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EFFECT OF PROJECT RISK MANAGEMENT IN CONSTRUCTION PROJECTS: CASE OF CITY GOVERNMENT OF ADDIS ABAB MEGA PROJECT CONSTRUCTION OFFICE

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A RESEARCH SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF ST.MARY UNIVRSTY (SMU) IN PARTIAL FULFILLMENT OF REQUIREMENT FOR THE DEGREE OF MASTER OF PROJECT MANAGEMENT (PM)

MAY, 2023

ADDIS ABEBA, ETHIOPIA

Declaration

I, Tinsae Semahegn, the under signed, declare that this thesis entitled: “EFFECT OF project risk management in construction projects: case of CITY GOVERNMENT OF ADDIS ABAB mega project CONSTRUCTION OFFICE” is my original work. I have undertaken the research work independently with the guidance and support of the research advisor. This study has not been submitted for any degree or diploma program in this or any other institutions and that all sources of materials used for the thesis has been duly acknowledged.

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ACKNOWLEDGMENTS

First of all, my hearty thanks go to Almighty God for his blessing-full knowledge, inspiration and diligence required for the successful completion of this thesis and for making my dream a reality. The successful completion of this thesis would not have been possible without the support, encouragement and cooperation from many individuals who assist me in diverse ways from the beginning to the end. Next, I would like to express my thank you and appreciation to my advisor: Dejene M. (PhD)for his guidance, continual advice, patience, vast knowledge, and critical review of the thesis, I really appreciate the invaluable advice that he has given to me starting from selection of title up to the end of this thesis. Finally, my hearty thanks to office heads and staff of Mega project in Addis Ababa constriction, for their relevant information for the successful completion of this study and collaboration in responding questionnaires.

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LIST OF ACRONYMS AND ABBREVIATIONS

AEO- ---------- -African Economic Outlook

APM ---------- Association for Project Management

BC---------- Building Contractors

CAE---------- Consulting Architects and Engineers

EEA---------- Ethiopian Economic Association

GC----------General Contractors

GDCF ---------- Gross Domestic Capital Formation

GDP---------- Gross Domestic Product

PRM ---------- project risk management

IMF ----------International Monetary Fund

MUDC ---------- Ministry of Urban Development and Construction

PMBOK ---------- Project Management Body of Knowledge

PMI---------- Project Management Institute

RC---------- Road Contractors

RFI---------- Requests for Information

SC---------- Specialized Contractors

SD ---------- Standard Deviation

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Abstract

The aim of the research is, to assess building constructing project risk management in Addis Ababa towards consulting and constructing firms. Participants of the study, located in Addis Ababa, were grade-one contractors and consultants. To achieve its objective, in this study, mixed method research approach deployed. Around 264 questionnaires were distributed and almost all questionnaires were successfully collected from the respondents. All the data was gathered from the respondents were analyzed using Statistical Package for Social Science (SPSS) versions 21. Survey questionnaire implemented for collecting data. Simple Random Sampling Technique used, which ensures representativeness of the sample to the population. The collected data analyzed with Descriptive Analysis using Statistical Package for Social Science SPSS 24 through statistical tools such as frequency, percentage, mean, and standard deviation, etc. and the results are presented using tables, and charts, etc. The research findings indicated that five critical risk factors identified based on an assessment of their probability of occurrence in building construction projects. These were high inflation rate, delayed payment by clients, poor resource management, risk of response, and economic instability that have influence on project objectives. Risk evaluation is, as the most significant risk category recognized by participants. Due to unexpected nature and changes that occur during implementation of building construction projects, risk becomes a prevalent phenomenon. Hence, the two critical possible risks identified were time overrun and cost overrun. It also indicated that for effective risk alleviation, risk transfer and risk reduction measures were the major strategies recognized by participants. In this study, lack of knowledge and practice of risk planning, which needs to be improved, revealed from further investigation of opinions of participants. The study concluded that a complete understanding and identifying of risk factors could enable the practitioners to execute early responses to possible risks. Therefore, consultants and contractors, including other stakeholders, should work together as a team on projects to systematically identify critical risk factors, analyze and respond to risks with appropriate strategy to achieve project objectives of time, cost, & quality.

