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EFFECTS OF RISK MANAGEMENT ON PROJECT PERFORMANCE OF ETHIOPIA ELECTRIC POWER: IN CASE OF CENTERAL REGIONS.

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THIS THESIS IS SUBMITTED TO THE GRADUATE SCHOOL OF St. MARRY UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF PROJECT MANAGEMENT (MA).

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Declaration

I Gizachew Gebeyehu, registration number ID.No. SGS/0823/2015A do here by declare that this Thesis is my original work, that all the source I have used or quoted have been indicated and acknowledged as complete references, and that it hasn't been submitted for degree purposes previously.

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Abstract

The main objective of this research was to analysis the effect of risk management on projects performance and how it affects project time performance. Since the problem of the study was lack of completion of project at a given time schedule, this research is conducted mainly to analysis usage of risk management on projects in order to check what should be done to improve projects performance as reflection of effective risk management. The research targeted project managers and other staff related to project management in the company. This research used quantitative method of data collection, it is based on a scheduled questionnaire survey to collect the primary data using purposive sampling of nearly or fully completed projects. Data from respondents by rating on a Likert scale were processed and analyzed through SPSS. The extent of agree/disagree of respondents about research variables was assessed by using the Mean Score (MS). Risk management method is documented, based on questionnaire survey in percentage through tables. Significant factors of the risk were identified by ranking the risk factors based on the response of respondents regarding their probability of occurrence. The objective of studying the impact was achieved through testing using regression analysis between risk management process (risk identification, risk assessment, risk mitigation, risk implementation and risk monitoring) as the independent variables with time schedule as dependent variables. This study showed a positive linear relationship between risk management and project performance. Specifically, effective identification of risk analysis as well as risk mitigation at planning and implementation of a considerable level of stage involve large statistical effect about the performance of project. Findings also revealed that risk management process require a bit of improvement in organizational projects. In addition, the thesis makes a contribution to practice. The findings of this study can assist project managers in improving existing risk mitigation strategies, which will benefit many stakeholders in the Ethiopian Electric Power sector in streamlining the project development process and lowering project risks.

Keywords: *risk management; project performance; project time performance.*

Table of Contents

LIST OF TABLES

LIST OF FIGURES

List of Abbreviation

EEP……..Ethiopian Electric Power

RA …….Risk Assessment

RI…….. Risk Identification

RIM ……Risk Implementation

RM …….Risk Mitigation

RMO ……..Risk Monitoring

OLS ……The ordinary least squares

SPSS…….. …Statistical Package for Social Science

PC……. .Project Completion

PP……..…..… Project Performance

MS…….. Mean score

Chapter One

1.0. Background of the study

1.1. Introduction

Given the variety of organizational roles involved in project management and the associated hazards, risk management is crucial (Ford RC, 1992). Projects typically have significant degrees of uncertainty due to their tight timelines, hazy or insufficient funds, designs that are almost at the edge of what is practical to achieve, and constantly shifting requirements (Kerzner H, 2009). A "measure of the probability and consequence of not achieving a defined project goal" is how project risk is described in this context. Through the identification and ranking of possible risk events, the creation of a reaction plan, and active monitoring throughout project execution, risk management dynamically reduces risk levels.

According to the Project Management Institute (2004), project management, including risk management, is one of the most important aspects of project commissioning. Effective risk management and project success are strongly correlated, according to numerous studies. For instance, time spent on project planning activities will lower risk and increase project success, according to a study by Wang and Gibson (2008). Morris (1998) and Thomas et al. (2008), among other studies, have also demonstrated that while more preparation results in more successful initiatives, insufficient analysis and planning can lead to failed projects. Despite being aware of the significance of risk management, many businesses, according to Akintoye et al. (2003), are still not utilizing proven risk management models and procedures. This runs counter to the industry's efforts to regulate projects more and operate more efficiently in terms of time and money. Some firms do not approach issues with recognized risk management techniques, despite knowing of the risks and their effects.

To address the needs of customers and accomplish organizational objectives, the Ethiopian electric power sector is pursuing a variety of project types, including distribution, transmission, and generation projects. These projects cannot be successfully completed without careful planning, risk identification, risk response, and risk management. To gain a better understanding of how risk management affects project performance across various project types in the Ethiopian electric power sector, a research conducted in the Addis Ababa central region substation is presented in this thesis. Management of risk is a management activity that becomes more important as companies become more global and more competitive. The processes of managing risk involves of a series of steps that define context, analyze, assess, process, control, communicate, and continuously improve decision making. Organizations can prevent unplanned and costly emergencies and more efficiently allocate resources by using risk management. By presenting a quick assessment of the hazards it may encounter, it enhances communication and organizational effectiveness (Pojasek, 2017) Effective project risk management has the potential to significantly improve project performance by addressing various barriers that can obstruct the project's effective completion. In order to obtain improved project performance, (Abednego, 2006) believe that risk in a project should be adequately identified,

managed, and allocated to the relevant parties involved. Explaining how risk management can improve project performance, (Wallace, 2004) recommended developing an effective governance model to better detect and reduce risk associated with the project's internal and external environment, which can lead to improved project performance. They have introduced six dimensions of software project risk that can impact project performance. These include organizational environment risk, user risk, requirement risk, project complexity risk, planning and control risk and team risk. Effective risk assessment and management not only reduces policymakers' uncertainty, but also allows project managers to take focused preventative steps to minimize possible losses caused by such risk factors. Thus, effective management of risks can facilitate project team to experience increased project performance through better identification and management of such risk factors.

Project management there is many factors which can lead the projects to suffer unexpected outcomes, abandoned contracts, time and cost overruns. For instance, the techniques that managing risk have to be done in a systematical way, when it is not well practiced it can delay, overrun cost or fail the project. Tzvi et al(2002) in their research, they showed that due to poor handling of risk, some projects are still suffering and facing cost overruns, delays, disappointing results and unexpected outcomes.

In Ethiopian electric power project performance management is very important because it contributes in all sectors of economy; it is a key pillar for sustainable development. As investments in projects are quite high and the improvement of energy infrastructures, it needs hard work by financiers, researchers, customers, builders, owners, and engineers to attempt to cause the minimum possible risk (Guido et al2016). However, in the world poor risk management leads to challenges of lack of effective project performance. This is putting businesses at a disadvantage and slowing the country's economic progress, therefore better project performance through effective risk management is required. In project management no one can completely eliminate project risks, due to that we can plan for them by including risk management activities in project planning, having activities, backups and extra resources in place that will defend the organization when it is needed improves the situation when anything goes wrong. (Bertrand,2019).

At this time, in Ethiopian electric power there are various project are there and these many types of projects are examples of expensive projects in which governments from various countries invest actively. Generating project, transmitting project and distributing project are some of the project available in Ethiopian electric power for achieving the goals of the organization and achieving the needs of customer. As a result, in order to accomplish the organization's goals and objectives, proper planning, risk identification, risk response, and risk management are essential. This academic research presents the findings of a study conducted in the Addis Ababa central region substation in order to have a better understanding of how risk management influences project performance in various project types.

1.2. Statement of the problem

As part of the Ethiopian government's efforts to improve living conditions and mitigate poverty, enhancing access to electricity is a top national priority. These efforts would also support social services and livelihoods in the rural periphery (Gebre, 2019). Supporting electricity supply is another aspect, or building block of the national decentralization of service delivery, the program object being to expand utility services to the rural periphery. The key aspects of project management are to achieve the objectives, to keep the project within budget, to ensure the quality of the result, to maintain safe working conditions, and to complete the project on time (Zhou et al, 2007).

However, complications (delays) that could be financial performance hits to the project, are common in projects when there are delays in acquiring resources, when delays occur in payment, or when there is a dispute about a contract (Zhou et al, 2007). Ezekiel et al. (2016) determined that how well risk management is undertaken or carried out greatly impacts financial performance. A project's implementation can be affected by a sensitivity to risks that researchers find to be especially high during the early stages of project design (Assaf & Al-Hejji, 2006). Nadi et al. (2018) note the persistent trend of abandoned projects or projects that are completed well behind schedule and with significant cost overruns and the inadequacy of stakeholder engagement in the project's risk management. No project manager, no project sponsor and indeed no project participant wants to see delays, overspending or project failure expected but many continue to believe their initiatives will be successful (Morris & Hough, 1987).

Two of the most important performance criteria for a project will always be its ability to satisfy the stipulations and be presented for accreditation by the relevant authorities (Hamilton, 1996) and to complete the project on-time. The Ethiopian electric power industry, the parent organization under study, has had several project experiences that have faced challenges in meeting these expectations.

Project completion according to intended specifications, project completion within the given budget, and project completion within the promised timeline are all examples of project performance measures. (Hamilton, 1996) have also stated that cost and schedule savings are a fair indicator of project performance when it comes to achieving stakeholders' expectations.

The success of a project is strongly reliant on key indicators such as time taken to complete, meeting the standards set by varies authorities such as the government and county authorities. The current study used completion time as the measures of project performance. There are some risk management practices that have a greater impact on organizational performance than others, such as having a risk management policy in place and incorporating risk management into the definition of organizational goals. These are considered to be the basic risk management practices that have a direct impact on a company's project performance. (Dionne, 2013).

Ethiopian electric power sector is still facing various executed projects that fail to meet their objectives, many projects yet still suffer delay, cost overruns, and even failures which leads the organizations as well the country in various losses and less profitability (ashenafi, 2023). Ethiopian electric power had selected a design for its SCADA system in 2011 and construction was to resume shortly. However, the design was not found to be adequate by the corporation for reasons of an improper airflow system. The corporation then selected MH Engineering from nine local and international consultants for design, supervision and contract administration of EEP's SCADA system complex. The construction was planned to start in October 2016. However, due to delays, construction is expected to begin in January, 2018, and is expected to be completed in three years (36 months). However, the project has failed and terminated due to the time schedule overrun. In addition of this in some substation installation of transformer also not complete as planned time schedule which leads cost overrun and that fail to meet the organizational goals. As instance substation like Sebeta-I, Sebeta-II and Sululta installing transmission line is not connected to the gird system project start but still it is not complete as a planned time schedule. Therefore, in Ethiopian electric power, I look for the well performing projects as reflection of effective risk management, while most of the project managers utilize most of their time figuring out how to meet the objectives of the projects they are carrying out, most of these projects in Ethiopian electric power are not completed within the stipulated time.

1.3. Objective of the study

1.3.1 General objective

The main objective of the study is to analyses the effects of risk management on the project performance in Ethiopia electric power central regions.

1.3.2. Specific objective

- To assess the effectiveness of risk identification techniques used in Ethiopian electric power project in central regions and their influence on project performance.
- To analyze the methods of risk assessment employed in the projects and their impact on decision making and overall project outcomes.
- To investigate the various risk mitigation strategies implemented in project and their effectiveness in reducing project risks and enhancing performance.
- To evaluate how risk management plans are implemented in projects and their correlation with project success metrics such as time and budget adherence.
- To assess the risk monitoring mechanisms in place and their role in ensuring ongoing project performance and adaptability to emerging risks.

1.4. Research questions

- What techniques are currently used for risk identification in Ethiopia electric power project in central regions, and how effective are they?
- How does the risk assessment process influence decision making project management in Ethiopian electric power?
- What risk mitigation strategies are implemented in Ethiopian electric power project how do they impact project performance?
- How are risk management plans implemented projects and what is their correlation with project success metrics such time and budget adherence?
- What risk monitoring mechanisms are in place, and how do they contribute to maintaining project performance and addressing emerging risks?

1.5. Significance of the Study

This study is relevant on several levels. It contributes to the body of knowledge that can improve project performance in the electric power sector in Ethiopia, which is relevant for the advancement of the country and its economy. It is important for the country to develop and electricity is a critical component of socioeconomic development. Furthermore, the research examines the relationship between risk management and project success, specifically looking at time schedule as a key performance criterion. Additionally, local project managers in Ethiopia (Addis Ababa central region) can apply findings to improve current risk mitigation strategies and possibly influence project success, reducing organizational losses. The implications for the study highlight the added value to the body of knowledge; the study has the potential to add value to project management literature.

1.6 Scope of the Study

The study was conducted to analyses the effects of risk management on project performance of Ethiopian electric power. The study analyzed that the usage of risk management on projects performance of EEP with respect to the time schedule given. From the factors that affect project performance the study focused on only time when it is the main indicators and fundamental criteria for success of any project that used to measure the project performance. In analyzing the effects of risk management on project performance innovation at EEP, since the corporation is managed by one rule & regulations, the scope of this study was limited on the project office. The time interval given for the research was starting from July to January 30, 2025 so, data was gathered from. Conceptually, it focused on risk management practices and project performance factors which mainly affect the project performance of the company which align with conventional project management practices in the literature.

1.7. Limitations of the Study

The study faced the following limitations; some participants viewed the information sought as confidential and were hesitant in providing information fearing that competitors might use the information for their own gains. However, the researcher used introductory and authorization letter from the university to assure the participants that the information provided would be used for education purposes only. There were delays in data collection where the respondents were too busy to fill in the research questionnaire. The researcher however, persuaded the respondents by explaining the importance of the research study.

1.8. Organization of the Study

The study has categorized into five chapters. The first chapter provides a brief background to the study, statement of the problem, the research question, Objective of the study, scope, significance of the study, limitation and organization of the study. The second chapter presents review of related literature. The third chapter presents the research methodology in which the research methods, data collection, the sources of data and the methods of data analysis. The forth chapter follows with analysis and discussion of findings. And the last chapter deals with summary of findings, conclusion and recommendations.

Chapter two

2. Literature review

This part clearly discusses on the existing studies which are the most important to this research and provides the basis of this study.

Review of relevant past literatures on the topics analysis of risk management on project performance are:

2.1. Theoretical Review

Theoretical review of the study can be guided by three theory including: - stakeholder's theory, change theory and agency theory.

2.1.1. Stakeholders Theory

Freeman (1984) invented the stakeholder theory as a management tool, and it has evolved through time to have a strong explanatory potential on project performance. Stakeholder theory emphasizes stakeholder interest equilibrium as the primary determinant of business policy. The most potential addition to risk management is the application of implicit contracts theory beyond employment to other contracts, such as sales and financing (Cornell et al, 1987). Consumer confidence in a firm's ability to continue supplying its services in the future can contribute significantly to corporate value in some areas, particularly high-tech and services. The value of these implicit claims, on the other hand, is greatly dependent on the costs of financial difficulty and bankruptcy. Because corporate risk management strategies reduce these estimated costs, the value of the organization grows (Klimczak, 2005). As a result, stakeholder theory offers a fresh perspective on risk management logic. However, it has yet to be put to the test. Only indirect evidence is provided by investigations into the financial distress theory (Smith, 1985). Aobo (2002) analyzes the relationship between a company's aims and the risk management method it employs in his study of the effect of stakeholder theory on risk management. The study revealed an important variance among the two groups of organizations in terms of real risk management decisions, which has an impact on whether the risk management decisions add or subtract value to the company. The theory is suited for the study because it is necessary to include the interdependence of the credit management team in both short and long run profitability estimation, which will raise the profitability levels in an organization and reduce the degree of risk.

