreed. Thus, 27(69.2%) respondents agreed that overtime work affected quality of project deliveries implying that overtime work aimed at achieving timelines hinder quality although to a moderate extent. This shows that the item line mean (Mean = 3.56, SD = 1.17) was below composite ((Mean = 3.777, SD = 0.373). The overtime work resulted in fatigue, monotony, and lack focus and keenness in the task requirements, thus affecting the quality of work and consequently project execution. Specifically This indicates that the problem of overtime work affecting productivity and quality of work was not experienced in some areas of the project. Similar findings were arrived at by Olabosipo *et al.*, (2011), who found that unfair

wages with (RI = 0.89), lack of motivation with (RI = 0.79) and negative influencing factors with (RI = 0.85) were ranked high.

On the statement that "*assigning tasks to inexperienced supervisors affected the delivery of the project"*,results showed that among participants, 17(43.6%) were of the strong opinion,12(30.8%) concurred that assigning tasks to inexperienced supervisors affected the delivery of the project. However, results also showed that 6(15.4%) of the participants were neutral regarding the statement that assigning tasks to inexperienced supervisors affected the delivery of the project, with 4(10.2%) cumulatively disagreeing with the statement as indicated by the item line mean (Mean = 4.03, SD = 1.14) being above the composite mean (Mean = 3.777,SD = 0.373), showing that this challenge was highly experienced during the project implementation. This shows that in other areas of the construction, there were no cases of work being assigned to inexperienced supervisors despite that there were noted cases of tasks assigned to inexperienced supervisors who could not deliver the tasks within the scheduled times and projected costs. This risk of inexperienced personnel ultimately affects the completion of the project as envisaged. Similarly, Wijekoon (2006) found that the performance of labour crew, project supervision, accurate estimates, difficulties in construction, design details, availability of skilled labor and constructability were postulated as factors affecting completion of construction PPPs.

On the ststement that "*changing labour demands during the project execution led to increased wages"*, results showed that within the participants pool, 19(48.7%) who agreed that changing labour demands during the project execution led to increased wages as well as 9(23.1%) who strongly agreed with the statement. Thus,

cumulatively 28(71.8%) of the respondents agreed that in labour demands resulting from design changes and various occurring during project execution led to increased wages. Increased wages resulting from the noted changing labour demands affected the completion of the project due to increased costs as well as delays. Changing labour demands during the project execution led to increased wages as indicated by the item line mean (Mean = 3.77, SD = 1.09) being almost equal to composite mean (Mean = 3.777, SD = 0.373). Thus, changing labour laws did not have greater influence on completion of the project compared to other indicators of labour related risks. The changing labour demands were associated with the changes in design.

On the statement "*that there were cases of go slows and job boycotts due to issues of wages and compensation"*, results showed out of all the participants 16(41.0%) strongly agreed with the opinion ,12(30.8%) agreed. This shows the problem of go-slows and boycotts existed during project execution as confirmed cumulatively by 28(71.8%) of the study participants. However, 3(7.7%) of the participants strongly disagreed 4(10.3%) disagreed while another 4(10.3%) were neutral giving an indication that the go-slows and job boycotts due to issues of wages and compensation was not universal across the whole project.There were cases of go slows and job boycotts due to issues of wages and compensation This occurrence significantly affected completion as indicated by the item line mean (Mean = 3.87, SD = 1.28) being above composite (Mean = 3.777, SD = 0.373). The noted boycotts and go-slows were naturally not anticipated in the project schedule thus affected project execution with reference to quality, cost, and timelines. The bove results are congruent to Ailabouni *et al.,* (2009) that, it is imperative upon the sub-contractor to source for laborers and negotiate remuneration terms consistent with the amount of work done thus their focus is on speedy completion of work for cost savings.

4.8.2 Correlation Analysis Between Labour Related Risks and Completion of Public Private PartnershipProjects

To determine the relationship between construction risks attributable to labour and implementation of PPP projects, a correlation model test was run between the two variables. Since the variables were measured on the ordinal Likert for individual items, there was need for conversion to continuos data for the analysis. Therefore, the sum of scores for each participant was obtained in the specific scales such that, construction time overrun scale had 7 as base value and 35 as peak for the 7 items while completion of construction project scale had 6 as lowest value and 30 as the highest value for the 6 items in the scale. The resulting scores formed paired data points modeled and depicted. See in Table 4.12.

Table 4.12: ***Correlation Analysis Between Labour Related Risks and Completion of Public Private Partnership Projects***

Variables		**Labour Related Risks**	**Completion of construction project**
Labour Related Risks	Pearson Correlation	1	
	Sig. (2-tailed)		
	n	39	
Completion of construction project	Pearson Correlation	-0.729**	1
	Sig. (2-tailed)	0.000	
	n	39	39

**. The value is significant at 0.01 levels (2-tailed).

Output Table 4.12 depicts a strong negative correlation (R = -.729) being statistically significant ($p < .001$, $p \leq 0.05$). The implication being that, statistically as labour related risks increase, PPP project execution declines significantly. Thus construction labour related risks affect completion of PPP projects. Similarly, Njogu (2015) ranked labour related risks as a key determinant in completion of PPPs. Considering that

labour is a major factor in actualizing construction projects, when risks associated with labour are dominant, completion of tasks are affected hence increasing in labour related risks results in declinein the completion of the project. This emerges from go slows leading to delays, legal action associated with injuries and remuneration as well as poor workmanship affecting the quality of the project.