Key words: *risk; evaluation; construction risk response; risk analysis; project performance, risk planning*

CHAPTER ONE

INTRODUCTION

2.1.Introduction

This chapter presents a comprehensive review of theoretical literature review, Mega project, project risk management, project risk classification, project management, construction risk management process, fundamental of risk process management, empirical literature review finally, conceptual frame work.

2.2.Background of the study

The construction industry is experiencing vast and rapid changes every second. These changes are bringing very essential features to the firm but also they come with many unpredictable elements to the firm. The number of stakeholders involving in the construction is also increasing day to day and this also brings another package of risks. Construction of condominium apartments started between 2003 and 2005 in Addis Ababa (Weldemariam, 2017). When construction of the condominium apartments transferred from pilot project in specific areas of the city to formal routine construction many uncovered areas started to appear. One of those things is construction risk management. Due to the reason that most of the stakeholders of the apartment construction gave relatively less attention to risk management and most of their plans didn't contain risk management, quality, cost, time and scope deviations appeared repeatedly. The concept of risk management emerged as a continuous process followed by any project to address the risks associated with its activities Serpella, Ferrada, Howard& Rubio, (2022).

Construction projects have substantial impact on the economic growth It involves several participants in the process of implementation throughout all phases of the project. Besides, operators in the sector challenges and unreliable circumstances Wiguna, & Scott (2005). This results, mainly in the delay of project schedule, excessive increase in project cost, and sub-standard construction work, and so on 15.9% of gross domestic product at current prices during the 2015/16 fiscal year. The research also aims providing the "3C" team (Client, Consultant, and Contractor) with a clear understanding of the necessary actions to be taken in order to protect the project from hidden and identified threats and to utilize existing opportunities for improving project performance. It also provides clear roles and responsibilities, a primary level description of the risk management process. It is designed to provide support to the project team and all the

stakeholders. ’in general are apparent to have more inherent risks due to participation of many contracting parties, such as clients, consultants, contractors, subcontractors, suppliers, and other stakeholders.‘’ Wiguna, & Scott (2005) also noted that uncertainty and risky situations have vast portion in decision making of the ongoing projects. It may result in cost overruns, time overruns, and even poor quality of deliverables if they are not dealt with properly. Thus, detecting and handling the possible risk factors, which can considerably differ from project to project accountable on numerous circumstances, plays a decisive role in improving the performance and achieving the effective and efficient supply of the deliverables. Researchers in several publications sort out and identify major risk factors, which may possibly occur in building construction projects and classifying in diverse collections based on their sources and magnitude of influences, as vital contribution to the industry. In the study by Serpella, Ferrada, Howard& Rubio (2014) addressed the gap and its impact on risk management case in construction projects with a knowledge-based approach to develop and support risk management projects in Chile. Both general and specific literature review was included in the research methodology to assess the situation in an organization for constructing projects that WAS help in structuring a framework of risk management.

The construction projects is still ineffective and its main cause is lack of knowledge and proposed a systemic and formal approach to risk management that WAS assist both owners and contractors. In their study of Risk Management in Construction Projects Banaitiene &Banaitis (2012) described contractors think about the importance of knowing about construction projects risk, to analyze the risk itself and finally to discover how to manage that analyzed risk in construction companies. In the study of project management maturity in the construction industry of developing countries Yimam (2021), stated that in the constructing sector of developing countries especially Ethiopian contractors’ way of using knowledge areas and their maturity of project management as a whole concept. Moreover, in the study of construction contract risk management practices in Ethiopian building construction projects Addis (2022) identified the level of use of construction contract and risk management techniques in building projects.