2.1.2. Agency Theory

Agency theory developed by Mackling (1994), the authors identified two types of agency conflicts. The first focuses on the conflict between shareholders and managers and the second on the conflicts between equity-holders and debt holders. Conflicts between shareholders and managers arise because managers do not hold

total claims thus; they cannot capture the entire gain from their value maximizing activities. The second type of conflict arises between debt holders and equity holders because debt holders give equity holders an incentive to invest sub optimally. According to the theory, project managers of asset left on their own are expected to act on the best interest of those who have appointed or elected them. This implies that the entire project ought to be carried out in a manner to benefit owners (Lan, 2010). In agency theory terms, the project beneficiaries are principals and project managers are the agents. Therefore, the agents, since they hold power on behalf of the principal, are expected to exercise control for the benefit of the principal by ensuring sufficient returns. According to agency theory, managers should always work in the best interests of the beneficiaries, reducing loss and boosting benefits (wealth generation) to the principal. This theory is important in project management because it emphasizes the importance of considering stakeholder interests in all project management decisions. The study's application of agency theory helps project managers ensure that resources like time, money, people, and materials are used in the citizens'/beneficiaries' best interests.

2.1.3. Theory of Change

The Aspen Institute Roundtable on Community Change developed theory of Change in the 1990s to analyze and analyses extensive network operations. This theory gives a definition of all phases involved to result in a given long-term goal (Harris 2005). A change framework/pathway of change, which is a realistic portrayal of the change process, depicts such a set of associated phases–interchangeably known as results, products, events, or requirements–on a map (Chizea, 2002). A Theory of Change is a thorough description of how and why a desired change is predicted to occur in a specific environment (Andersen, 1996). Its purpose is to close the gap between what a change or program effort accomplishes (its interventions or activities) and how these lead to the desired outcomes (Chizea, 2002). This theory is relevant to the study because it enables construction firms to identify preferred long-term project/goal performance and then work backwards from there to determine all of the conditions (outcomes) that must be in place (and how they are related to one another) for the goals to be achieved (Mintzberg & Waters 1996). This could entail making sure that material, time, financial, and human resources are all used effectively and efficiently.

2.2. Empirical Review

2.2.1. Risk management

There are a variety of strategies and procedures that may be used to help manage the risks in each of these processes. Many companies have become more proactive and conscious of the need of applying analysis in their projects. Similarly, risk management has become a pressing concern. Similarly, risk management has become a topic of conversation in many firms. Risk management, on the other hand, is not typically used in engineering projects (Klemetti, 2006). In reality, throughout the last two decades of the twentieth century, controlling risk became a prominent topic in business writing (Loosemore et al, 2006). The process of

managing risk is a frequently used concept in the field of risk management, and it consists of four key steps: risk identification, evaluation, action, and monitoring (Cooper et al, 2005).

Risk is the future measurement of uncertainty on aims and goals or the possibility of unanticipated consequence with an activity (Laurence, 2013). Managing risk is a systematic technique used to identify risk, to assess risk and to mitigate the identified risk but also risk monitoring and control in order to achieve successfully the risk reduction and their negative impacts (Burgherr & Hirschberg , 2014).

The main benefit of risk management is that it reduces the likelihood of bad project events occurring while increasing the likelihood of good occurrences (Guido et al2016). The benefit of risk management technique is that it allows a project to achieve the highest level of control while also boosting the effectiveness of problem solving. However, it is important to note that only handling risk is not a technique that guarantees success; rather, it is a tool that aids in increasing the likelihood of success. As a result, risk management is a proactive rather than a reactive approach. In order to optimize project performance, effective risk management should be addressed.

Risk management is crucial in the early stages of a project while making decisions on construction methods, site selection, and procurement (Kamalendra & Anja, 2017). (Wang et al, 2004) emphasize that the process of managing risk entails the systematic application of management principles and procedures such as risk detection, risk assessment, risk treatment, and risk monitoring.

Once all of the risks associated with the project have been identified, they must be assessed in order to determine the level of risk and the likelihood of occurrence. The risk mitigation process entails how the identified risks has managed and their negative impact reduced or transferred using various approaches such as avoiding, minimizing, or transferring identified hazards. There are three primary areas of risk in the energy business; the first is related to the price of expenses such as fuel and electricity, which can affect incomes. The second is technical risk, which refers to the unpredictability of investment costs, maintenance, and operation. Finally, it addresses financial risks such as contract risk, interest rate risk, and credit risk (Guido et al, 2016).

During the implementation of projects, internal and external risks are frequently mentioned Market risks and management risks. The majority of the time, they are classified as risks associated with projects. As a result, actions in project management are required to reduce the negative impact of recognized risks on the project. Stakeholders in the project, such as the government, contractors, designers, and clients, must share responsibilities for better risk management. This makes it easier for project managers to deal with recognized hazards in a timely and quality manner (Zhou et al, 2007).

For proper risk management, the risk management team should be made up of people who are experienced and skilled in risk management approach monitoring and enhancement (Loosemoreet al, 2006). Designers, clients, consultants, end users, contractors, and project managers should all be included in the team (Ellis et al, 2004). The contractor's role is accountable for project uncertainties connected with poor productivity due to

some changes, bad treatment of personnel, site section, and delayed payment, among other things. The consultants' job is to deal with the risks associated with bad design, such as design faults, design revisions, and designs that aren't sufficiently defined. Clients are responsible for risks such as inflation, payment delays, fluctuating exchange rates, and decision making due to force majeure (Nnadi et al, 2018).

Effective risk management should be considered in order to improve product performance. Risk management is critical in the early stages of a project to make decisions on building methods, site selection, and procurement issues (Kamalendra & Anjay, 2017). Risk management is fraught with difficulties. To begin with, there is a problem of creativity and development when using risk management systems to effectively mitigate risks related with a given projects. The second area is connected to risk policymakers, where the application of standards in risk management instruments is a challenge. Finally, in order to attract investors, risk management advice in finance and investing is provided (Lee & Zhong, 2015).

According to Schoonwinkel & Fourie (2016), project managers face additional challenges such as a lack of a formal way of assessing project scope (risk impact of change, time, and cost), project modification not being recorded systematically, project modification not being well treated, and a risk management procedure that is not well implemented. However, many practitioners are still unaware of the need of including risk management into the project delivery process (Smith et al, 2006). Despite the fact that some firms are aware of risks and their repercussions, they do not approach them using established risk management strategies.

2.2.2. Effect of Risk management on project performance

Tzvi et al(2002) have conducted a research on risk management, project success and technology uncertainty. They look at how risk management approaches including risk identification, analysis, planning, and trade-off analysis are used, as well as how they are applied differently on many types of projects and their impact on various project success dimensions, based on data gathered on many projects completed in Israel in a several industries. As the results from their research, they ended up by finding that risk management practices are not widely used, were more applicable to high risk projects. They discovered that risk management has the greatest influence on reaching time and budget goals and has the least impact on product performance. More awareness of Application, training, tool development, and risk management are all things that need to be considered and required as a result of their conclusion that risk management is still in its start.

In a similar manner, a research titled "Understanding the Impact of Project Risk Management on Project Performance" was released by (Roque R., 2013). Their research includes a survey of many initiatives in various economic sectors across multiple Brazilian states, ranging in complexity from simple to complicate. Non-probability sampling was employed, as well as a survey based on opinions of respondents. Risk management strategies have a considerable positive impact on project success, according to the data. They've also mentioned how having a risk manager can help a project succeed. They also said that focusing on ambiguities during the project, adopting risk management methodologies, having a thorough understanding of

the business environment, and needing the attention of project managers and risk managers are all critical success factors.

An interesting related study done by Mudau & Pretorius (2009) worked on project control and risk management for project success: A South African case study. The objective of this study was to assess the contribution of control and risk management to project success. It was a qualitative study and descriptive methods have been used. Data was collected by using questionnaire, engineering project management and projects controls departments were involved in the survey.

The collected data was processed and analyzed trough spreadsheet application. The main findings from this study indicated that risk management and project controlling have a significant influence on performance of a project and therefore on the success of the company. They indicated that by strengthening and focusing more on project controlling and risk management methods and processes, the performance of projects should be improved. An additional element was presented by Nnadi et al. (2018), who conducted a study to examine the degree of risk management awareness among Nigerian main contractors.

A descriptive cross-sectional survey design was used in this study, with stratified random sampling used to choose stakeholders. Data was collected using a structured questionnaire and telephone interviews. In comparison to the huge damages caused by risks in the sector, the study found that stakeholder risk management awareness is comparatively low at 57.25 percent. The study also discovered that there is no strong relationship between stakeholder risk management involvement and risk management involvement extent. The strength of the link discovered between stakeholders and risk management participation is quite weak. Within the same line, Assaf & Al-Hejji (2006) indicated that most of the time, the variations during project implementation are a reflection of the unmanaged risks that take place during the initial stages of the project. On other side, Mardiana et al, (2018) the impact of risk management on financial performance was investigated, with excellent corporate governance serving as a moderating element. This study used a sample size of 5 companies in Indonesia. This study found that risk management has a positive significant impact on financial performance. Based on the findings, the researchers indicated that companies need to improve risk management to obtain expected returns by improving the company's financial performance as reflected in risk management. Within the same line, Love et al(2002) in their research using systems dynamics to better understand change and rework in construction project management systems, they found that any modification related to the project due to uncertainties affect significantly project cost and time. Change is thought to have a higher impact on construction performance than rework. When project managers are short on time and resources, they would adjust the design and specifications to avoid rework. According to this study, the amount spent on changes is more than twice as much as the amount spent on rework. 16 In Tanzania, Lyambiko (2012) has conducted a study which was guided by two objectives: To determine the operational risks management practices and financial performance in commercial banks in Tanzania and to identify the sources of operational risks exposures among commercial banks in Tanzania. The study adopted a descriptive research design a target population of 36 licensed commercial banks as at 31st December 2013 with a sample of the 36 commercial banks being analyzed. Secondary data was collected from the financial statements of

commercial banks between 2009 and 2013. A regression model was developed with bank performance being measured by ROA and the independent variables consisting of credit risk, insolvency risk and operational efficiency.

The research findings established that the independent variables had varying degrees of relationship with financial performance of commercial banks. The research confirmed that operational efficiency was positively correlated with the financial performance of commercial banks while credit risk and insolvency risk negatively influenced the financial performance of commercial banks. Within the same line in Nigeria, Adeusi et al(2013) conducted the related research about risk management and financial performance of banks in Nigeria. The focus of this research is on the relationship between risk management methods and bank financial performance in Nigeria. The second source of information was a four-year series of annual reports and financial statements. Risk management difficulties, they said, have an impact not just on project performance, but also on national economic growth and overall company development. The study's final findings revealed a significant link between bank performance and risk management. As an outcome, the authors advised banks to conduct careful risk management in order to safeguard investors' interests.

For the construction as one of the main parts of energy projects, Lawrence (2016) in his research entitled the influence of management risk during project planning phase on performance of construction projects in their country, he indicated that risk management practices at planning stage has impact on project performance. The objective of their research was to investigate the usage of risk management at planning level and the impact of these risk management on cost and schedule of project performance. The experts including consultant, site engineer, designer, project manager, surveyors, contractors and regulatory bodies in 17 Rwanda, as well as key clients with significant investments in the construction industry, were the focus of the research. About the extent of usage of risk management, the researcher indicated that risk management was widely used at 92%, the process was mainly informal and also the construction team members did not study risk management and project management. The findings showed that many projects did not benefit from professional input at planning stage and the impact of identified but unmanaged risks were found to be high in those projects. In terms of project performance, the data revealed that many projects' cost and schedule development processes were inefficient, resulting in incorrect estimations that harmed project performance. After the investigation done by Mervat (2017) on the impact of controlling risk on success of project, it is an empirical investigation in Jordanian ministry of environment. This study ended up with important results where it found a positive significant relationship between risk management components (risk planning, risk analysis, risk response, risk evaluation and review) and project success.

The goal of this research was to determine risk management in the Jordanian Ministry of Environment and its impact on project success. This assessment included 62 environmental initiatives in Jordan's north, center, and south. For data collection on respondent perception, a descriptive analytical technique was utilized, along with a structured questionnaire. In the research conducted by Maylene (2014), key statements were discovered. The research was conducted to determine how important risk analysis is in the project management process. This

article emphasizes the need of risk analysis, as demonstrated throughout the presentation by the organization of a press conference in January 2014.

The findings of this study show that conducting a thorough risk analysis improves the chances of a company's project succeeding. Risk analysis is an important part of the project management process and may be utilized as a success guarantee. This paper underlines that, even if a company has numerous risk mitigation strategies, it must employ them wisely and efficiently throughout the project management process, from risk identification to risk mitigation.

2.2.3. Project Performance

Performance in general has many different context-based definitions. It can be referred to profitability, market standing, and efficiency of operation, cost performance financial performance, nonfinancial performance, time performance, schedule performance and operational performance. Project management is a well-known field that uses a variety of tactics and best practices to keep scope, resources, and progress under control. However, today's difficulties require techniques that take it a step further and address important performance limits. PPM understands these difficulties and provides a framework for understanding project management requirements, establishing effective solutions, and improving project performance across all project activities. Therefore, for the projects performance this study focused mainly on cost and time performance. Project performance is generally seen as combination of three factors made up of quality, cost and time. Project managers need day by day to assess and compare the estimated time with percent completed and the lasting duration of the tasks (Lawrence, 2016). On other side, Lekan and have studied on the main causes of the project time and cost overrun. They found that most of the time lack of funds, poor planning, poor estimations, changes related to work and payment delays are the most significant factors of both project cost and time overruns.