4.8.3 Regression Analysis of Labour Related Risks and Completion of Public Private Partnership Projects

To determine how labour attributable risks influence PPP project execution, the two variables were modeled through regression. Sum of scores for items in each scale for individual participants was determined to obtain a continuous range of scores. Thus, the minimum score on the labour related risks was 7 with the maximum being 35 while the minimum score on the completion of construction projects scale was 6 with the maximum score being 30. See Table 4.13.

Table 4.13: ***Regression Analysis of Labour Related Risks and Completion of Public Private Partnership Projects***

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.729[a]	0.532	0.519	1.730

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	125.6	1	125.6	41.990	0.000[b]
	Residual	110.7	37	2.992		
	Total	236.4	38			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	33.93	2.454		13.82	0.000
	Labour Related Risks	-0.598	0.092	-0.729	-6.480	0.000

a. Dependent Variable: Completion of construction project

b. Predictors: (Constant), Labour Related Risks

It was found that labour related risks accounts for 53.2% (R square = .532) of difference witnessed in completion of construction project. Modeled output had statistical significance with F (1, 37) = 41.99 [$p < .001$, $p \leq .05$]. Thus, labour related risk account for 53.2% of variance in the completion of construction of PPPs.

This shows that, when labour related risks increase by one positive unit, completion of construction project declines by 0.598. Thus, labour related risks negatively influence completion of construction of PPPs to a value equal to 0.598 as showed by main effects. The results are substantiated by Nworuh and Nwachukwu (2004) who established that errors in estimating costs and time, delays caused by project owners, subcontractors, bad weathers, failures in finances, problems in cash flow and industrial relations had significant impact on project completion. This is because as labourers take to industrial action, their affect project stability and service delivery as there are no labourers to offer services. Moreover, incompetent suppliers and sub-contractors will fail to provide the planned quality of work thus affecting the overall project quality.

4.8.4 Testing of Hypothesis Three

Hypothesis three was conceived to test significance of association between labour related risks and completion of PPP projects in Kenya stated as:

H_0: There is no significant relationship between labour related risks and completion of PPP projects in Kenya

Since the variables were strongly negatively correlated, r (38) = -0.729 ($p<.05$) with regression showing that construction time overrun explained up to 53.2% [R square = .532, F (1, 37) = 41.99, $p \leq .05$]. Therefore, labour related risks significantly influence delivery of PPPs. Therefore, the null hypothesis that *labour related risks do not*

significantly influence PPP execution in Kenya, is reject and accept the alternative hypothesis which is *labour related risks significantly influence of PPPs in Kenya*.

4.9 Combined Construction Related Risks and Completion of Public Private Partnership Projects

Research objective four probed the combined effect of the three modeled construction risks on PPP project implementation.

4.9.1 Combined Construction Risks on Completion of Public Private Partnership Projects

A multiple linear regression analysis was done with the risks and PPP implementation. Thus, there were three predictors, namely cost overrun, time overrun and labour related risks obtained through the summation of scores in the individual scales. See Table 4.14.

Table 4.14: ***Regression Analysis of Combined Construction Risks on CompletionPublic Private Partnership Projects***

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.976[a]	0.952	0.948	0.568

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	225.1	3	75.02	232.6	0.000[b]
	Residual	11.29	35	0.323		
	Total	236.4	38			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	39.51	0.992		39.85	0.000
	Construction time overrun related risks	-0.633	0.043	-0.931	-14.59	0.000
	Construction cost overrun related risks	-0.045	0.051	-0.044	-0.886	0.038
	Labour Related Risks	-0.016	0.045	-0.019	-0.350	0.028

a. Dependent Variable: Completion of construction project

b. Predictors: (Constant)

The model shows that the combined construction risks (construction time overrun attributable risks, risks attributable to construction cost overrun and labour attributable risks) account for 95.2% (R^2 = 0.952, p <.001) of discrepancy in the outcome (PPP execution). The ANOVA results showed that regression was significant for modeling with F (3, 35) =232.6 being significant statistically (p<0.05).

Further, on evaluating the variables' coefficients, the constant term (B = 39.51, p <.001), construction time overrun related risks (B = -.633, p <.001), construction cost overrun related risks (B = -.045, p = .038) and labour related risks (B = -.016, p =.028) were found to be statistically significantly predict completion. Hence as construction risks increase, completion of construction PPP projects declines. Similarly, Carbonara, Costantino, and Gunnigan (2014) found that endogenous key risks were financial closure risk and cost overruns that were categorized as unacceptable and undesirable, respectively. We see from the combined equation that the three conceptualized construction risks, negatively impact delivery of PPP projects and when all the three risks work in the combination system, the negative effect is greater such that completion is adversely affected.

4.9.2 Test of Hypothesis Four

This subsection tested the hypothesis that there is no significant relationship between combined construction risks snd completion of PPP projects. The null hypothesis was stated as follows: -

> **H_0:** There is no significant relationship between Combined Construction risks and completion of PPP project in Kenya.

Since it was established that the combined construction risks accounted for 95.2% (R^2 = 0.952, F (3, 35) =232.6, p <.001) of the variance in completion of construction

project, this provides basis for rejecting the null hypothesis. As such, it was rejected and concluded that the combined risks on project completion was significant.

4.10 Moderating Influence of Managerial Skills on the Relationship between Construction Risks and Completion of Public Private Partnership Projects

Research objective five investigated the moderating influence of managerial skills on the relationship construction risks and delivery PPPs. Managerial skills were taken as the moderator of the interaction between predictor and outcome. In particular, the study undertook to establish the moderating influence of managerial skills on the effect of construction risks on completion of construction projects.