Project risk management aims to implement projects according to the approved budget, on time and within the required specifications. Risk management has been closely associated with project management as one of the potential threats to the project, which may lead to disparities in achieving the pre-defined objectives and the success of the project (Holt, 2004). The traditional

view of project risk management emphasizes the importance of planning as one of its main processes and linked to project activities in an integrated way throughout its life cycle (Dvir et al., 2002). Several models and frameworks for risk management and managing project uncertainties have appeared as an attempt to better regulate and apply risk and uncertainty management (Mills, Donald, 2001). Olsson (2019) argued that risk management is critical to the success of the project as the organization is able to deal with various risks and threats. In addition, he confirmed that it is a mistake to face threats individually. Where organizations tend to launch several projects simultaneously for their development and more efficient work; new risks arise in the individual project as a result of project dependencies (PMI, 2008). The project management institute supports the broad risk management trend involving reallocation of resources between projects taking into account the additional risks and problem detection (Sanchez et al., 2009). In addition, the ability to deal with risks, and the correctness of the information on which actions are taken. To sum up, it is logical to link risk management components and project success in terms of time, cost, quality, and stakeholder satisfaction

It also stated that, to make the project successful first of all knowing the risk itself and then find the way to mitigate them for various types of related contracts by making the way open for different stakeholders to participate. Since risk management is one from the knowledge areas, it should and have to be a crucial and essential element for the project success. Construction projects are very complex and risky projects that also numerous human resources, high amount of capitals and golden times invested on. Even if all those resources invested on there also have high probability to uncertainty and unexpected events might happen from various sources. That is why it is very important to manage risks before damages due to impose by risk and uncertainty (Banaitene and A. Banaitis, 2012). The main target of risk management is to develop and facilitate risk free decision making processes to achieve the objective by obtaining detail information about the uncertainty and risk (Winch, 2010). It does not mean that assessing and managing risk and its management completely insures that risk WAS be removed but rather it helps to just achieve overall objective of the project (Potts, 2008).

2.3.Statement of the problem

Construction, in general have very close relation and direct impact on people's day to day life so that high quality and risk free construction has the of increasing their life and contribute to the societal development. However, the sector has been criticized for higher cost deviation, quality issues, delayed completion and critical risk management problems. Risk management it crucial

and irreplaceable element of the entire project management portfolio. The construction projects can happen in the constraint of time, cost, and quality. The budget that runs in the industry makes it very sensitive for governmental projects as a country. The researcher sees the gap on the area of impact of risk management. There are impacts of risk management in the construction projects; the researcher needs to assess the area and believes giving some additional and specific information on the area WAS be the best for the managers and workers who are responsible. There are most researchers study on risk management and most of the managers or workers have enough information about the topic. However, the researcher thinks there are some information gaps on knowing or getting information on the impact of risk management in construction projects. The researcher believes by putting one information source about the topic WAS help the upcoming works on the industry.

2.4.Research questions

1. What are the effects of risk management (risk planning, risk analysis, risk response, risk evaluation and feedback) on project success?
2. How is the risk management process applied in practice at constriction projects?
3. What are the effects of risk and risk management in construction projects in Ethiopia on project success?
4. How risk management affects construction project on project success quality?

2.5.Objective of the study

2.5.1. General objective

The general objective of this study is assessing the impact of project risk management in construction projects: case of city government of Addis Ababa mega project construction office

1.4.2. Specific objective

1. To identify the effects of risk management (risk planning, risk analysis, risk response, risk evaluation and feedback) on project success.
2. To improve risk management process applied in practice at constriction projects.
3. To assess effects of risk and risk management in construction projects in Ethiopia on project success.

4. To identify of risk management positive or negative in construction project on project success quality.

2.6.Significance of the study

The city government of Addis Ababa is investing large sum of money and resource in order to achieve the expected result from Mega projects. Not only the government but also all other stakeholders highly expect the project to be risk free or in state of conditions that all risks are managed with limited deviation. The research was play its role in finding out the causes that hold the implementation of risk management practice back, highlighting the importance of risk management and showing the good practices being implemented by the project to the government and other stakeholders. Finally, not only Mega project housing but also building construction in Ethiopia is in almost in growing stage, consequently the level of construction risk management is also in an infant stage. Therefore the result of this research was used as input for other current and future Mega projects and also put a brick for further study of risk management in Ethiopian building construction. And also to give information for the upcoming researchers about the area especially in Ethiopia. Show the direction and information for the city government of Addis Ababa Mega Project Construction Office.