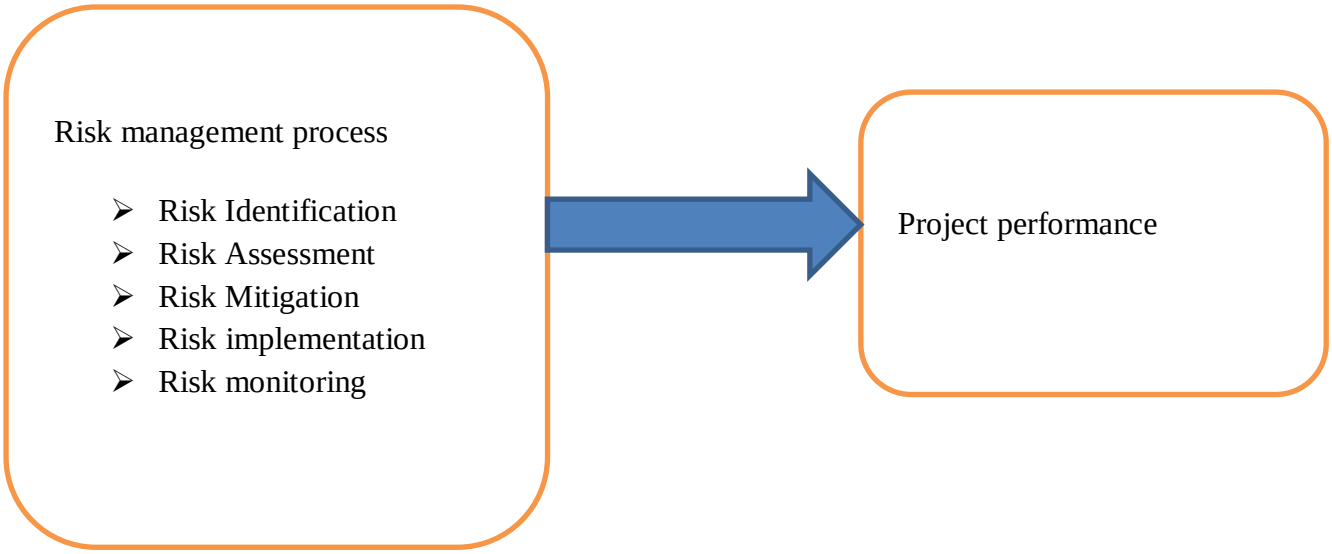
2.2.4. Project time schedule performance

The estimated starting and finishing dates for each activity are part of the project time performance throughout project management. Project managers must analyze and compare the projected time with the % finished and the task's overall duration on a daily basis (Lawrence, 2016). Lekanet al(2017) investigated the primary drivers of project time and cost overruns. They discovered that the most common reasons of project cost and time overruns are a lack of finances, poor planning, bad projections, changes relating to work, and payment delays. Ismail et al (2012) proposed that the primary elements that can affect both time and cost performance be taken into account as well. They discovered that design changes are the most important factor affecting project completion. Another main factor that affects completion of project was discovered to be financial resource management. When it comes to financial performance, delays in resource procurement, payment delays, and contract issues can all have an impact. The critical chain approach compares the quantity of buffer remaining to the amount of buffer required to protect the delivery date, allowing the schedule status to be determined (PMI, 2008).

2.3 Conceptual Framework

The conceptual framework for this study outlines the relationship between the independent and dependent variables. The independent variable is risk management practices, which are measured through the key components of the risk management process: risk identification, risk assessment, risk treatment, risk implementation, and risk monitoring.

The dependent variables are the measures of project performance, with a specific focus on project time schedule performance. Project time is considered a fundamental criterion for project success, as many projects have historically failed due to ineffective management of the project schedule.



Source (Bertrand, 2019)

Figure 1 conceptual frame work of variables

The study has used regression and correlation analysis through SPSS to measure the effect of the risk management practices (independent variables) on project time schedule performance (dependent variable). This analytical approach has determined the strength and significance of the relationships between the risk management process and the ultimate project time outcomes.

2.3.1. Definition of variables

Project performance:

The assessment of project performance can be based on a variety of criteria. To start with, time management may be defined as the completion of projects within the specified timeframe and the management of any potential delays that could result in the failure to meet deadlines. Next, cost management implies keeping to the set budget of the project and reducing cost overruns along with the effective usage of resources. Yet another important factor is the quality of deliverables, which expresses the level to which the results of the project met the anticipated results according to the standards set including the approved technical specifications and compliance with regulators.

Risk

Risk is Uncertainty about the outcome of actions and events (positive opportunities or negative threats). It is a mixture of probability and influence, including the importance of perception.

Risk Identification

The process of identifying and listing project-related concerns is known as risk identification (Ungureanu., A., & Romania., B., 2015). As one of the most essential risk management methods, it aids in determining whether the project is worthwhile, which may improve the project's chances of being completed on time, on budget, and to the desired quality.

Risk Assessment

Risk assessment is the process undertaken to analyze the risk levels and the probability of occurrence (Neil, Frey and Embrocates, 2005). As one of the important risk management practices, it helps to assess if the project is worth taking, this may increase chances to complete the project within planned time, budget, scope and quality.

Risk Mitigation:

Risk mitigation is the process of taking measures in order to reduce identified risks by avoiding those risks, retain, or transfer those (Sokratis, 2009). As one of the important risk management practices, it helps to assess if the project is worth taking, this may increase chances to complete the project within planned time, budget, scope and quality.

Risk monitoring:

Identify risks, analyze and plan processes, monitor specific risks, re-analyze existing risks, monitor risk triggers, and symptoms, and review the implementation of risk response strategies to assess their effectiveness

Time:

In project management, this refers to the starting time and finishing time of different tasks. When the time schedule is well managed, it helps the project managers to complete the estimated time.

2.4. Research gap

Various past studies have attempted to address risk management issues and project performance, with Mulat Abate work being among the most important. Who investigated the causes of construction project delays in Ethiopian electric utility enterprises: the case of the universal electric access program discovered that delays in Ethiopian construction projects influence project performance; in Ethiopian Electric Power Corporation's Gebregziabher Hailu studied that project management approaches in the instance of the Universal Electricity Access program. Laurence (2016) investigated the effects of risk management practices during the project planning phase on project performance in Rwanda, finding that risk management practices during the planning stage had a significant impact on project performance.; Risk management difficulties have an impact not only on project performance but also on national economic growth and general business development, according to Adeusi, Akeke, Adebisi, and Oladunjoye's (2013) study of risk management and financial performance of banks in Nigeria. These studies have made significant contributions to the empirical literature on risk management and project performance.

The current study adds to this literature in several ways. First, even though the variables that have been used are the same, they were used for the projects only related to the banks and constructions and little attention has been paid to the study of the above constructs in projects risk management in Ethiopian electric power. This study addresses this empirical gap and assesses the extent to which risk management practices affect project's performance. Second, from a contextual point of view, this study covers projects performance in a developing country which was not adequately given equal academic attention. Electricity is very important in developing countries because it contributes in all sectors of economy; it is a key pillar for sustainable development. As investments in electricity projects are quite high and the improvement of energy infrastructures needs hard work by financiers, researchers, customers, owners, and engineers to attempt to cause the minimum possible risk (Guido, Juan and Maria 2016). However, many developing countries are still facing the problem of lack of effective project performance due to poor risk management practices, this handicapping business and reducing growth; therefore better project performance through effective risk management is required. While no one can avoid project risks, we may prepare and add risk management activities to project plans, putting place mechanisms, backups and extra resources that will protect the organization when something goes wrong. The thesis has both academic and policy implications. It provides a deep understanding of risk management in projects which has not been given important attention in the academic literature as most studies have a bias on banks and construction industries. The thesis contributes to practice as well. Findings from this study can help the project managers to enhance existing risk mitigation strategy which will be beneficial to the various stakeholders in sector to streamline the project development process and reduce the risks attached to projects.

Chapter three

3.0 Research Methodology

3.1. Introduction

This chapter explains how the research has conducted. It includes background of the study area, research design, research approach, target population, Sampling techniques and Sample Size determination, data source and type, methods of data collection and data analysis.

3.2. Study Area

According to the EEP (2022) the company's history, electric power was introduced to Ethiopia during the Minilik II period in the late 19th century. Around 1898 the first generator was installed to supply electricity to the palace. In addition to the diesel generator set, the first hydraulic power plant, namely Aba Samuel was built on the Akaki River in 1912 by Minilik II to provide supplied electricity to the main and public roads around the palace and small factories. Government efforts to expand electricity supply to the public have been thwarted by the Italian invasion of the country in 1936. Italians a company called Coneil has overcome the distribution system and diesel generator which is belonging to the government. In 1941, a public organization called Enemy property. The government was established and took over the entire production and distribution system electricity of the country. Shewa Electric Power replaced the old company in 1948 and succeeded in strengthen power supply to administrative areas other than Shewa. To representing the whole country, Shewa Electric was replaced by "Ethiopia Electric light and power" in 1955 and the board of directors was appointed by the government oversees the company. Then, after eight months of age, the Ethiopians Electric and electric lighting with the Ethiopian Electric Lighting and Power Supply Authority (EELPA) has been established. The purpose of the name change is for the new company to engage in the production, transmission, interruption and sale of electrical energy to the public and to engage in any other legal business. To adapt to the new developments of the country, according to Regulation No. 24 18/1997, Ethiopia Electric Lighting and Power Supply Authority to be converted into Ethiopia Electricity Corporation (EEPCO) are reorganizing its functions to reflect policy and economic changes. The purpose of EEPCO is to reorganize the old agency on the principles of commercialization and decentralization. In 2013, the Ethiopian Electricity Corporation was split into two separate companies; Ethiopia Electric Utility and Ethiopia Electric Power.

3.3. Research Approaches

Research Methodology To investigate and analyze the effect of risk management on construction project performance; quantitative methodology is to be used in this study within Ethiopian Electric Power (EEP) substations that exist Addis Ababa. The decision to go for a quantitative method is made so as to gather empirical data that can be analyzed using statistics. This approach to research is intended to provide

indisputable conclusions derived from the most trusted and factual information available, gained in a systematic data collection process. The methodology has involved a survey being carried out on amongst project managers, engineers and stakeholders involved in EEP substation projects that are representative of the different business units within ABB to ensure generalizability as broadly as possible across the company.

Structured questionnaire also developed which includes close ended and scaled questions to capture the dimensions of risk management practices on one side, as well project performance metrics mostly cost, time technologies requirement & quality. The survey would be administered online and in-person to ensure the highest response rate. Afterward, the data was refined through sophisticated statistical analysis software like SPSS and analyzed using descriptive statistics to compile overall summaries of the findings along with correlation and regression analyses that relate risk management practices to project performance outcomes.

Although the research is likely to be mainly quantitative, this mean conducted interviews and/or focus groups with a selection of stakeholders to get more detailed opinions about how they perceive risk management practices, as well as using projective techniques to locate potential blind spots that are not previously on the radar from quantitative data.

The reason for the emphasis on quantification is to be able to extract tangible, useful findings from the analysis of metrics. This research has focused on trends and statistical significance in order to provide reliable results for future reference- regarding superior and inferior methodologies of EEP project performance. The research is expected to be conducted using quantitative techniques supplemented by available guidelines from qualitative technique, if need arises further deepening the analysis relevant for the impact of risk management on project performance.

3.4. Research Design

In Addis Ababa region of Substation under Ethiopian electric power, this research design used a descriptive type to assess how risk management can impact the performance in project work. A descriptive research design is one where the researcher has more control over their imperfections of interest using smaller observations (Kothari, 2004). This method is especially helpful to gather the through perception regarding the present status of risk management practices and relation with project performance metrics.

A descriptive survey according to Mugenda (2014) will ascertain correlations by studying samples at a point in time without inferring any cause-effect relationships. Such an approach is particularly apt for this investigation in demonstrating how risk management affects the performance of EEP projects, as it enables deep probing into target questions by systematically gathering information from different project actors. This research design has been beneficial for understanding the impact of risk management practices on project outcomes (cost, time and quality) by considering focusing current state in terms of perception about risks.

In this nutshell, descriptive research design forms the underlying framework of study through which Ethiopian electric Power Substation projects experience and implementing risk management can be captured in a broader sense than ever before.

3.5 Data Source and Type

The researcher uses both quantitative and qualitative type of data. Data gathered from both primary and secondary data sources. The primary data collected through structured questionnaire and interview. Documents like company policy, procedures and manuals related to quality management and customer satisfactions have used as secondary data sources. The structure questionnaire was developed to capture the Effect of Risk Management on Project Performance of Ethiopian Electric power substations in Addis Ababa central regions based on opinions of employees of the company. Questionnaire was designed by the researcher to analyses the effect of risk management on project time performance, and to analyses the project performance of Ethiopian Electric Power. Variables were adapted and modified from the existing literatures to measure the level of customer satisfaction.

To ensure that the measures have the appearance of validity, I would adapt and modify existing literature variables for use in the questionnaire. These would be mostly from the field of customer satisfaction, but I have also draw upon related measures of project effectiveness. These kinds of measures don't usually appear in the kind of organizational documents that I am perusing to provide context for this study (more on that shortly). Here ensures that I understood a kind of study that appearance-wise has the validity of a reliable assessment. Adding the appearance of validity to the kind of study that has the potential to add a lot of value in guiding future actions of EEP makes it worthwhile.

3.6 Data Collection Tools

In order to collect evidence of risk management in project performance in Ethiopian Electric Power, a self-structured questionnaire has design for the research purposes. This instrument would seek to capture the thoughts of groups of respondents, including senior management, finance officers, project managers or coordinators, project supervisors, site engineers, and those involved in the staff of substation projects (Others).

The types of questionnaire items attract the closed ended questionnaire types using a Likert-type scale to indicate the extent to which the respondent either agreed or disagreed with various statements about risk management practices and their effects on project performance. In this way, noted open-ended responses may provide measurable quantities to have an appropriate representation of varied elevations and levels of thoughts across the organization.

In constructing this questionnaire, considerable consideration was given to previous empirical studies in the literature and the questions developed are relevant and consistent with the established benchmarks. Given the

expenses and advantages of a questionnaire survey, it was decided as the best approach for administration to collect and connote risk management practices during projects. Specifically, a survey questionnaire method was selected, as it is commonly less costly, is easy to administer for a larger number of respondents, and generally provides more consistent and reliable quantitative research. The use of a structured methodology with a self-developed survey document attempts to create sufficient data to inform analysis about risk management and project performance.

3.7. Population

The study's target population comprises staff employed at Ethiopian Electric Power, those stationed at the Head Office regional offices, in Addis Ababa and project and planning offices. This encompasses personnel from project offices and technical experts from contractor staff involved in substation projects.

A structured questionnaire has been created to gather insights from these individuals given their roles in understanding how risk management impacts project performance. By involving a range of respondents, with expertise the study aims to gather comprehensive primary data reflecting various perspectives within the organization. This inclusive approach ensures that the findings are shaped by the experiences and viewpoints of those actively involved in implementing risk management practices.

3.8. Sampling

In this thesis all 44 employees were included due to their small number, resulting in a complete census. This approach is particularly relevant in the context of project management within the organization, as the size of 44 represents the entire population of interest in the Ethiopia electric power (EEP) sector. By conducting a census rather than a sample, the researcher ensures comprehensive data collection and analysis, allowing for a more accurate representation of the employees' perceptions and experiences. This method enhances the validity of the findings, as it captures the views of every participant without the potential biases associated with sampling methods.

3.9. Measurement of variables

The measurement of variable for this research can be categorized depending on the dependent variable and independent variable those variables the project performance and risk management respectively.

3.9.1. Independent variables

Risk identification

Evaluate the method using Likert scale (1-5) to assess the extent to which various risk are identified in this research and the structured questions is focuses on the frequency and effectiveness of risk identification process.

Risk assessment

Evaluate the method used for assessing risk, including qualitative and quantitative approaches. A Likert scale can be used to gauge the perceived effectiveness of these methods.

Risk mitigation

Measures the strategies implemented to mitigate risks using Likert scale. Questions can focuses on the variety and effectiveness of these strategies in reducing identified risks.

Risk implementation

Assesse the execution of risk management plans through surveys that ask about adherence to planned activities and processes using Likert scale to evaluate the effectiveness of implementation.

Risk monitoring

Evaluate the mechanisms in place or monitoring risks through the project lifecycle.