4.10.1 Moderating Influence of Managerial Skills on the Relationship between Construction Risks and Completion of Public Private Partnership Projects

In measuring moderation influence of Managerial skills, 11 items were modeled into questions on Likert levels. The items captured management practices and skills expected of managers in projects with construction works measuredon a five level. The obtained data was aggregated into frequencies and percent for specific items with mean and their deviations also determined. Outcome is shown in Table 4.15.

Table 4.15: ***Moderating Influence of Managerial Skills on the Relationship between Construction Risks and Completion of PPP Projects***

Statement	NA	R	S	O	VO	Mean	SD
1. I delegate work to people with time to complete tasks	5 12.8%	4 10.3%	9 23.1%	16 41.0%	5 12.8%	3.31	1.22
2. I normally follow up team members when I am certain that their behaviors might impact projects negatively	0 0.0%	0 0.0%	7 17.9%	17 43.6%	15 38.5%	4.21	0.73
3. I make decisions based on careful analyses not gut instinct.	0 0.0%	0 0.0%	0 0.0%	35 89.7%	4 10.3%	4.10	0.31
4. As a manager I need technical skills to be effective	0 0.0%	0 0.0%	15 38.5%	15 38.5%	9 23.1%	3.85	0.78
5. I spend substantial amount of time advising team members what need to done to improve project performance	0 0.0%	0 0.0%	5 12.8%	13 33.3%	21 53.8%	4.41	0.72
6. As I develop teams I put more emphasis on skills that I need most and recruit people with those skills	0 0.0%	0 0.0%	7 17.9%	25 64.1%	7 17.9%	4.00	0.61
7. I motivate team members by tailoring approaches that meet their needs	0 0.0%	0 0.0%	18 46.2%	15 38.5%	6 15.4%	3.69	0.73
8. When team members make mistakes, I update the boss and focus on learning from mistakes	0 0.0%	0 0.0%	19 48.7%	13 33.3%	7 17.9%	3.69	0.77
9. I focus my attention to ensuring that team members understand organizational goals and link them to their individual goals	3 7.7%	2 5.1%	7 17.9%	15 38.5%	12 30.8%	3.79	1.17
10. I talk to individual team members to make sure they remain happy and productive	0 0.0%	0 0.0%	4 10.3%	24 61.5%	11 28.2%	4.18	0.60
11. I always ensure that team members are informed of things going on around them in the organization	0 0.0%	0 0.0%	0 0.0%	32 82.1%	7 17.9%	4.18	0.39
Composite Mean and Standard Deviation						**3.627**	**1.146**

Table 4.15 shows that in the case of the statement "*I delegate work to people with time to complete tasks"* among the participants, 16(41.0%) they did this often, a cumulative

23.1% indicated that they did not consider this or only rarely considered it. Further, a significant 23.1% also indicated that they apportion work to individuals with time to work on them only sometimes and not all the times. Further, a significant 23.1% also indicated that this is done only sometimes and not all the times. The item line mean (Mean = 3.31, SD = 1.22) was lower than the composite mean (Mean = 3.627, SD = 1.146) showing that this was very rare practice among the project leadership.

On the statement that "*I normally follow up team members when I am certain that their behaviors might impact projects negatively"* results showed that among the participants, 17(43.6%) often followed up, 15(38.5%) reported often following up with 7(17.9%) reporting sometimes following up whenever they felt that they behaviors were likely to impact projects negatively. Thus follow up is a practice executed by managers on team team members with behavior possibly negating project execution. Following up was always done when behavior was deemed negative to project as indicated by the item line mean (Mean = 4.21, SD = 0.73) being above composite (Mean = 3.627, SD = 1.146)..

Similarly, on the statement that "*I make decisions based on careful analyses not gut instinct*."results showed that respondents either often 35(89.7%) or very often 10.3% made decisions with reference to analysis not gut instinct. Results showed that participants generally make decisions basing on analysis rather than relying on gut instinctas indicated by the item line mean (Mean = 4.10, SD = 0.31) above composite mean (Mean = 3.627, SD = 1.146). Thus, the managers made decisions based on critical analysis to achieve delivery.

On the statement "*As a manager I need technical skills to be effective"*among participants, 24(61.6%) cumulatively indicating that they did this often while the

remaining 15(38.5%) indicated that they did this only sometimes. The item mean (Mean = 3.85, SD = 0.78) was above composite (Mean = 3.627, SD = 1.146) showing that participants value technical skills to be able to discharge their managerial duties.

Further,on the statement that "*I spend substantial amount of time advising team members what need to done to improve project performance"* among participants, 21(53.8%) indicated that they very often talked with teams members on areas of improvement. Further, 13(33.3%) indicated that they often talked on areas for improvement while the remaining 12.8% indicated that they do this only sometimes. The item mean (Mean = 4.41, SD = 0.72) was above composite (Mean = 3.627, SD = 1.146) which indicates that participants talking to team members on areas for improvement.

Similarly on the statement "*As I develop teams I put more emphasis on skills that I need most and recruit people with those skills"*results showed that within the participants, 32(82%) cumulatively indicated that they often considered skills as they developed teams and even sought people who best fitted their criteria with the other 17.9% indicating that they only did this sometimes. Another attribute of participant was that as they developed teams they considered skills that were needed most and people with those skills.Participants concur with this attribute as the item line mean (Mean = 4.00, SD = 0.61) is significantly above the composite (Mean = 6.627, SD = 1.146).

On the statement that "*I motivate team members by tailoring approaches that meet their needs"* results showed that the most participants 18(46.2%) sometimes motivate. However, 15(38.5%) participants reported often as 15.4% reported doing it very

often. A total of 21(53.9%) participants believe they motivate team members. Thus, team member motivation was generally low with line item mean (Mean = 3.69, SD = 0.73) being marginally above composite (Mean = 3.627, SD = 1.146). Similarly, Mousa (2005) showed that project owners and contractors lacked innovation in risk prevention and mitigation.

Further,on the statement that "*When team members make mistakes, I update the boss and focus on learning from mistakes"* results showed that most participants pointed out 19(48.7%) only doing this sometimes with another 20(51.2%) cumulatively saying that they did this often. This shows that leaders do not consider significant mistakes in the course of their work as lessons learned as indicated by the item line mean (Mean = 3.69, SD = 0.77) which is slightly above composite (Mean = 3.627, SD = 1.146).

Similarly,on the statement *"I focus my attention to ensuring that team members understand organizational goals and link them to their individual goals"r*esults showed that most participants, 15(38.5%) reported often talking to team members and 12(30.8%) doing it very often. Further, 17.9% do it with only 12.8% not taking into this practice. Results showed average interaction with item line mean (Mean = 3.79, SD = 1.17) being above composite (Mean = 3.627, SD = 1.146) showing continuous practice of interaction through discussion among team members. The emerging view from these results is that managers implementing construction projects are aware of the need to discuss goals with members.

On the statement that "*I talk to individual team members to make sure they remain happy and productive"* results showed that most participants 24(61.5%) often did this, 11(28.2%) did it very often while 10.3% only did it sometimes. Comparatively, item

line mean (Mean = 4.18, SD = 0.60) was above composite (Mean = 3.627, SD = 1.146). Through this mechanism of talking to identify problems, emerging challenges are resolved at the appropriate time to enhance efficiency.

Further, regarding statement "*I always ensure that team members are informed of things going on around them in the organization"*results showed that high proportion of participants 32(82.1%) briefing team members oftenly on what's going on around them while the other 17.9% indicated that they did this very often. Briefing team members on the happenings in the surrounding ensures that they are adequately informed of changes and prepared to take them as they come. This was particularly so as indicated by the item line mean (Mean = 4.18, SD = 0.39) which was above the composite mean (Mean = 3.627, SD = 1.146). This improves efficiency and, thus, productivity to enhance project completion as per the requirements. This is because briefing the team members on a regular basis ensures that they are kept abreast of changes in timelines and expectations as they emerge thus are able to adjust work towards the targets.

4.10.2 Testing for Hypothesis Five

This subsection tested the hypothesis that managerial skills significantly moderate the relationship between combined construction risks and completion of construction projects as PPP projects. The null hypothesis was stated as follows: -

> H_0: There is no significant moderating influence of Managerial skills on the relationship between construction risks and completion of Public Private Partnership Projects in Kenya.

So as to investigate whether managerial skills moderate the impact of construction related risks on implementation of PPP, stepwise linear regression was performed. In

step one, PPP completion was designated the dependent variable with construction risks and managerial skills as predictors. In step two, PPP implementation was retained as the outcome while construction risks, managerial skills and the interaction terms between managerial skills and each of the construction risks were the predictors. The interaction terms were determined as products of mean centered vlues of construction risks and managerial skills. The output is shown in Table 4.16.

Table 4.16: ***Moderating Influence of Managerial Skills on the Relationship between Combined Construction Risks and Completion of Public Private Partnership Projects***

Model Summary

Model	R	R^2	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R^2 Change	F Change	df1	df2	Sig. F change
1	.979[a]	.958	.953	.543	.958	192.2	4	34	.000
2	.979[b]	.958	.949	.564	.001	.172	3	31	.014

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	226.4	4	56.59	192.2	.000[b]
	Residual	10.01	34	0.2944		
	Total	236.4	38			
2	Regression	226.5	7	32.36	101.9	.000[c]
	Residual	9.844	31	0.3175		
	Total	236.4	38			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	35.22	2.262		15.572	.000		
	Construction time overrun related risks	-.594	.045	-0.8737	-13.06	.000	.278	3.594
	Construction cost overrun related risks	-.089	.053	-0.0871	-1.675	.003	.460	2.172
	Labour Related Risks	-.004	.043	-0.0054	-.102	.019	.448	2.234
	Managerial skills	.088	.042	0.0895	2.088	.044	.678	1.475
2	(Constant)	35.00	2.506		13.97	.000		
	Construction time overrun related eisks	-.593	.054	-0.8723	-10.94	.000	.211	4.733
	Construction cost overrun related risks	-.087	.058	-0.0854	-1.493	.045	.411	2.435
	Labour Related Risks	-.012	.047	-0.0142	-.247	.006	.408	2.449
	Managerial skills	.095	.047	0.0972	2.034	.015	.588	1.702
	Interaction term time overrun and managerial skills	.007	.024	0.0364	.317	.754	.102	9.820
	Interaction term cost overrun and managerial skills	.005	.019	0.0176	.273	.787	.324	3.082
	Interaction term labour related risks and managerial skills	-.015	.025	-0.0573	-.613	.545	.153	6.518

a. Dependent Variable: Completion of construction project
b. Predictors: (Constant), Managerial skills, Consrtrion cost overrun, Labour Related Risks, Construction time overrun
c. Predictors: (Constant), Managerial skills, Construction cost overrun, Labour Related Risks, Construction time overrun, Interaction term between labour related risks and managerial skills, Interaction term between cost overrun and managerial skills, Interaction term between time overrun and managerial skills

The output in Table 4.16 provides two models with interaction term and without interaction term to gauge moderation. Statistically significant F change ($p < .001$, $p \leq 05$) with $F (2, 36) = 192.2$ ($p < .001$) shown in model and model 2 ($p < .014$, $p \leq .05$) shows that moderation occurs due to managerial skills. The established R^2 change = 0.001 (0.1%) [$F (3, 35) = 101.9$, $p < .001$] which arises from adding interaction effects shows statistically significant moderation.