3.9.2. Dependent variables

Project performance

The project performance can be measure in time management; cost management, quality and deliverables, stakeholder satisfactions and sustainability those measurements has been used in this thesis paper in the context of Ethiopian electric power in Addis Ababa central regions.

3.9 Data Analysis Method

Analysis of data was done by use of descriptive statistics, which included mean, frequencies and percentages. These have been showed the correlation between the independent variable and dependent variable and the significant P- values, and inferential analyses have been used to make judgments of the probability that an observed difference between groups and studies was dependable one. Quantitative statistical analysis for the questionnaires was done by using SPSS version 20. Pearson's correlation and regression model have been used to assess the relationship between risk management and projects performance. The outcomes are presented trough charts and graphs.

3.9.1 Model Specification

This study has used a single estimated equation entitled linear regression method. The linear regression needs data to find out its estimates, it is powerful and easy to check the assumptions for model like linearity, variance and constant.

$$yi = \beta 0 + \beta 1RIi + \beta 2RAi + \beta 3RMi + \beta 4RIMi + \beta 5RMOi + \varepsilon I \quad \text{.....Equation 1}$$

Yi: stands for dependent variable (project time performance)

β1 – β5: represent the coefficient of the independent variables

Independent variable

RI: Risk Identification

RA: Risk Assessment

RM: Risk Mitigation

RIM: Risk Implementation

RMO: Risk Monitoring Dependent variable

PC: project completion

εI: is the error term assumed to be normally distributed with zero mean and constant variance.

I: related project

3.9.2 Data Validity

Pearson correlation through SPSS has been conducted to test the validity of the questionnaires. Based the output Pearson correlation value, to identify whether an item questionnaire was valid, it has been done by looking at the value of significance for each item. Based on the obtained significant value by sig. (2-tailed) ≤ 0.05, for this reason, the item was valid and meets acceptance standards. Therefore, this research has only considered the valid items of questionnaire with a significant value which ≤ 0.05.

3.9.3. Data Reliability Test

The reliability test ensures the internal consistency of data collection instruments that were used for the collection of data from selected respondents of Electric power substations in Addis Ababa. In order to test the consistency of instrument, reliability analysis has been undertaken and found that the items used in the data collection instrument were reliable to collect consistent information from selected respondents. In this regard, table 3.1 summarizes the result of reliability analysis as follows:

Table 1 Data Reliability Test

Variables	Cronbach's Alpha	N of items
Risk identification	0.813	6
Risk assessment	0.859	6
Risk mitigation	0.875	6
Risk implementation	0.883	6
Risk monitoring	0.802	5
Project completion	0.902	4
Overall	0.864	33

3.10 Ethical Considerations

In doing any research, there is an ethical responsibility to do the work honestly and with integrity. The basic principle of ethical research is to preserve and protect the human dignity and rights of all subjects involved in a research project. In this regard, the researcher assured that the respondents' information is confidential and used only for the study purpose. The researcher also committed to report the research findings in a complete and honest manner, without confusing others about the nature of the results. As a general rule, therefore, the study did not raise any ethical anxiety.

Chapter Four

Results and Discussion

4.1. Introduction

This chapter presents the findings from this study. The results are presented in accordance with sets of questions and items in questionnaire respectively.

4.2. Response rate

In this thesis all 44 employees were included due to their small number, resulting in a complete census. This approach is particularly relevant in the context of project management within the organization, as the size of 44 represents the entire population of interest in the Ethiopia electric power (EEP) sector. By conducting a census rather than a sample, the researcher ensures comprehensive data collection and analysis, allowing for a more accurate representation of the employees' perceptions and experiences. This method enhances the validity of the findings, as it captures the views of every participant without the potential biases associated with sampling methods. Therefore, the response rate is shown in table below.

Table 1 shows the response rate of the questioner

Study Aspect	Details
Total Employees	44
Study Method	Census
Population Represented	Entire population of interest in EEP
Response Rate	100% (All participants included)
Purpose of Census	Ensures comprehensive data collection
Implication	Enhances validity and accuracy of findings

4.3. Demographic characteristics of respondent

Table 2 shows the demographic characteristics of respondents

Characteristic	Category	Frequency	Percent
Gender	Male	31	70.5
	Female	13	29.5
	Total	**44**	**100.0**
Age	21-25	1	2.3
	26-30	2	4.5
	31-35	19	43.2
	36-40	15	34.1
	Above 40	7	15.9
	Total	**44**	**100.0**
Educational Level	Level 5	2	4.5
	Bachelor's	20	45.5
	Master's	21	47.7
	PhD	1	2.3
	Total	**44**	**100.0**
Work Position	Finance Officer	2	4.5
	Project Manager	2	4.5
	Supervisor	16	36.4
	Site Engineer	13	29.5
	Other	11	25.0
	Total	**44**	**100.0**
Work Experience	1-5 Years	4	9.1
	6-10 Years	17	38.6
	11-15 Years	19	43.2
	Above 15 Years	4	9.1
	Total	**44**	**100.0**

4.4. Descriptive analysis of risks management practices

This section collects descriptive statistics on risk identification, risk assessment, risk mitigation, risk implementation, risk monitoring, and project completion time. The measures utilized in descriptive analysis were mean and standard deviation. The mean is a crucial measure; it offers each subject's score during the study, whereas standard deviation represents the difference of individual responses from the mean. The standard deviation shows whether 44 the responses are clustered around the mean or dispersed widely. Identify the major crucial areas in the analysis of risk management on project performance by comparing the acquired standard deviation with the obtained mean of the process. The lower the mean score, the less of an

effect the parameter has on the practices. The mean indicated the average degree to which the sample group of agrees or disagrees on the different statement of dependent and independent variable. The lower the means average shows that the more respondents disagree on the statement. The higher the average, more respondents agree with the statement. On the other hand, the standard deviation indicated that the variation of the observational response from a single sample. According to MondNaib(1994) the mean values were explained for Likert scale ranging from 1 to 5 the interpretation of the mean from 1 to 2.33 low, from 2.34 to 3.66 moderate and above 3.67 High.

4.4.1. Risk management processes

This thesis examines how effective the risk management process is within an organization, using insights from descriptive statistics gathered from a survey of 44 participants. The analysis highlights essential elements of the risk management framework, such as risk monitoring, risk mitigation, risk transfer, and overall implementation practices.

The results show that the organization generally has a solid approach to risk monitoring. Participants rated the company's ability to document risk management cases with an average score of 3.70, indicating a moderate agreement on the effectiveness of this practice, although the standard deviation of 0.823 suggests some variability in opinions about how thorough the documentation is. The organization's support for risk management initiatives also received a mean score of 3.70, reflecting a strong commitment to creating a culture that values risk management, backed by a lower standard deviation of 0.734. However, the adequacy of training in risk management policies received a mean score of 3.66, with a higher standard deviation of 0.888, indicating significant differences in perceptions regarding the training offered. The clarity in defining employees' roles and responsibilities was confirmed with a mean score of 3.70, highlighting the importance of accountability within the risk management framework.

Regarding risk mitigation, participants have a positive view of the organization. The mean score of 3.89 for managing the risk management program indicates strong agreement on the effectiveness of these controls, although the standard deviation of 0.920 points to some differing opinions. The practice of categorizing risks received a favorable mean score of 3.80, suggesting that this approach to prioritizing risks is appreciated, despite a moderate standard deviation of 0.851 indicating varied opinions. Additionally, the company is viewed positively in terms of checking for different types of risks (mean 3.82) and effectively eliminating serious risks (mean 3.80).

4.4.2. Risk Identification

In Table 7, the author examined the effectiveness of risk identification practices applied by the organization based on descriptive statistics from a survey of 44 participants. The results indicate a positive opinion on the risk identification efforts by the company. The organization demonstrated a mean score of 3.70 for responding to any risk such that risks are identified in the internal and external environments. Even though the company

has a proactive attitude concerning the identification of potential risks, the standard deviation of 0.795 suggests variability in the responses. Thus, while majority of those surveyed seemed to agree on the need for this practice, others disagreed on the process of checking the environment and how competent such checks were. In addition, there was a mean rating of 3.80 given for appointing roles and responsibility of risk considerations, suggesting that participants agreed that clarity in the roles was considerably vital. Such a structure is necessary for successful risk identification, allowing all employees to be aware of their unique contribution to the process. With a standard deviation of 0.701, it shows a fairly low degree of variability, lending credence to the fact respondents generally felt confident in the clear roles built into the organization. The participants also rated the company's financial statements for the risk identification analysis at 3.73, indicating that financial data incorporated into the risk identification process was highly regarded by the participants. A standard deviation of 0.727 shows variability in perception concerning how well these statements are being used, which would be very important for input regarding the health of the organization and inherent risk factors.

All in all, it was the mean score of 3.89 for the standardization of risk identification processes that endorsed the firm agreement of respondents toward the effectiveness of the task. The standard deviation of 0.689 indicates higher consensus highlighting that framed guidelines are essential to support risk identification.

Table 7 shows that the descriptive statics of Risk Identification

	N	Minimum	Maximum	Mean	Std. Deviation
The company checks the environment for risk	44	2	5	3.70	.795
The company sets roles and responsibilities for risk identification	44	2	5	3.80	.701
The company uses financial statement for risk identification analysis	44	2	5	3.73	.727
The company sets clear standards to improve risk identification	44	2	5	3.89	.689
The company uses risk rating to classify the risks	44	2	5	3.86	.765
The company develops a risk management	44	2	5	3.91	.676

framework.					
Valid N (list wise)	44				

(Source: SPSS)

4.4.3. Risk Assessment

Table (8) shows that the descriptive statistics provided offer valuable insights into the company's approach to risk assessment, with a sample size of 44 respondents. Each aspect evaluated—ranging from assessing uncertainty of loss to categorizing risks—reveals a generally positive consensus among employees. The mean scores, which range from 3.68 to 3.89, indicate strong agreement with statements regarding the effectiveness of the company's risk management practices. For the highest mean of 3.89 suggests a robust agreement that the company categorizes risks into levels for further analysis, highlighting a structured approach to understanding and managing different risks.

Additionally, respondents express confidence in the company's ability to assess uncertainty of loss, with a mean score of 3.73 and a moderate standard deviation of 0.817, indicating some variability in opinions. The use of qualitative methods is similarly supported, with a mean of 3.75, while quantitative methods received a slightly lower mean of 3.68, accompanied by a higher standard deviation of 0.909. This suggests that while there is agreement on the use of quantitative methods, opinions vary more widely, which may reflect differing experiences among employees

The research analysis also indicated that a strong perception that the company actively reduces risk occurrence (mean of 3.82) and assesses risks on a case-by-case basis (mean of 3.75). Overall, the data illustrates that the company engages in comprehensive risk assessment practices, balancing both qualitative and quantitative approaches. However, the variability in responses, particularly concerning quantitative methods, suggests that further exploration may be beneficial to ensure alignment among employees regarding risk management strategies.

Table 8: Descriptive Statistics in terms of risk Assessment

	N	Minimum	Maximum	Mean	Std. Deviation
The company assesses uncertainty of loss	44	1	5	3.73	.817
The company uses quantitative methods to assess risks	44	1	5	3.68	.909
The company uses qualitative methods	44	2	5	3.75	.781

to assess risks					
The company uses risk assessment for potential loss	44	2	5	3.84	.861
The company reduces risks occurrence	44	2	5	3.82	.843
The company assesses every risk differently.	44	2	5	3.75	.781
The company categorizes risks into levels for further analysis.	44	2	5	3.89	.868
Valid N (list wise)	44				

(Source: SPSS)

4.4.4. Risk Mitigation

Table (9) shows that descriptive statistics concerning risk mitigation practices within the company reveal generally positive perceptions among the 44 participants. The mean score of 3.82 for checking different types of risks indicates that respondents believe the company effectively identifies various potential risks, with a relatively low standard deviation of 0.724, suggesting a consensus on this diligence. Similarly, the mean of 3.80 for eliminating serious risks reflects a strong agreement that the company successfully addresses significant threats, supported by a standard deviation of 0.734that shows consistent views among participants.

Participants rated the company's ability to estimate potential losses with a mean score of 3.89, indicating strong confidence in this area, although the standard deviation of 0.754 suggests some variability in perceptions. However, the mean score of 3.68 for training employees on risk mitigation indicates a slightly lower level of agreement, with a higher standard deviation of 0.829, highlighting a greater diversity of opinions regarding the adequacy of training provided. Furthermore, the mean of 3.59 for risk transfer practices reflects a more moderate perception, with a standard deviation of 0.787, indicating that while some participants feel the company effectively transfers risks, others may have reservations. Lastly, the mean score of 3.80for developing technical regulations to manage claims suggests that participants believe the company implements appropriate measures in this regard, with a standard deviation of 0.734 reinforcing consistent perceptions. Overall, while the company demonstrates strengths in various aspects of risk mitigation, the findings suggest a need for improvement in employee training and risk transfer strategies. Addressing these areas could enhance the company's overall effectiveness in managing and mitigating risks moving forward.

Table 9: Descriptive Statistics in terms of risk mitigation

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
The company checks different types of risks	44	2	5	3.82	.724
The company eliminates terrible/serious risks.	44	2	5	3.80	.734
The company estimates potential losses.	44	2	5	3.89	.754
The company trains its employees on risk mitigation	44	2	5	3.68	.829
The company transfers its risks	44	2	5	3.59	.787
The company develops technical regulations to cover claims.	44	2	5	3.80	.734
Valid N (list wise)	44				

(Source: SPSS)

4.4.5. Risk Management Implementation

Table (10) shows the descriptive statistics regarding risk management implementation reveal generally positive perceptions among the 44 participants. The mean score of 3.70 for documenting risk management cases indicates a consensus that the company effectively maintains records of such cases, although the standard deviation of 0.823 suggests some variability in responses. Similarly, participants rated the company's support for risk management efforts with a mean of 3.70, reflecting a strong sentiment that the company is committed to fostering these initiatives, supported by a relatively consistent standard deviation of 0.734. However, the mean score of 3.66 for providing appropriate training in risk management policies suggests a

slightly lower level of agreement, with a higher standard deviation of 0.888 indicating greater variability in perceptions about the adequacy of training. In terms of defining employees' roles and responsibilities, a mean of 3.70 suggests that participants generally agree that the company provides clarity in this area, with a standard deviation of 0.823 reinforcing the consistency of this view.