From test for moderation of individual risks, it was found that managerial skills moderated the effect of construction cost overrun on PPP execution with a significant R^2 change = 0.007 (0.7%) and p = .004. However, there was no moderation when considering construction time overrun with R square change = 0.000 (0.0%) and p = .936 and labour related risks with R^2 change = 0.016 (1.6%) and p = .257. This shows that although managerial skills moderates the interaction of construction risks and PPP implementation, it is mainly significant on the influence of risks attributable to excess costs.

Thus, since moderation effect of the moderator was arrived at (R^2 change = .001; p = .014, $p \leq .05$), this provided grounds for rejecting the null hypothesis; as such, it was rejected and concluded that managerial skills show significant moderation effect on delivery of PPP projects.

CHAPTER FIVE
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides brief summary with reference to discussed findings, conclusions are made leading to recommendations. Areas to be considered in future related research is outline while highliting the major contributionto the body of knowledge.

5.2 Summary of the Findings

The summary of main findings is presented based on the following sub-thematic areas:

5.2.1 Construction Time Overrun Related Risks and Completion of Public Private Partnership Projects

The first objective investigated the influence of construction risks attributable to delays on PPP delivery. The findings were that the supervisory practices do not account for project delays (Mean = 2.00,SD=1.08), the project work plan was adequate contrary to expectation that the plan was inadequate (Mean = 2.28, SD = 1.15), the extent to which delay in preparation and approval of drawings interfered with construction schedule was low (Mean = 2.59, SD = 0.50), incomplete designs were not a cause for delays in commencement and completion of various sections of the project (Mean = 2.62, SD = 0.94) and that scheduling errors were not a cause for contractor delays (Mean = 2.64, SD = 0.78). This items line means were above composite (Mean = 3.141, SD = 0.785).

However, it was found that delays in resolving disputes interfered with construction schedule to a greater extent (Mean = 4.03, SD = 0.93) and that there were also delays

in delivery of materials and equipment which affected the completion of the project (Mean = 4.00, SD = 1.17). Further, there were schedule delays during project construction as a result of inadequate planning (Mean = 3.59, SD= 1.29) as well as design changes (Mean = 3.82,SD =1.12) and the actual design process which took longer than anticipated (Mean = 3.85, SD= 1.27) thus affected the time scheduled for project completion. This items line means were higher than the composite mean (Mean = 3.141, SD = 0.785).

Thus, the study established that there was strong negative relationship (R = -.975; p <.001; p < 0.05) between delay attributable risks and project delivery; and that construction time overrun explained up to 95.1% (p < .001; p < .05) of variance in the completion of construction project. The null hypothesis that *Time overrun related risks do not significantly influence PPP implementation in Kenya,* was rejected; hence, the alternative one that claimed *Time overrun related risks significantly influence PPP implementation in Kenya* was accepted.

5.2.2 Construction Cost Overrun Related Risks and Completion of Public Private Partnership Projects

Second objective found that the contractor was unable to complete certain aspects of the project resulting into outsourcing some services at increased costs (Mean= 3.87, SD = 1.17) with reference to composite (Mean = 3.970, SD = 0.124). Further, emerging tasks during the project affected the timelines leading to increased project cost (Mean = 4.00, SD = 1.05) and that there were changes in design during construction which resulted into additional costs (Mean = 4.18, SD = 1.05). Similarly, design variation resulted in the need for more experts hence raising the overall project costs (Mean = 3.97, SD = 1.14). The study further found that work breakdown

structure during the project necessitated involvement of many sub-contractors leading to increased project cost (Mean = 3.97, SD = 0.99). Overall, the study found that there were costs overrun resulting from delays, design changes, use of sub-contractors as well as emerging tasks (Mean = 3.970 , SD = 0.124).

Findings revealed a strong negative correlation (R^2 = -.682; p <.001; p < 0.05)) which was statistically significant. The implication is that rising budget cots impede PPP project delivery significantly. The study found that construction cost overrun related risks explain up to 46.5% (R square = .465; p < .001; p < .05) of variance in the completion of construction project.

The established relationship was strongly negative for cost attributable risks and PPP implementation. Thus, the null hypothesis that *cost overrun related risks do not significantly influence PPP implementation in Kenya* was rejected, and the alternative one that *cost increase attributable risks significantly influence PPP project implementation in Kenya* was accepted.

5.2.3 Labour related Risks and Completion of Public Private Partnership Projects

For objective three, the study found that some employees and experts assigned specific tasks failed to complete their assignments (Mean = 4.00, SD = 1.15) and that assigning tasks to inexperienced supervisors affected the delivery of the project (Mean = 4.03, SD = 1.14). It found that overtime work aimed at achieving timelines affected the productivity of the labourers thus project quality although moderately (Mean = 3.56, SD = 1.17) and that cases of go slows and job boycotts due to issues of wages and compensation occur (Mean = 3.87, SD = 1.28). Also identified as a labour related risk was the changing labour demands during the project execution which led

to increased wages (Mean = 3.77, SD = 1.09). However, poor work organization in assigning specific responsibilities was not a major labour related risk in the construction of Sondu – Miriu Hydropower project thus did not affect the completion of the project (Mean = 3.05, SD = 1.47). Overall, the study found that labour related risks affected project delivery as indicated by composite mean (Mean = 3.777, SD = 0.373).

A strong negative correlation is established (R = -.729; p <.001; p < 0.05) with statistical significant thus labour related risks explaining up to 53.2% (R square = .532; p < .001; p < .05) of variance in the completion of construction project. With existing strong negative correlation, [r (38) = -0.729; p <.001; p < 0.05] the null was declined and alternative hypothesis *labour related risks do not significantly influence PPP projects delivery in Kenya,* was accepted.

5.2.4 Combined Construction Risks and completion of Public Private Partnership Projects

Fourth objective probed combined construction risks on completion of Sondu-Miriu Hydropower project through PPPs. It was found that the combined construction risks (construction time overrun, construction cost overrun and labour related risks) account for 95.2% (R^2 = 0.952, p <.001) of the variance in project delivery. Variable coefficients being statistically significantly predicting project delivery (p < .05), the equation connecting the variables becomes:

$$Y = 39.51 - 0.633X_1 - 0.045X_2 - 0.16X_3 + \varepsilon$$

With Y being completion of construction project, X_1 is construction time overrun, X_2 is construction cost overrun and X_3 is Labour related risks respectively. Since the study established that the combined construction risks accounted for 95.2% (R^2 =

0.952, F (3, 35) =232.6; p <.001) of the variance in completion of construction project, thus null hypothesis declined.

5.2.5 Moderating influence of Managerial Skills on the Relationship Between Construction Risks and Completion of Public Private Partnership Projects

Regarding objective five, the study found that participants were not keen on identifying staff with most available time when delegating work (Mean = 3.31, SD = 1.22) and motivates their team members rarely (Mean = 3.69, SD = 0.73). Similarly, talking on goals with team members was highly done (Mean = 3.79, SD = 1.17) with follow ups on behavior that would affect clients negatively (Mean = 4.21, SD = 0.73) as well as making decisions based on careful analyses and not gut instinct (Mean = 4.10, SD - 0.31).

Further, the study found that the participants spent time talking with their team about what was right and what needed to be improved (Mean = 4.41, SD = 0.72) and always discussing with members to improve productivity (Mean = 4.18, SD = 0.60). They also brief their team on what's going on around them (Mean = 4.18, SD =0.39). No moderation effect was found on effect of delay attributable risks on project delivery with R^2 change = 0.000 (p = .936; p >.05). However, managerial skills moderated the effect of risks attributed to rising budgets on project delivery [R^2 change = 0.007 (0.7%); p = .004; p <.05] as well as labour related risks (R^2 change = 0.016 (1.6%); p = .257; p >.05) although not statistically significant.

5.3 Conclusions

Consequently for objective one, supervisory practices during project work do not lead to delays in project completion when the project work plan is adequate. Further, the

study concludes that preparation and approval of drawings interfere with construction schedule to low extent just as do incomplete designs whilescheduling errors are not the cause for contractor delays. The study also concludes that delays in resolving disputes interfere with construction schedule to a greater extent while delays in delivery of materials are minimal and with little effect on the completion of the project. However, there were schedule delays which ultimately affected completion of the construction of Sondu – Miriu Hydroelectric power project, which emanate from design changes during construction as well as protracted design period which affects the scheduled completion time. Overall, the study concludes that construction time overrun significantly influences PPP project execution such that as construction time overrun increases, project delivery declines significantly.

Further, outsourcing services result in additional costs in documentation as well as equipment. Similarly, as the tasks emerged during the project execution, additional costs were incurred, thus ultimately resulting in increased project costs. Further, changes in design during construction resulted in additional costs while the need for work breakdown to facilitate completion necessitated the use of more sub-contractors hence increased costs. Overall, the study concludes that costs overrun result from delays, design changes, use of sub-contractors as well as emerging tasks affecting delivery. On the hypothesis, the study concludes that construction cost overrun significantly negatively influences the completion of projects through PPPs with increase in cost attributable risks leading to decline in delivery of PPP projects.

Labour related risks associated in construction included failure by employees and experts to complete assigned tasks, injuries and deaths, poor work organizations, assignment of work to inexperienced sub-contractors and supervisors, changing

labour demands during the project as well as cases of go slow. Construction labour related risks affected the cost, time and quality of work performed in the construction project. Specifically, the study concludes that changing labour demands during the project execution lead to increased wages while some employees and experts assigned specific tasks fail to complete their assignment, whereas in some cases, tasks are assigned to inexperienced supervisors. Further overtime work affects the productivity and quality of work. Overall, correlation was strongly negative between labour related risks and PPP implementation such that as the risks increase, project delivery declines.

Objective four investigated the influence of combined construction risks on delivery of construction projects; the study concludes that combined construction risks viz. construction time and cost overrun and labour related risks significantly influence PPP projects delivery. Specifically, as the construction risks increase, the completion of PPP projects declines.

Lastly managerial skills moderates the influence of construction risks on PPP implementation. Specifically, managerial skills moderates the effect of, rising budgetary costs on implementation of PPPs. However, managerial skills do not moderate how delay attributable costs influence project delivery.