The company's ability to control its risk management program received a mean score of 3.89, demonstrating strong agreement among respondents about the effectiveness of these control measures, although the standard deviation of 0.920 indicates some differing opinions. Finally, the practice of categorizing risks into levels received a mean score of 3.80, suggesting that most participants view this practice favorably, with a standard deviation of 0.851 reflecting moderate variability. In summary, while the findings indicate strengths in several areas of risk management implementation, such as documentation, support, and role clarity, the concerns about training suggest an opportunity for improvement. Enhancing training programs could lead to a more uniform understanding and application of risk management practices among employees, ultimately strengthening the company's risk management framewor

Table 10 shows the descriptive statistics regarding risk management implementation

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
The company documents risk management cases	44	2	5	3.70	.823
The company supports risk management efforts	44	2	5	3.70	.734
The company provides appropriate training in risk management policies.	44	2	5	3.66	.888
The company defines employees' roles and responsibilities in risk management.	44	1	5	3.70	.823
The company controls the risk management program.	44	2	5	3.89	.920
The company categorizes risks into levels.	44	2	5	3.80	.851
Valid N (list wise)	44				

(Source: SPSS)

4.4.6. Risk Management Monitoring

Table (11) shows the descriptive statistics for risk management monitoring reveal generally positive perceptions among the participants regarding the company's practices. Participants indicated a mean score of 3.75 for the company's approach to limiting credit based on individual cases, suggesting a general agreement that this practice is effectively implemented. However, the standard deviation of 0.918 indicates moderate variability in responses, implying that while most support this practice, there are differing opinions on its execution. The company's compliance with the maturity ladder chart received a higher mean of 4.05, reflecting strong agreement and a low standard deviation of 0.914, which suggests consistent views among respondents and a high level of confidence in this aspect of risk management.

Regarding the development of a regular reporting system for risk management, a mean score of 3.95 indicates that participants generally recognize the importance of consistent reporting, with a standard deviation of 0.834 reflecting relatively uniform responses. Participants also viewed the company's efforts to monitor international standards positively, with a mean of 3.93. However, the higher standard deviation of 1.087 suggests greater variability in opinions, indicating that perceptions of the company's adherence to these standards differ more significantly among respondents. Finally, the mean score of 3.91 for monitoring customer performance shows a favorable view of this practice, which is crucial for assessing credit risks. Overall, the findings highlight a positive sentiment towards the company's risk management monitoring practices, while also identifying areas, particularly in monitoring international standards, where perceptions may vary and improvements could be made. These insights can inform future enhancements in the company's risk management strategies.

Table 11 shows the descriptive statistics for risk management monitoring

Descriptive Statistics	N	Minimum	Maximum	Mean	Std. Deviation
The company limits credit according to individual cases.	44	2	5	3.75	.918
The company complies with the maturity ladder Chart.	44	2	5	4.05	.914
The company develops a regular reporting system regarding risk management	44	2	5	3.95	.834
The company monitors international standards	44	1	5	3.93	1.087

The company monitors the customer's performance	44	1	5	3.91	.984
Valid N (list wise)	44				

(Source: SPSS)

4.4.7. Project completion

Table (12) shows that The descriptive statistics for project completion reveal several key insights regarding the impact of various risks on timely project delivery, based on responses from 44 participants. The statement Effective risk management contributes to the project completion on time received a mean score of 4.00 indicating a strong consensus among participants that effective risk management is crucial for timely project completion. The standard deviation of 0.915suggests moderate variability in responses, meaning while most participants agree, there are some differing opinions on the extent of this contribution. Next, the statement regarding Risk associated with suppliers (late deliveries, inexperienced suppliers, etc.) affect the estimated project timely completion resulted in a mean of 3.95. This high mean indicates that participants recognize the impact of supplier-related risks on project timelines, though with less emphasis than on risk management itself. The standard deviation of 0.834 suggests relatively consistent perceptions among respondents, implying that the majority agree on the importance of managing supplier risks to prevent delays. Additionally, the statement regarding Risk associated with planning (improper planning) affects the estimated project timely completion scored the highest mean of 4.11. This finding emphasizes that participants view planning risks as particularly significant contributors to project delays, reflecting a strong belief that proper planning is essential for maintaining schedules. The standard deviation of 0.970 indicates some variability in perceptions, suggesting that while many recognize the critical role of planning, there may be differing perspectives on its overall impact.

The statement Delayed payment (financial risk) affects the project timely completion received a mean score of 4.20, which is the highest among all items assessed. This suggests that participants strongly believe that financial risks, particularly related to payment delays, significantly hinder project timelines. The standard deviation of 0.904 indicates moderate agreement among respondents, again showing some variability in the responses but overall strong consensus on the detrimental effects of financial delays. The results indicate that effective risk management, planning, supplier reliability, and financial stability are all viewed as critical factors influencing the timely completion of projects. Among these, financial risks due to delayed payments are perceived as the most impactful, followed closely by planning-related risks. The general agreement across these items suggests that addressing these risk factors is essential for enhancing project performance and ensuring timely delivery. The variability in responses also highlights the need for tailored strategies to manage these risks effectively, considering the diverse perspectives of project stakeholders.

Table 12 shows descriptive statistics for project completion

	N	Minimum	Maximum	Mean	Std. Deviation
Effective risk management contributes to the project completion on time.	44	2	5	4.00	.915
Risk associated with suppliers (late deliveries, inexperienced suppliers, etc.) affect the estimated project timely completion due to late deliveries, when they are not well managed.	44	1	5	3.95	.834
Risk associated with planning (improper planning) affects the estimated project timely completion	44	1	5	4.11	.970
Delayed payment (financial risk) affects the project timely completion	44	1	5	4.20	.904
Valid N (list wise)	44				

(Source: SPSS)

4.4.8. Project Performance

Table (13) shows that project performance, in general, received a favorable perception among the participating 44 members. The managing of risks was highlighted, with statements concerning the ability of the said company to mitigate risks and cover risk claims, both achieving high means of 3.98, which indicated agreement, with moderate variability in responses (standard deviations of 0.952 and 0.876). Overall, participants feel strongly that the company is properly handling the management of risk. For market responsiveness, a mean of 3.84 was scored, which is closer, yet slightly lower, in perception compared to risk management, and a standard deviation of 1.098 was recorded. This captures different opinions on this aspect, which implies that some participants may see the company as being not very responsive to market changes despite a substantial number of others having a more approving opinion.

On local ratings and profitability, the participants agree that company practices strongly contribute, as indicated by means of 3.95 and 4.09, respectively. The minority standard deviations of 0.834 and 0.910 reveal relative consistency amongst opinions regarding each respective subject, for operation profitability in particular got the highest mean score. Customer satisfaction did better with a score of mean 4.00 to reflect high agreement that company practices are satisfying their customers, but customer loyalty was slightly lagging with a mean of 3.86, indicating that while satisfaction was considered strong, there is potential for improvement in customer loyalty. The standard deviations of these perceptions are 1.012 and 1.047. The statement on improving operational performance had a high mean of 4.02 again; there was consensus among all respondents that this area should improve. While the results indicate a fairly strongly viewed company performance on projects, especially with regard to risk management and profitability, market responsiveness and customer loyalty are areas of more variation and would justly benefit from further attention and perhaps improvement.

Table 13 shows the descriptive statistics presented for project performance

Descriptive Statistics	N	Minimum	Maximum	Mean	Std. Deviation
The company decreases risks to minimum levels	44	1	5	3.98	.952
The company covers risk claims as required.	44	2	5	3.98	.876
The company responds to market changes	44	1	5	3.84	1.098
The company practices improve the local rating	44	1	5	3.95	.834
The company practices improve the profitability	44	1	5	4.09	.910
The company practices satisfy its customers.	44	1	5	4.00	1.012
The company gains customer loyalty	44	1	5	3.86	1.047
The company moves to identify and hedge new risks	44	1	5	3.98	1.067

The company improves its operational performance.	44	1	5	4.02	.902
The company practices improve sales	44	1	5	3.95	.888
Valid N (list wise)	44				

(Source: SPSS)

4.5. Correlation analysis

The Pearson correlation coefficient analysis was performed to determine the relationships between the variables under investigation. Risk management techniques employed in the correlation analysis included risk identification, risk assessment, risk mitigation, risk implementation, and subsequent monitoring of risks, correlated with the time performance of the project as shown in table 14. Correlation analysis assesses relationships among variable factors to determine an association's direction and degree. Correlation coefficients fall between -1 and + 1, ranges of -1 indicating inverse relationship (- 1), 0 for uncorrelated variables (0), and + for correlated (+). The sign of the correlation coefficient shows the direction of the relationship. The absolute value shows the strength of the correlation. According to Dancy and Reidy (2004), correlation acts on the dimensions of no correlation from 0 to 0.2, weak correlation from 0.21 to 0.4, moderately correlated from 0.41 to 0.6, a strong correlation from 0.61 to 0.8, and ranging from 0.81 to and above 1 being a perfect or a vastly strong correlation among the variables. The results of the Pearson correlation coefficient analysis for this study are below:

The correlation analysis involves five variables, namely Risk Impact (RI), Risk Assessment (RA), Risk Management (RM), Risk Mitigation Initiatives (RMI), and Risk Management Outcomes (RMO), as reported by the 44 subjects. There was a positive correlation between RI and RA, $r = 0.627$, $p < 0.001$. This indicates that the greater the perception of risk impact, the greater the assessment of risk. RI also showed a moderate correlation with RM, $r = 0.336$, $p = 0.026$. This indicates that for a higher perceived risk impact, better risk management practices are associated. Additionally, RI was found positively correlated with RMI ($r = 0.371$, $p = 0.013$) and RMO ($r = 0.518$, $p < 0.001$). This correlation implies that greater risk impacts are associated with more robust mitigation initiatives and better management outcomes. RA had a strong positive correlation with RM, $r = 0.575$, $p < 0.001$; this indicates that effective risk assessments will be associated with improved risk management practices. RA had also good correlation with RMI($r = 0.440$, $p = 0.003$) and RMO ($r = 0.450$, $p = 0.002$). This further indicates that better risk assessments contribute to more effective mitigation strategies and healthy outcomes. RM had very strong correlation with RMI, $r = 0.696$, $p < 0.001$. This indicates that effective risk management practices are closely tied to risk mitigation initiatives and that RM had a also good correlation with RMO, $r = 0.647$, $p < 0.001$. This means a positive risk management always leads to favorable outcomes. Lastly, strong correlation between RMI and RMO, $r = 0.694$, $p < 0.001$, indicates

that successful mitigation initiatives tend to lead to good risk management outcomes. In summary, all these findings churn around interrelations among risk impact, assessment, management, and mitigation. This brings the organization to consider improvement in risk management process and assessment as an effective push for project-based success.

Table 14: A table shows the Correlation between risk management and project time performance.

Correlations						
		RI	RA	RM	RMI	RMO
RI	Pearson Correlation	1	.627**	.336*	.371*	.518**
	Sig. (2-tailed)		<.001	.026	.013	<.001
	Sum of Squares and Cross-products	318.432	302.273	131.841	169.273	225.955
	Covariance	7.405	7.030	3.066	3.937	5.255
RA	Pearson Correlation	.627**	1	.575**	.440**	.450**
	Sig. (2-tailed)	<.001		<.001	.003	.002
	Sum of Squares and Cross-products	302.273	730.909	341.636	303.909	297.182
	Covariance	7.030	16.998	7.945	7.068	6.911
RM	Pearson Correlation	.336*	.575**	1	.696**	.647**
	Sig. (2-tailed)	.026	<.001		<.001	<.001
	Sum of Squares and Cross-products	131.841	341.636	482.795	390.636	347.227
	Covariance	3.066	7.945	11.228	9.085	8.075
RMI	Pearson Correlation	.371*	.440**	.696**	1	.694**
	Sig. (2-tailed)	.013	.003	<.001		<.001
	Sum of Squares and Cross-products	169.273	303.909	390.636	652.909	433.182
	Covariance	3.937	7.068	9.085	15.184	10.074
RMO	Pearson Correlation	.518**	.450**	.647**	.694**	1
	Sig. (2-tailed)	<.001	.002	<.001	<.001	
	Sum of Squares and Cross-products	225.955	297.182	347.227	433.182	596.636
	Covariance	5.255	6.911	8.075	10.074	13.875

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

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

c. List wise N=44

(Source: SPSS)

The confidence interval of the Pearson correlation coefficients points out the strengths of the relationships among the variables-Risk Impact (RI), Risk Assessment (RA), Risk Management (RM), Risk Mitigation Initiatives (RMI), and Risk Management Outcomes (RMO). For instance, RI correlates very strongly with RA (0.627) and the corresponding confidence interval of [0.399, 0.776] indicates a very high level of confidence that the true correlation falls within this boundary. In the same vein, RI shows weak but significant correlation with RM (0.336) and a confidence interval of [0.040, 0.573]; this is indicative of some uncertainty as the lower bound is close to zero. The correlation between RI and RMI reveals a moderate positive relationship (r = 0.371) and a confidence interval of [0.079, 0.599] adds to this moderate variability in the association. The correlation between RI and RMO is much stronger (0.518) with a confidence interval of [0.256, 0.704], denoting the strength of this relationship.

For RA, the strong correlation with RM (r = 0.575) with a confidence interval of [0.330, 0.742] shows that effective risk assessments should be taken into consideration before the management practices can be fully formed. RA also moderately correlates with RMI (r = 0.440) and RMO (r = 0.450) with confidence intervals of [0.160, 0.649] and [0.172, 0.656], respectively: successful risk assessments yield good mitigation strategies and positive outcomes. RM very strongly correlates with RMI (r = 0.696) and, RMO (r = 0.647) with confidence intervals of [0.497, 0.820] and [0.427, 0.789], respectively. It provides evidence of strong interrelationships in these domains. Finally, also, RMI-RMO correlates strongly (r = 0.694), with a confidence interval of [0.494, 0.819], stressing the marked effect effective risk mitigation initiatives have had on outcomes in overall management. In the whole, these confidence intervals give pictorial representation of the strength and truth behind the relationships across these variables, spotlighting where organizations can improve their risk management practices.

Table 15 Confidence intervals for the Pearson correlation coefficients

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
RI - RA	.627	<.001	.399	.776
RI - RM	.336	.026	.040	.573
RI - RMI	.371	.013	.079	.599
RI - RMO	.518	<.001	.256	.704
RA - RM	.575	<.001	.330	.742
RA - RMI	.440	.003	.160	.649
RA - RMO	.450	.002	.172	.656

RM - RMI	.696	<.001	.497	.820
RM - RMO	.647	<.001	.427	.789
RMI- RMO	.694	<.001	.494	.819

a. Estimation is based on Fisher's r-to-z transformation with bias adjustment.

(Source: SPSS)

4.6. Regression analysis assumptions

In conducting the regression analysis, several key assumptions were evaluated to ensure the validity of the model results. Firstly, the assumption of linearity was assessed by examining scatter plots of the dependent variable against each independent variable. The plots indicated a linear relationship, which was further confirmed through residual plots, demonstrating that the residuals were randomly scattered without any discernible patterns. Next, the independence of observations was considered, which is crucial for the validity of the results. This was ensured through careful study design, and the Durbin-Watson statistic was calculated, yielding a value close to 2, indicating no significant autocorrelation in the residuals.

The assumption of homoscedasticity, which posits that residuals should exhibit constant variance across all levels of the independent variables, was evaluated using residuals versus fitted values plot. This plot revealed a random scatter of residuals, thereby confirming the assumption of equal variance. The normality of residuals was also assessed, utilizing Q-Q plots and histograms, which indicated that the residuals approximated a normal distribution. Additionally, the Shapiro-Wilk test was conducted, resulting in a p-value greater than 0.05, supporting the normality assumption.