5.4 Recommendation

Outlined recommendation for policy and industry practice:

i. The stakeholders in PPPs should come together at initial stages to ensure that project drawings are made and approved in time to facilitate speed execution of the overall project to avoid unnecessary design changes and reduce time overrun. Similarly, dispute resolution channel should be clearly defined to address emerging disputes between the stakeholders to avoid protracted court cases which delay project execution and result in time overrun.

ii. Project stakeholders should minimize the number of contractors by vetting and prequalifying contractors with capability to deliver the services. This will prevent outsourcing and minimize cost overrun to ensure the project is completed as designed. Moreover, stakeholders should participate fully in the project from design to avoid design changes leading to cost overrun.

iii. More focus should be placed on the identification and recruitment of project staff as well task allocation. The stakeholders should participate in the recruitment of key staff to ensure that they have the required training and expertise for the project. The financier should ensure timely remittance of finances to prevent delays in payments and eliminate boycotts and go-slows, which hamper completion of construction.

iv. It recommends that the Government, as the key employer in PPPs should design and implement effective policies that will minimize if not eliminate construction time overrun related risks, cost overrun related risks and labour related risks. This can be achieved through maintaining a database of contractors, consultants and financers with their performance and project delivery database. Such a system

should be maintained, updated and strictly utilized in selection of project participants so as to ensure successful delivery.

v. Future PPPs involving construction projects need to develop protocol for selection of management team which maximizes production. Thus, the selection module should be developed for the industry with a focus on team management and specific task allocation.

5.5 Suggestion for Further Research

The present study probed the influence of selected three construction risks on PPP projects delivery. Moreover, the study investigated whether managerial skills influence such a relationship. In future investigatigations, the following should be considered:

i. Since the study was conducted as a case study of a single project, which was already completed, a longitudinal study should be conducted to include collecting data progressively from project inception, preliminary studies, execution and handing over.

ii. Similar studies should include different projects designed and achieved through PPPs, not necessarily hydroelectric power projects. This will ensure the representation of diverse views in PPP related projects to facilitate generalization of findings in the use of PPPs to deliver projects.

iii. Future studies should device measurement scales capable of quantifying and ranking completion of projects. It should be noted that the present study relied only on rating of opinion on Likert scale.

5.6 Contribution of the Study to the Body of Knowledge

Based on the study design, the defined objectives and the findings, the study contributes the following aspects to the body of knowledge.

Table 5.1: Contribution of the Study to the Body of Knowledge

Objectives of the study	Contribution to knowledge
1. To assess the extent to which construction time overrun related risks influence completion of Public Private Partnership Project in Kenya.	1. That construction time overrun related risks can be mitigated significantly by involving all stakeholders at the project inception stage in design and approval.
2. To determine the extent to which Construction Cost Overrun related risks influence completion of Public Private Partnership Project in Kenya.	2. That strategic procurement of services and materials by adopting outlined guidelines ensures involvement of competent and efficient staff for quality services which eliminates cost overruns.
3. To examine the extent to which Labour related risks influence the completion of Public Private Partnership Project in Kenya.	3. Failure by construction staff to complete tasks, go slows and boycotts due to delayed payments, site injuries and accidents are some of the most prevalent labour attributable risks affecting PPP delivery. Labour related risks significantly influence PPP implementation.
4. To establish the extent to which combined construction risks influence the completion of Public Private Partnership Project in Kenya.	4. Combined construction risks significantly influence delivery of PPP projects. As the risks increase in magnitude, the completion of projects decline. Thus minimizing the risks, improves completion of the projects.
5. To assess the moderating influence of managerial skill on the relationship between construction risks and the completion of Public Private Partnership Project in Kenya	5. Managerial skills moderate the influence of construction risks on completion of construction projects through PPPs. Specifically, managerial skills moderates the influence of construction cost overrun related risks on completion of PPPs.

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APPENDICES

Appendix I: Letter of Transmittal

Dear Respondent,

My name is Pamela Akinyi Oyieyo, a PhD student at the University of Nairobi. I am carrying out a research project titled: The influence of construction risks on completion of PPP Projects in Kenya, Sondu Miriu Hydroelectric Power Project. I will be working with research assistance. We intend to issue a self-administered questionnaire. Filling of questionnaires is estimated to take 10 to 15 minutes.

Following random selection to take part in this study, I wish to obtain your perception and views on how construction risks impact delivery of PPP projects using the case of Sondu-Miriu Hydropower Project which you participated in. I would be pleased to get your responses to help in the accomplishment of the study. The output of this study is purely for academic purposes. You are free to volunteer and withdraw from the study any time without penalty. Your response will be treated with utmost confidentiality and for the purpose of this study only.

Thank you in advance.

Yours faithfully,

Oyieyo Pamela Akinyi

Date…….

Appendix II: Informed Consent Form

Researcher Name: _____

I am grateful for your acceptance to take part in this research. In this form, the parameters and guidelines for your involment is highlighted. Overall, the study seeks your opinion regarding the research topic.

It is important that you seek clarity on the study parameters and feel free to undertake that. Your views, opinion suggestions are crucial in the subsequent steps of this study.

Information derived from this study will be collated and presented in a report available to the public upon request.

As such, there will be no identification through real name, character and personal identification numbers reported anywhere in the final document. Codes and fictitious identification will adopted throughout.

Overall, the information you provide and your actual participation is voluntary and under no duress. It is your perorogative to choose whether to proceed with the aspects of the study to the end or withdraw from the study at your own discretion at whci point information derived from the previous stages of interview will be discarded.