4.6.1. Normality test

The Q-Q plots for RI and RA indicate a linear pattern with strong tendencies toward the diagonal reference line. For RI, observed values may be assumed to follow the normal distribution, highlighting the normality of the regression model matching the assumption. Thus, the proximity of points to the line assures that the distributions are almost normal, increasing the robustness of subsequent statistical analysis that relies upon this assumption. Similarly, for RA, the Q-Q plot shows a great deal of similarity, with observed values also extensively conforming to the expected normal values. Again, the same conclusion may be drawn here: residuals for RA are normally distributed given that the necessary postulates of regression analysis are satisfied. All these findings assure improved reliability of the models' results and endorse the availability of parametric statistical methods in the following analyses.

The Q-Q plots for RM and RMI reveal that both sets of important observed values are well fitted along the diagonal reference line, meaning they conform to very close ranges of expected normal distribution, supporting that the residuals for RM and RMI are normally distributed since the normality assumption

sustains subsequent analyses. It indicates very little deviation of the two plots from the reference line validates the underlying assumptions of regression models; therefore, it enhances the reliability of the results.

These findings together points to the essence of checking for normality test in statistical analyses, guaranteeing the effective application of parametric methods for trustworthy interpretations. For PC and PP, the Q-Q plots measure both data points primarily along the diagonal reference line, thus confirming significant conformance to expected normality. In PC, the nearly linear alignment also further suggests that its residuals were indeed normally distributed.

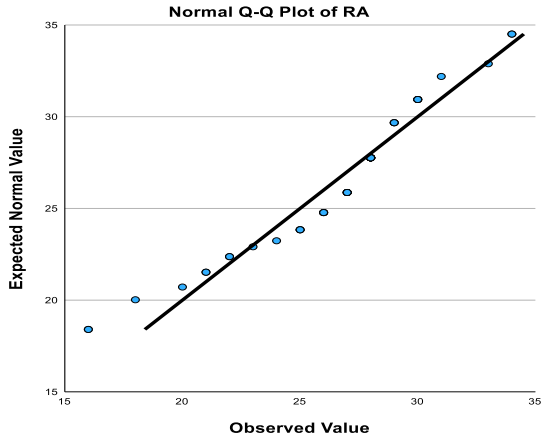


Figure 2 normality test of Figure

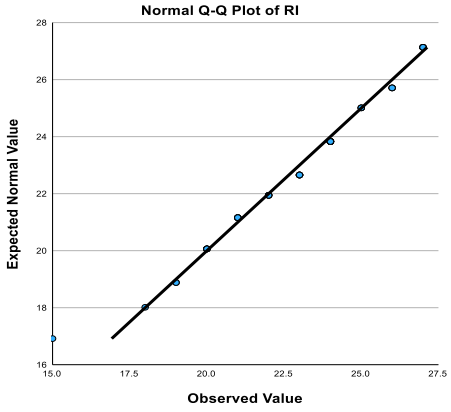


Figure 3 normality test of risk analysis

Source SPSS

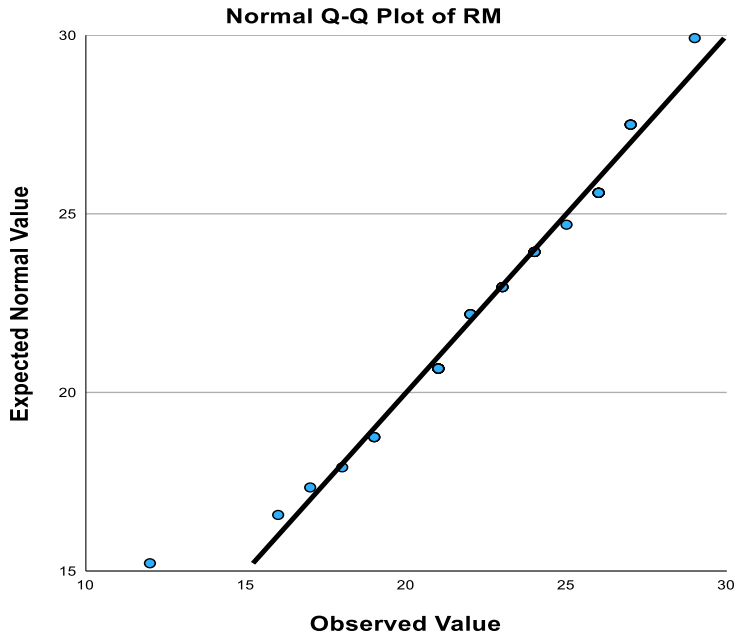


Figure 4 normality test of risk mitigation

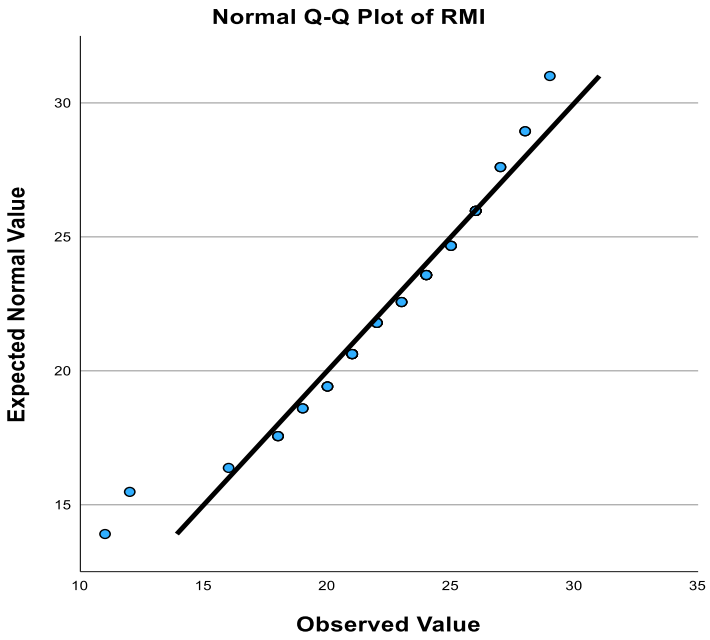


Figure 5 normality test of risk management implementation

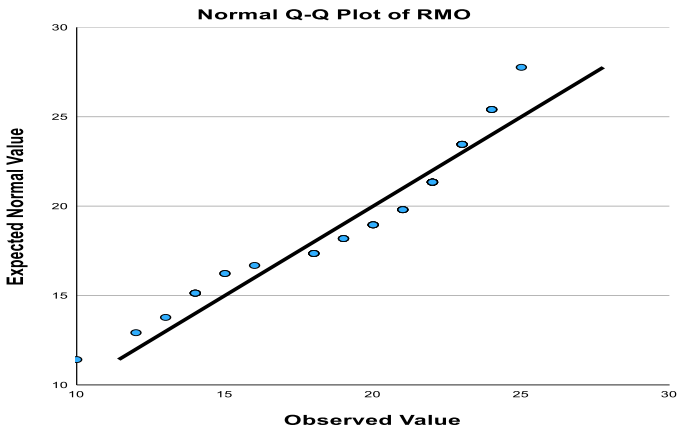


Figure 6 normality test of risk monitoring

Source SPSS

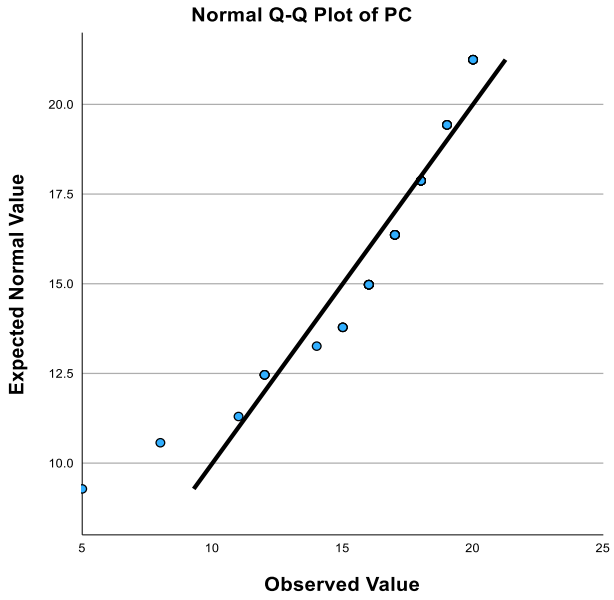


Figure 7 normality test of project completion

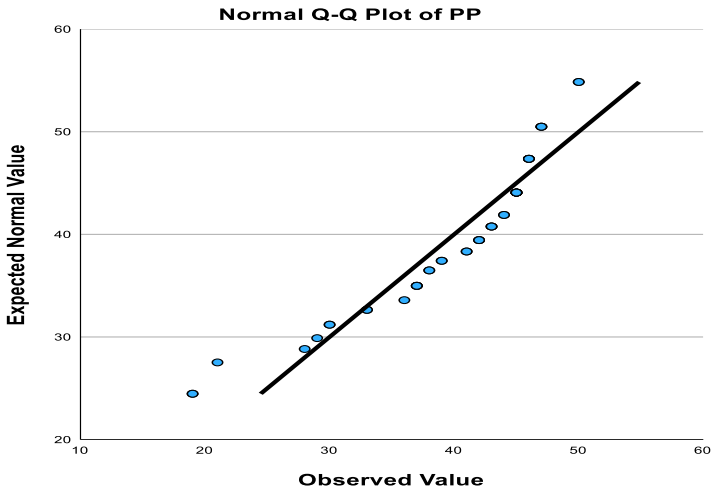


Figure 8 normality test of project performance

4.6.2. Homoscedasticity regression test

The scatterplot reveals an important factor concerning the validity of the regression model: homoscedasticity. Residuals are evenly dispersed across the range of predicted values with a random scatter and no obvious pattern, indicating that the variance of residuals remains constant. Such uniformity lends weight to the model's legitimacy, implying that it does a good job capturing the relationship between independent variables and dependent measures. The observed random scatter begs the inference that the regression model for PP is solid and reliable, hence allowing for the interpretation of results confidently and, really, in favor of parametric statistical methods in further analyses, unlike scenarios where residuals tend to manifest funnel shapes or systematic trends, as would be that violation of the homoscedasticity assumption.

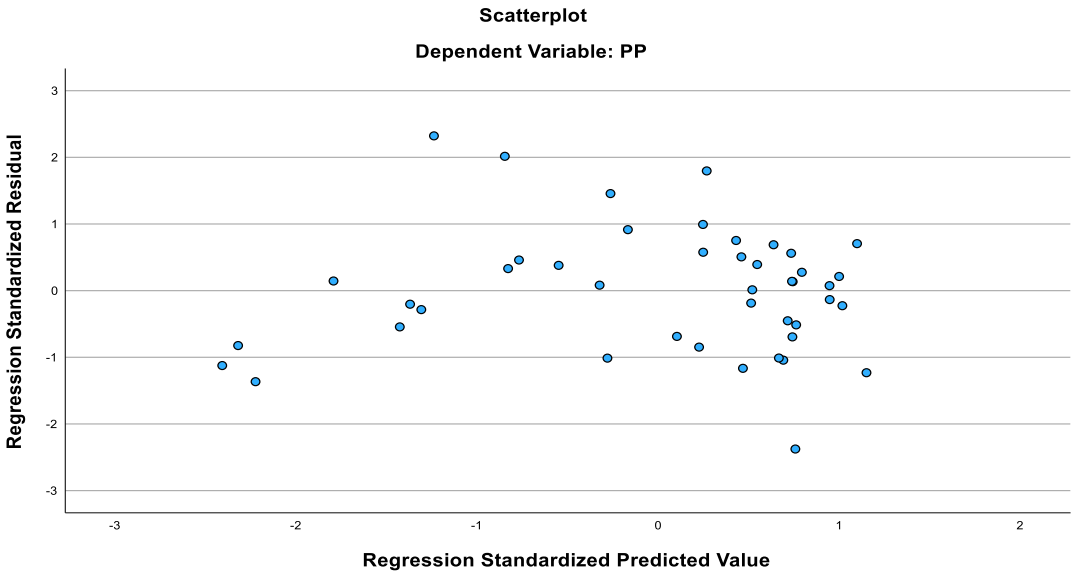


Figure 9 Homoscedasticity regression test

4.7. Regression analysis independent variable with project performance

The regression analysis carried out intended to evaluate the association between several independent variables, RMO (Risk monitoring), RA (Risk assessment), RI (Risk identifications), RMI (Risk implementation), RM (Risk mitigation), and a dependent variable, PP (project Performance). It yielded four separate regression equations, each providing insight into how these variables intermingle and report back to PP.

Model Summary

The R^2 in first model was 0.661; this indicates that 66.1% of the variance in the dependent variable (PP) may be explained by the independent variables included in the model. The adjusted R^2 was 0.617, which is an indicator of the contribution of the number of predictors, even with so many predictors, one meaning that the model maintained considerable explanatory power. The standard error of the estimate was...4.817, indicating the average distance of the observed values from the regression line, which is an extra measure of the accuracy of the model.

The models that followed (Models 2, 3, and 4) really kept to some R^2 values; it's static in terms of how these models predict the variance in PP, notwithstanding the removal of certain variables. In model 2, the variable RI has been excluded, yet the R^2 value stays at 0.661 whereby adjusted...R^2 stayed at 0.626. This

demonstration includes that the model doesn't lose its worth of explanatory ability just because of the exclusion of RI. In Model 3, just after RM had been taken into account, R^2 is brought down a little to 0.660 and adjusted...

R^2 fell to 0.634 probably indicating that RM possibly makes some contribution for the data to fit; however, this contribution is not drastically affecting how other data fit. Finally, Model 4 excluded RMI, reporting each returned an R^2 of 0.634 adjusted R^2...

ANOVA Results

The ANOVA provides additional evidence for the significance of these regression models. The F-value was 14.826, and the corresponding p-value was less than 0.001 for Model 1. This indicates that the model predicts PP significantly better than a model with no predictors. The second, third, and fourth models followed the same pattern: The F-value of Model 2 was 19.020 ($p < 0.001$), Model 3 was 25.881 ($p < 0.001$), and Model 4 was 38.945 ($p < 0.001$). With these F-values statistically significant across all models, one can conclude that the independent variables contribute meaningfully to the explanation of variance in PP when taken together.

Coefficients Analysis

The coefficients table provided important information about the individual contributions of each predictor to PP. In Model 1, RMO was found to have a very strong, significantly ($B = 1.281$, $p < 0.001$) positive effect, suggesting that an increase in RMO would mean an increase in PP. Conversely, RA had a coefficient of 0.364, but it was not found to be significant ($p = 0.179$) in its effect on PP, hence probably considered regarding its effect. Models 2, RM, and RMI also showed non-significant effects on PP and had coefficients of 0.120 ($p = 0.741$) and 0.154 ($p = 0.602$), respectively.