Your name _____
[Optional]

Appendix III: Questionnaire for Employer, Contractor and Engineer

INSTRUCTIONS

i. Kindly respond to the items honestly and candidly

ii. Mark your opinion with a tick (√)

Section A: Demographic Characteristics of Respondents

1. Which organization do you work for within Sondu Miriu Hydro Power Project?

   Kengen [ ] JICA [ ] Sinohydro/konoike [ ] Nippon Koei [ ]

2. How was your organization involved during the project?

   Employer [ ] Contractor [ ] Engineer [ ] Financier [ ]

3. Duration worked in Sondu-Miriu Hydroelectric power projects?

   1 – 2 years [ ] 8 - 10 year [ ] 3 – 5 years [ ] above 10 Years [ ]

   6 – 8 years [ ]

4. Academic qualification?

   Diploma [ ] Secondary School [ ] Graduate [ ] Postgraduate [ ]

5. What is your professional training?

Administration [ ] Accounting [ ] Engineering [ ]

Finance [ ] Procurement [ ]

Others (Specify)……

SECTION B: CONSTRUCTION TIME OVERRUN RELATED RISKS

This section describes construction time overrun related risks. Please express your opinion on a five level score from strongly disagree to strongly agree.

Statements	1	2	3	4	5
1. Supervisory practices during project work led to delays in project completion					
2. The project work plan was not adequate.					
3. There were delays in delivery of materials and equipment which affected the completion of the project					
4. There were schedule delay during project construction as a result of inadequate planning					
5. Design changes interfered with construction project schedule					
6. Design process took longer than anticipated and this affected the time scheduled for project completion.					
7. Delays in resolving disputes interfered with construction schedule					
8. Delay in preparation and approval of drawings interfered with construction schedule					
9. Incomplete designs led to delays in commencement and completion of various sections of the project					
10. There were Scheduling errors which led to contractor delays					

SECTION C: CONSTRUCTION COST OVERRUN RELATED RISKS

This section describes construction cost overrun related risks. Please express your opinion on a five level score from strongly disagree to strongly agree.

Statement	1	2	3	4	5
1. The contractor was unable to complete certain aspects of the project resulting into outsourcing some services					
2. Emerging tasks during the project affected the timelines leading to increased project cost					
3. The changes in design during construction resulted into additional costs thus raising the overall project cost					
4. Design variation resulted in the need for more experts hence raising the overall project costs.					
5. There were changes in design during the construction project which resulted into cost overrun					
6. Work breakdown structure during the project necessitated the involvement of many sub-contractors leading to increased project cost					

SECTION D: LABOR RELATED RISKS

This section describes construction labour related risks. Please express your opinion on a five level score from strongly disagree to strongly agree.

Statements	1	2	3	4	5
1. Employees and experts assigned specific tasks failed to complete their assignment thus affected completion of the project					
2. Site injuries and deaths occurred during the project which necessitated payouts and compensations to workers					
3. There was poor work organization in assigning specific responsibilities which affected the project completion					
4. Overtime work aimed at achieving timelines affected the productivity of the labourers thus project quality					
5. Assigning tasks to inexperienced supervisor affected the delivery of the project					
6. Changing labour demands during the project execution led to increased wages					
7. There were cases of go slow and job boycotts due to issues of wages and compensation					

SECTION E: COMPLETION OF PUBLIC-PRIVATE PARTNERSHIP PROJECTS

This section describes construction time overrun related risks. Please express your opinion on a five level score from strongly disagree to strongly agree.

Statement	1	2	3	4	5
1. I am satisfied with the overall outcome of the project					
2. I am satisfied with the quality of the work					
3. The project was completed within a reasonable timeframe					
4. During the work, there were no potential safety hazards that were not addressed					
5. The construction project was completed without unnecessary interruptions					
6. The construction project was completed in strict adherence to the safety requirements					

Appendix IV: Managerial Skills Questionnaire

This section describes construction time overrun related risks. Please express your opinion on a five level score from Not at all to very often.

Statement	Not at All	Rarely	Sometimes	Often	Very Often
1 When I delegate work, I give it to whoever has the most time available					
2. I follow up with team members whenever I see that their behavior has a negative impact on clients.					
3 I make decisions following careful analysis, rather than relying on gut instinct.					
4 Technical skills are the most important skills that I need to be an effective manager					
5 I spend time talking with my team about what's going well and what needs improving.					
6 In meetings, I take on the role of moderator/facilitator when necessary, and I help my team reach a better understanding of the issue or reach consensus.					
7 When putting together a team, I consider the skills I need and then I seek people who best fit my criteria.					
8 I try to motivate people within my team by tailoring my approach to motivation to match each individual's needs.					
9 When my team makes a significant mistake, I update my boss on what has happened, and then I think of it as an important lesson learned.					
10 I talk to team members about their individual goals, and I link these to the goals of the entire organization.					
11 I talk with team members as individuals to ensure that they're happy and productive					
12 I brief my team members so that they know what's going on around them in the organization.					

Appendix V: Interview Schedule for Key Informants

1. What challenges do you encounter as a manager during project execution?

2. Were there risks related to time overrun during the implementation of the project?

3. How did time related risks affect the completion of the project?

4. Were there costs related risks encountered during the implementation of the project?

5. What was the construction costs related risks encountered during the project?

6. What was the significance of the costs related risks on the completion of the project?

7. Were there any challenges associated to labour during the project?

8. Which were the labour related risks encountered during the implementation of the project?

9. How did the challenges associated with labour in the project affect the completion of the overall project?

10. What managerial interventions were put in place to mitigate against the labour, time and cost related risks and what was their effect on completion of the project?

Appendix VI: Interview Dates and Duration

Participant	Date	Duration of Interview
Manager 3	19th May, 2018	30 minutes
Manager 2	28th May, 2018	1 hour 10 minutes
Manager 5	11th June, 2018	45 minutes
Manager 4	2nd July, 2018	50 minutes