In Model 2--excluding RI--RMO's importance was once again suggested with the coefficient of 1.277 ($p < 0.001$), and so it seemed very likely that this correlated highly with PP. RA's influence stayed insignificant in Model 2, which portrays it to have the potential to influence PP, although minimally. In Model 3, RA gained some significance, seeing a p-value of 0.058 that merits further exploration. In the final model (Model 4), RA proved significant ($B = 0.418$, $p = 0.037$); under the circumstances of the analyses of the models, it is a relevant predictor in the presence of RMO. This becomes a crucial point since it emphasizes how variable interactions and context should be incorporated when interpreting outcomes derived from regression models. The coefficients from RM and RMI showed no significant effects in this model, which highlights the idea that these two do little in investigating PP.

Overall, the regression analysis points to RMO as a stable predictor of PP across models, which aligns too with the other evidence regarding a strong positive relationship. RA's relevance increases and decreases through the models but especially in the last analysis. Raw results show no significant effects of RM, RMI, or RI on PP and so may explain some less specific connections with PP.

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	RMO, RA, RI, RMI, RM[b]	.	Enter
2	.	RI	Backward (criterion: Probability of F-to-remove >= .100).
3	.	RM	Backward (criterion: Probability of F-to-remove >= .100).
4	.	RMI	Backward (criterion: Probability of F-to-remove >= .100).

a. Dependent Variable: PP

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.813[a]	.661	.617	4.817
2	.813[b]	.661	.626	4.755
3	.812[c]	.660	.634	4.703
4	.809[d]	.655	.638	4.678

a. Predictors: (Constant), RMO, RA, RI, RMI, RM

b. Predictors: (Constant), RMO, RA, RMI, RM

c. Predictors: (Constant), RMO, RA, RMI

d. Predictors: (Constant), RMO, RA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1720.136	5	344.027	14.826	<.001[b]
	Residual	881.751	38	23.204		
	Total	2601.886	43			
2	Regression	1720.109	4	430.027	19.020	<.001[c]
	Residual	881.777	39	22.610		
	Total	2601.886	43			
3	Regression	1717.207	3	572.402	25.881	<.001[d]
	Residual	884.679	40	22.117		
	Total	2601.886	43			
4	Regression	1704.610	2	852.305	38.945	<.001[e]
	Residual	897.276	41	21.885		
	Total	2601.886	43			

a. Dependent Variable: PP

b. Predictors: (Constant), RMO, RA, RI, RMI, RM

c. Predictors: (Constant), RMO, RA, RMI, RM

d. Predictors: (Constant), RMO, RA, RMI

e. Predictors: (Constant), RMO, RA

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.939	7.108		-.132	.896
	RI	-.013	.383	-.005	-.034	.973
	RA	.364	.266	.193	1.369	.179
	RM	.120	.359	.052	.333	.741
	RMI	.154	.293	.077	.526	.602
	RMO	1.281	.314	.613	4.072	<.001
2	(Constant)	-1.089	5.510		-.198	.844
	RA	.359	.217	.190	1.658	.105
	RM	.123	.343	.053	.358	.722
	RMI	.154	.289	.077	.533	.597
	RMO	1.277	.287	.611	4.452	<.001
3	(Constant)	-.555	5.246		-.106	.916
	RA	.388	.199	.206	1.954	.058

	RMI	.197	.261	.099	.755	.455
	RMO	1.303	.274	.624	4.747	<.001
4	(Constant)	.568	5.004		.114	.910
	RA	.418	.194	.222	2.158	.037
	RMO	1.431	.214	.685	6.671	<.001

a. Dependent Variable: PP

Excluded Variables

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
2	RI	-.005[b]	-.034	.973	-.006	.497
3	RI	-.016[c]	-.125	.901	-.020	.532
	RM	.053[c]	.358	.722	.057	.399
4	RI	-.025[d]	-.200	.843	-.032	.537
	RM	.085[d]	.640	.526	.101	.480
	RMI	.099[d]	.755	.455	.118	.498

a. Dependent Variable: PP

b. Predictors in the Model: (Constant), RMO, RA, RMI, RM

c. Predictors in the Model: (Constant), RMO, RA, RMI

d. Predictors in the Model: (Constant), RMO, RA

4.8. Regression analysis independent variable with project completion

The regression analysis consisted of 44 observation data rows. The imputed values were performed based on user-defined methods catering to particular missing values. Four regression analyses were conducted wherein the backward elimination technique or backward selection of variables based on their statistical significance (p-values) was directed. The first model, Model 1 had five independent variables: RMO (Resource Management Optimization), RA (Resource Allocation), RI (Resource Investment), RMI (Resource Management Index), RM (Resource Maintenance). In model 2, RM was excluded; in model 3, RI was out; and in Model 4, RMI was removed accordingly.

Model of summary

The summary results show different amounts of explanatory power. First, Model 1, with R equals 0.576; R squared equals 0.332; and the adjusted R equals 0.244, indicates a 33.2% explanation of the variance of the dependent variable, which is PC (Performance Criterion). Therefore this is moderately good fitting. The Model decline persisted in explanatory power at a statistical significance wherein R equaled 0.574; R squared equaled 0.329; and the adjusted R-square is 0.260though remaining a fairly strong fit. Model 3 also added

variance explained with R = 0.568; R squared equal 0.322; and an adjusted R squared of 0.271. Model 4 did account for 31.3% of the explained variance of PC and had R = 0.560; R squared equal 0.313; and the adjusted R squared of 0.280.

ANOVA

The ANOVA results across all models confirm their predictive significance. Model 1 had an F-statistic of 3.773 ($p = 0.007$), Model 2 reported $F(4, 39) = 4.783$ ($p = 0.003$), Model 3 showed $F(3, 40) = 6.336$ ($p = 0.001$), and Model 4 achieved an F-value of 9.361 ($p < 0.001$). These F-values indicate that each model significantly predicts the dependent variable PC.

Coefficient reveals

A detailed examination of the coefficients reveals the individual contributions of the independent variables to PC. In Model 1, none of the predictors reached statistical significance, with RMO showing a positive coefficient ($B = 0.254$, $p = 0.169$), but remaining non-significant. As the models progressed, RA approached significance in Model 2 ($B = 0.255$, $p = 0.068$) and was significant in Model 4 ($B = 0.226$, $p = 0.050$). RMO also became significant in Model 4, with a coefficient of $B = 0.311$ and $p = 0.016$, indicating a strong positive effect on performance.

In general the thesis analysis highlights RMO and RA as significant predictors of PC, particularly evident in Model 4, where both variables demonstrated statistically significant coefficients. The positive impact of RMO on performance becomes more pronounced as other variables are removed from the model. While other predictors did not show significant effects, the findings underscore the importance of effective resource management and allocation in enhancing performance outcomes. This analysis suggests avenues for further research and practical applications in resource optimization strategies, emphasizing the critical role of these factors in achieving improved performance criteria.

Model	Variables Entered	Variables Removed	Method
1	RMO, RA, RI, RMI, RM[b]	.	Enter
2	.	RM	Backward (criterion: Probability of F-to-remove >= .100).
3	.	RI	Backward (criterion: Probability of F-to-remove >= .100).
4	.	RMI	Backward (criterion: Probability of F-to-remove >= .100).

a. Dependent Variable: PC

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.576[a]	.332	.244	2.771
2	.574[b]	.329	.260	2.741
3	.568[c]	.322	.271	2.721
4	.560[d]	.313	.280	2.704

a. Predictors: (Constant), RMO, RA, RI, RMI, RM

b. Predictors: (Constant), RMO, RA, RI, RMI

c. Predictors: (Constant), RMO, RA, RMI

d. Predictors: (Constant), RMO, RA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	144.897	5	28.979	3.773	.007[b]
	Residual	291.831	38	7.680		
	Total	436.727	43			
2	Regression	143.725	4	35.931	4.783	.003[c]
	Residual	293.002	39	7.513		
	Total	436.727	43			
3	Regression	140.680	3	46.893	6.336	.001[d]
	Residual	296.048	40	7.401		
	Total	436.727	43			
4	Regression	136.905	2	68.453	9.361	<.001[e]
	Residual	299.822	41	7.313		
	Total	436.727	43			

a. Dependent Variable: PC

b. Predictors: (Constant), RMO, RA, RI, RMI, RM

c. Predictors: (Constant), RMO, RA, RI, RMI

d. Predictors: (Constant), RMO, RA, RMI

e. Predictors: (Constant), RMO, RA

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4.403	4.089		1.077	.288
	RI	-.112	.220	-.096	-.508	.614
	RA	.228	.153	.295	1.488	.145
	RM	.081	.207	.085	.391	.698
	RMI	.072	.169	.088	.425	.674
	RMO	.254	.181	.297	1.403	.169
2	(Constant)	4.985	3.767		1.323	.193
	RI	-.134	.211	-.114	-.637	.528
	RA	.255	.136	.329	1.875	.068
	RMI	.098	.153	.120	.642	.525
	RMO	.277	.169	.323	1.634	.110
3	(Constant)	3.585	3.035		1.181	.245

	RA	.209	.115	.271	1.822	.076
	RMI	.108	.151	.132	.714	.479
	RMO	.241	.159	.282	1.520	.136
4	(Constant)	4.199	2.893		1.452	.154
	RA	.226	.112	.292	2.015	.050
	RMO	.311	.124	.364	2.512	.016

a. Dependent Variable: PC

Excluded Variables

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
2	RM	.085[b]	.391	.698	.063	.373
3	RM	.113[c]	.544	.589	.087	.399
	RI	-.114[c]	-.637	.528	-.101	.532
4	RM	.149[d]	.796	.431	.125	.480
	RI	-.126[d]	-.709	.482	-.111	.537
	RMI	.132[d]	.714	.479	.112	.498

a. Dependent Variable: PC

b. Predictors in the Model: (Constant), RMO, RA, RI, RMI

c. Predictors in the Model: (Constant), RMO, RA, RMI

d. Predictors in the Model: (Constant), RMO, RA

4.9. Discussion

Here, it is observed that the thesis attempted to show positive evidence based on the regression analyses that risk management processes involving risk identification, assessment, mitigation, implementation, and monitoring are positively associated with project performance dimension indicators in terms of project timely completion and success. That effective risk identification and assessment stand out as crucial elements supports Wang and Gibson's (2008) conclusion, wherein comprehensive planning alleviates uncertainties and increases the probability of success. In addition, the finding that a potent risk mitigation strategy enhances project performance supported Akintoye et al. (2003) and Wallace (2004), who proposed that advancing risk management leads to fewer delays and a better level of governance. Continuous monitoring and implementation of risk management practices were confirmed to be critical, in keeping with Burgherr & Hirschberg (2014), who probably recognized that a project must adapt to unforeseeable circumstances throughout its lifecycle on a continuing basis.

At the same time, this gives additional, reasonable insight to the pre-existing risk management discourse in the Ethiopian Electric Power's literature, which supports Nnadi et al.'s (2018) argument that most failures intersect at this point due to a lack of stakeholder engagement in risk management since this calls for a boost in risk processes in engagement. Besides, the organizational constraints mentioned in the thesis are light reflection of Morris and Hough's (1987) finding that few organizations manage to integrate risk management into the culture of their organizations, which results in missed opportunities for project improvement.

Practically, this implies that Ethiopian Electric Power must embrace structured risk management through investment in risk-training programs for project managers, engagement of stakeholders in risky processes, and the development of comprehensive risk management practices synonymous with international best practices. Finally, regression results show effective risk management as critical to project performance and the correction of risks that now exist and hinder successful project implementation not only on Electric Power but at large.

Chapter Five

Summary, Conclusion and Recommendations

5.1. Introduction

The discussions on the obtained results from this study are presented in this chapter; it includes the conclusions and recommendations within the line with the research's objectives. The objective of the study was to analysis the effect of risk management on projects performance, mainly in time performance. This study has also investigated how risk management practices are related to the project's performance.

5.2. Summary

The study aimed to investigate the effect of risk management on project performance of Ethiopian electric power. The study specific objectives were determining the effect of risk management process on performance of projects in Ethiopian electric power. Regarding the various risk management practices employed by insurers, the study shows that risk mitigation contributes significantly to the project performance of Ethiopian Electric power followed by risk monitoring, risk implementation, risk identification, and risk assessment in that order. This conclusion is consistent with the practice that all risk management efforts reduce the risks facing ranked last in terms of its impact on project performance can be interpreted as meaning that organizations cannot identify and implement risk, but always have ways to mitigate risk. If these measures are properly evaluated, businesses can benefit from improving project performance. However, this result is not consistent with other studies, since the majority is showing that risk monitoring should ideally be the one effort of management to complete the risk management practices since they should monitor and control what they are facing before or after implement risks. This inconsistent could be a result of some dimensions, such as the small sample size and the fact that most managers were from the same company.

5.2.1 Risk identification

The thesis evaluates the effectiveness of risk identification practices within an organization based on a survey of 44 participants, revealing a generally positive perception of these efforts. Participants rated the company's ability to check the environment for risks with a mean score of 3.70, indicating a favorable view of its proactive measures, although the standard deviation of 0.795 suggests some variability in opinions about the thoroughness of these checks. Additionally, the clarity of roles and responsibilities for risk identification received a mean score of 3.80, reflecting strong consensus on their importance, while the integration of financial statements into the process was valued, with a mean score of 3.73 and a standard deviation of 0.727 highlighting varying perceptions of effectiveness.

Furthermore, the establishment of clear standards for enhancing risk identification garnered a mean score of 3.89, indicating strong agreement among participants and a low standard deviation of 0.689, which underscores the significance of structured guidelines. The practice of using risk ratings to classify risks received a mean score of 3.86, suggesting a positive perception despite moderate variability (standard deviation of 0.765). Lastly, the development of a comprehensive risk management framework was rated the highest at 3.91, indicating that participants believe it fosters a systematic approach to risk management, supported by a standard deviation of 0.676 that reflects consistent perceptions. Overall, the findings highlight strengths and areas for improvement in the organization's risk identification practices. Managers should be encouraged to continuously identify potential risks. Known risks are those that can be analyzed; by identifying who controls these risks and identifying risk performance, triggers and contingency plans to mitigate or mitigate impacts, certain risks can be positively identified and must be managed. If the risk-reward is balanced with the possible consequences, managers can simply accept the risk. Unknown risks are risks that have not yet been identified; because unknown risks cannot be actively managed, they can often be addressed by assigning a general level of emergency response in general and managing a reasonable level of unknown risks.

5.2.2 Risk Assessment

The risk assessment process begins with the identification, analysis, and assessment of risks, recording the results of the assessment and creating a risk record to record all control and mitigation measures. The thesis section on risk assessment evaluates the company's practices through a survey of 44 respondents, revealing a generally positive consensus among employees regarding its risk management strategies. Mean scores for various aspects of risk assessment range from 3.68 to 3.89, indicating strong agreement on the effectiveness of these practices. Notably, the highest mean score of 3.89 reflects robust agreement that the company categorizes risks into levels for further analysis, demonstrating a structured approach. Respondents also expressed confidence in the company's ability to assess uncertainty of loss, with a mean score of 3.73, although the standard deviation of 0.817 suggests some variability in opinions.

The analysis highlights that the company actively reduces risk occurrence, with a mean score of 3.82, and assesses risks on a case-by-case basis, scoring 3.75. While there is strong support for the use of qualitative assessment methods (mean of 3.75), quantitative methods received a slightly lower score of 3.68, with a higher standard deviation of 0.909, indicating more varied opinions among employees. Overall, the data illustrates a balanced approach to risk assessment that incorporates both qualitative and quantitative methods. However, the variability in responses, particularly regarding quantitative methods, suggests that further exploration may be beneficial to achieve alignment among employees on risk management strategies. Top risk management reviews the registry to assess the costs and resources required to implement the proposed control and mitigation measures. Because risk management is an ongoing process, implementation of the risk management process begins with senior management approval. It is important to document and document

each step of the process, send notes to the board through senior management, and make the necessary adjustments to improve and improve the risk management process.

5.2.3 Risk mitigation

Risk mitigation ranked the highest for the overall study, where Beta was the highest at (0.560), this indicates that for each t-value (2.106), the organizational performance was increased by (0.560). This means that mitigation risks are taken very high in the insurance companies, they have a mechanism to eliminate terrible or serious risks when signing, insurance contracts very high at (3.64) level and have mechanism for estimating & calculating potential losses at level of (3.45) respectively. This is very important because they have the right measures to mitigate risks when estimating and eliminating terrible risks. Mitigation strategies define measures that can mitigate or eliminate risks before they occur. Risk includes mitigation activities that attempt to balance the probability and severity of the risk with the profitability of the mitigation strategy. It is necessary to identify risk factors that indicate that mitigation strategies are no longer effective, and contingency plans must be implemented.

5.2.4 Risk Implementation

In most cases, the implementation of risk management involves determining risk thresholds, identifying risk factors, planning mitigation strategies and developing contingency plans. In this study the risk implementation increased for each unit and time performance decreased by 34.2% since the value of beta is negative. Most managers agreed that risk management efforts are supported by senior management, documents risk management cases, and employees have received appropriate training on the company's risk management policies the company categorizes risks into levels with a mean of (3.41), (309), (3.0) respectively. This is beneficial for companies because not all companies have the technical capabilities to implement and manage the risks they face.

5.2.5 Risk Monitoring

Based on the value of beta risk monitoring is the second highest next to risk mitigation. Answers from respondents for risk monitoring were relatively high. Mostly, managers agreed on monitors the customer’s performance for the highest mean at (3.05), monitors international standards for the highest mean (2.91), develops a regular reporting system regarding risk 46 management at mean value of (2.86), the company limits credit according to individual cases at mean value of (2.77) and the company complies with the maturity ladder Chart at mean of (2.73) respectively. By monitoring risk, managers can make changes to their plan to address project changes that may change the level of risk. If the risk/impact and/or risk do decrease, the risk may be a candidate for retirement or closure. In the event of a risk, certain contingency plans reduce the impact of risk on organizational performance.

5.2.1. Analysis of the effectiveness of the risk management on projects performance

After analyzing bivariate regression, it was found that there is a positive impact on risk management practices on organizational project performance. Risk management practices can help managers achieve their goals and improve organizational performance. Thus, for Ethiopian Electric Power, risk management practices have a positive impact on project performance. Companies can predict potential losses and manage risk well. However, if the company can implement and manage the potential losses, the mitigations used will be more appropriate and the company has been benefited more from risk management efforts. For better risk management, skilled personnel in charge of risk management is needed as Roque and Marly (2013) indicated that the existence of project risk manager can bring positive effect on project performance. Most of the project managers are engineers and they do not get sufficient regular trainings about risk management. However, the trained engineers and skilled consultants have better performance regarding cost, time, functionality, communication, cost and time management (Laurence, 2016). Therefore, it is very important to have a risk manager assigned in companies for a specialized professional to deal with risk management activities. Based on the case of EEP, most of the time various delays and cost overruns are due to: First, are the long procedures of availing plots where the availability of construction plot used to take long time and delay the whole project. This factor generally is related to unmanaged risks associated to the site selection. Second is the delay of equipment supply, this factor also is related to unmanaged risks associated to the supplier especially in terms of competence and experience. Lastly, is due to the contractor's financial crisis and contractor with no competence. This factor also is related to unmanaged risks associated to the contractor especially in terms of competence and experience. The findings do concur with the work done by Lawrence (2015) where he indicated that the main risk project management challenges are related to the budget estimation, time schedule estimation process, and site selection. Therefore, when risks associated to the site selection when are not well managed, this can lead to project delay or cost overrun. Bennett (2003) also indicated that qualification of the stakeholders is one of the most criteria that need more attention during the project management. When all above highlighted risks associated to the site selection, suppliers and contractors are identified, assessed and treated effectively at the planning stage, they should be avoided before their occurrence.

5.2.2. Project performance

In project management, completing a project within planned time, cost, quality, safety, and environmental sustainability objectives indicates project success (Zhou, Zhang & Wang 2007). This study has considered time as the most important indicator used to measure project performance. Ade (2012) showed that time and cost performance is fundamental criteria for the success of any project. Similarly, Bubshait (1994) indicated that cost and time are among the most significant indicators for measuring project performance. However, many projects of Ethiopian Electric Power are facing issues of time and cost overruns. This study focuses solely on the effect of time schedule on project performance. The findings concur with Laurence (2016), who showed that inefficient time performance negatively affects overall project performance.

Some elements significantly impact a project more than others, making it essential to identify the causes for better mitigation. The implementation of a SCADA system for Ethiopian Electric Power was planned to be a comprehensive project. When the contract was signed three years ago, the project was intended to be completed within the specified timeline. However, redesigning of the plans added complexity and scope, leading to significant delays. The project was slated to begin in October 2016, but due to various setbacks, construction was expected to commence in January 2018, with an anticipated completion timeframe of three years (36 months). Unfortunately, the project faced termination due to disagreements between Ethiopian Electric Power and the contractors.

In October 2016, EEP signed a 2 billion birr contract with CGCOC China Company to implement the SCADA system in accordance with FIDIC (Federation International des Ingénieurs-Conseils) law. According to the agreement, preliminary work was to be completed by EEP within three months, and the SCADA system was expected to be operational within 36 months. However, EEP failed to meet this timeline, resulting in a delay of over a year. EEP paid 294,000,000 birr in advance due to various contractor claims, including transportation, mobilization, legal service expenses, project worker's residence camp construction expenses, and different project construction material expenses. The contractor also requested additional time and one billion birr. In response to the delays, EEP formed a committee to investigate the matter and agreed to pay 400 million birr, but the contractor, CGCOC Company, opted to terminate the contract. As a result, the EEP project incurred heavy losses due to these delays. EEP is currently seeking another bidder for the project, and the original design will need to be revised, which may uses the old system until the SCADA system is implemented with the approval of the city administration.

5.2.3. Relationship between Risk management and projects performance

The regression analysis from table above also indicates the significant relationship between risk management and project time performance for 58.1% of variance (R square adjusted = 0.581). It means that 58.1% of variation in project time performance was explained by the variation in risk management practices. The more risk management is effective the more project time schedule is followed or reduced. While the remaining 41.9% can be attributed to the other variables not considered by this study model. The findings agreed with the study done by Mervat (2017) who found that the risk management components (risk planning and definition, risk analysis, risk response, risk assessment and review) have impact on the success of projects in terms of the time dimension of the project. 49 Based on the positive impact that risk management practices have on project time performance, therefore risk management has a positive impact on project performance. The findings do concur with the work done by Mudau and Pretorius (2009) who showed that risk management and project controlling have a significant influence on performance of a project and therefore on the success of the company. They indicated that by strengthening and focusing more on project controlling and risk management methods and processes, the performance of projects should be improved. Tzvi, Aoron and Dov (2002) postulated an additional consideration, where they concluded that there is a positive correlation between risk management and project performance; this means that the greater risk management is practiced the greater is project objectives achieved. To achieve this necessitates the additional developed risk

management tools and skills. Within the same line (Kishk, 2008) agreed with the findings by demonstrating the direct relationship which is between risk management and project performance. They showed how an uninterrupted effective risk management increases the chance of achieving the project goals successfully.

5.3. Conclusion

In general, this study aimed at analyzing how risk management is affects projects performance mainly time performance and investigating how risk management is related to projects performance. The research targeted project managers and other staff related to project management. The study has used quantitative method. Questionnaires have been used to collect needed data and collected data was processed using SPSS. The correlation analysis and regression analysis were used to analysis the relationship between risk management on projects performance. The results from the study first indicated that even if risk management is practiced on projects but it is practiced in informal way. The risk management is not being applied strategically by observing and assessing all risks associated to the project via a coordinated manner with formal and structured way at planning and implementation level. This means that risk management in company needs a bit of improvement. Second, it indicated a significant relationship between risk management and project performance. This means that an effective risk identification, effective risk assessment as well as effective risk mitigation at planning, implementation and monitoring stage have a large effect on project performance in terms of time performance. The thesis has both academic and policy implications. It gives a comprehensive understanding of risk management in project performance across time, which has received little attention in the academic literature because most studies focus on banks and the construction industry. The thesis is also useful in practice. The findings of this study can assist project managers in improving existing risk mitigation strategies, which will benefit many stakeholders in the Ethiopian Electric Power sector in streamlining the project development process and reducing the risks associated with corporate projects.

5.4. Recommendation

- This research recommends that the company should manage risks strategically by identifying and assessing all risks associated to the project via a coordinated manner with formal and structured way at planning and implementation level.
- This research recommends that the risk manager should be assigned in company for a specialized professional to deal with risk management activities.
- This research suggests that all the concerned organizations should train regularly and specifically their project managers and other members related to project management how to manage risks methodologically.
- The skilled, experienced project managers and consultants should be involved in all projects especially during the stage of budget and schedule estimations, stage the of selecting site, stage of identifying risks, risk assessment, mitigating risk, implementing and monitoring risks.

- Finally, it recommends that the organization should consider the opinion and advice of stakeholders on the identified risks and how they should be mitigated and monitor because to put effort together as one team is the best way to treat the risks of cost and time overruns.

5.4.1. Area for further research

Given that the variation of 58.1% of time performance are respectively due to risk management. This study further suggests a study on the factors that describe the remaining portion. This research has adopted a non-probability sample and based on the respondents from only on project office. This study suggests for further studies and bases for cross country on different projects in Ethiopian electric power.

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Appendix

Dear participants

My name is GIZACHEW GEBEYEHU and I am a Masters' student in project management at St. Marry University. I am conducting a master's academic research (thesis) on the Analysis of risk management on projects performance of Ethiopian Electric power: case study of Ethiopian Electric Power central regions. The purpose of this questionnaire is to gather data for the proposed study, and hence you are kindly asked to assist the successful completion of the study by providing the necessary information, sharing your experiences and perception. I want to assure you that, your participation in the study is fully voluntarily; the information you will share kept confidential and used only for educational purpose. Your personal identifiers such as names, phone number and signature would not record. Here, I would like to request you to give honest, genuine answers to all the questions and timely response is vital for the success of the study. The finding of this study will be presented and reported to the St. Marry university department of project management.

PART I: GENERAL RESPOND INFORMATION

For this section, please tick the response category that applies to you,

1. Gender

Male ☐ ☐ Female

2. Age group

Code	1	2	3	4	5
Age	21-25	26-30	31-35	36-40	Above 40
Tick					

3 Educational levels

Code	1	2	3	4	5
Level	Level 4	Level 5	degree	MSc	PhD
Tick					

4. Position of work

Code	1	2	3	4	5
Position	Finance office	manager	Supervisor	Site engineer	Other
Tick					

5. Work experience

Code	1	2	3	4	5
Experience	Less than 1 year	1-5	6-10	11-15	Above 15
Tick					

PART II: RISK AND RISK MANAGEMENT

Direction: Please indicate your level of agreement or disagreement with each of these statements EVALUATION SCALE:

1 = Strongly Disagree 2 = Disagree 3 = Neutral 4= Agree 5 = Strongly Agree

The following 44 questions tap into your perception about the actual implementation of risk management practices variables and organizational performance. [1 = strongly disagree (SD), 2 = disagree (D), 3 = neutral (N), 4 = agree (A), 5 = strongly agree (SA)] based on your knowledge and experience about the statement.

1. Determine your level of agreement with the following statement about the risk identification techniques used by your company, choose the appropriate rank from (strongly agree to strongly disagree and Neutral)

No	Risk identification:	SD=1	D=2	N=3	A=4	SA=5
1	The company checks the environment for risk					
2	The company sets roles and responsibilities for risk identification					
3	The company uses financial statement for risk identification analysis					
4	The company sets clear standards to improve risk identification					
5	The company uses risk rating to classify the risks					
6	The company develops a risk management framework.					

2. Determine your agreement level through the following statements about company risk assessment and measurement.

No	Risk assessment	SD=1	D=2	N=3	A=4	SA=5
1	The company assesses uncertainty of loss					
2	The company uses quantitative methods to assess risks					
3	The company uses qualitative methods to assess risks					
4	The company uses risk assessment for potential loss					
5	The company reduces risks occurrence					
6	The company assesses every risk differently.					
7	The company categorizes risks into levels for further analysis.					

3.To what range has your company adopted the following risk mitigation measures?

NO	Risk mitigation:	SD=1	D=2	N=3	A=4	SA=5
1	The company checks different types of risks					
2	The company eliminates terrible/serious risks.					
3	The company estimates potential losses.					
4	The company trains its employees on risk mitigation					
5	The company transfers its risks					
6	The company develops technical regulations to cover claims.					

4. How practical are the following aspects of risk management implementation to your company?

NO	Risk implementation	SD=1	D=2	N=3	A=4	SA=5
1	The company documents risk					

	management cases					
2	The company supports risk management efforts					
3	The company provides appropriate training in risk management policies.					
4	The company defines employees' roles and responsibilities in risk management.					
5	The company controls the risk management program.					
6	The company categorizes risks into levels.					

5. How practical are the following aspects of risk management monitoring to your company?

NO	Risk monitoring	SD=1	D=2	N=3	A=4	SA=5
1	The company limits credit according to individual cases.					
2	The company complies with the maturity ladder Chart.					
3	The company develops a regular reporting system regarding risk management.					
4	The company monitors international standards					
5	The company monitors the customer's performance					

COMPANY PROJECT PERFORMANCE MEASUREMENT

6. How performance is linked to risk management in your company?

NO	Project Performance:	SD=1	D=2	N=3	A=4	SA=5
1	The company decreases risks to minimum levels					

2	The company covers risk claims as required.					
3	The company responds to market changes					
4	The company practices improve the local rating					
5	The company practices improve the profitability					
6	The company practices satisfy its customers.					
7	The company gains customer loyalty.					
8	The company moves to identify and hedge new risks					
9	The company improves its operational performance.					
10	The company practices improve sales					

7. Determine your agreement level through the following statements about project time schedule.

NO	Project completion:	SD=1	D=2	N=3	A=4	SA=5
1	Effective risk management contributes to the project completion on time.					
2	Risk associated with suppliers (late deliveries, inexperienced suppliers, etc.) affect the estimated project timely completion due to late deliveries, when they are not well managed.					
3	Risk associated with planning (improper planning) affects the estimated project timely completion.					
4	Delayed payment (financial risk) affects the project timely completion					