1.5. Scope of the study

Project Risk Management (PRM) is the systematic process of identifying, analyzing and responding to project risks, in order to take advantage of the impact of positive events that may occur and to decrease the probability of negative events to occur. This study was taken on seven construction projects in city government of Addis Ababa Mega Project Construction Office. That was cover identification of effects of risks managements on the projects and assessing those impacts on each project under early mentioned office.

1.6. Operational Definition of Terms

Risk: Is an uncertainty of something might happen or not; positive or negative deviation of a variable from its expected value.

Risk management: Is management of the risk that might be a cause for the unexpected failure or success. It is one from the 10 Project Management Knowledge areas that covers an adequate overview of what you need to do to manage risk on the project.

Impact: Is a negative on something in our study it means a negative or positive effect of risk management on construction projects. Impact is an impinging or striking especially of one body against another. A forceful contact or onset. Also: the impetus communicated in or as if in such a contact. The force of impression of one thing on another: a significant or major effect.

Construction: Construction is an industry that can be owned by private sectors, governmental sectors and other institutions. It is the process of doing something to get some planned result.

Employee: Is workers who invest their idea, knowledge, energy and time for the project who has been hired.

Success: When individual or an organization meets its objective or goal.

City government of Addis Ababa Mega Project Construction Office: Is an office that working on different governmental big and vast construction works as a client on the side of governmental office.

1.7. Organization of the Study

The study is organized into five chapters. The first chapter includes introduction part, study of background area, statement of problem, objective of the study and research question, significance of the study, limitation of study, scope of the study, and organization of the study. The second chapter contains review of literature with theoretical and empirical review. The third contain research methodology, sampling data collection tools and data analysis method. The fourth includes result and discussion. The fifth chapter contains summary, conclusions and recommendations. Finally references and appendixes.

CHAPTER TWO

REVIEW OF LITERATURE

2.1.Introduction

This chapter presents a comprehensive review of relevant literature in an attempt to theoretical literature review, Mega project, project risk management, project risk classification, project management, construction risk management process fundamental risk management, empirical literature review finally conceptual frame work.

2.2.Theoretical literature review

Hereinafter the upcoming sections of the research was on overview important literatures which their innermost point is about definition of uncertainty and risk in building construction projects, their source and possible ways of minimizing the adverse effect of risks mitigating them. In addition, the negative effects of construction risks with respect to quality cost and time WAS be discussed. In general parlance, risk is understood only as a loss. However, it implies possibilities, probabilities and chances. This means that there are possibilities and chances. This means that there are possibilities, chances and probabilities to be positive. This means the business owner must consider the chances to avoid those negative risks those being the owner WAS meet. Here the consideration WAS help to analyze the risk and know how to manage it. PMI (, 2000) and Smith (2020) state that risk is future uncertainty about deviation from expected earnings or expected outcome. Risk measures the uncertainty that an investor is were to take to realize a gain from an investment. Risk is an uncertain event that can be expressed in terms of probabilities between 0 & 1 to calculate the upcoming negative or positive effects on the project. According to Wang, (2014) risk can be occur during and before the activity takes place. Some risks might happen on the planning phase. Loose more (2006) described risk is uncertainty on something with a probability interval of 0 & 1 for the event that may happen certainly or totally impossible. (Smith, 2006) also stated risk as it WAS occur when our decision described in series of possible outcomes and when we know probabilities known probabilities that helps to set outcomes.

In doing this, the effect of those risks on the project stakeholders WAS be shown in parallel. According to Wang, (2004), risk has a probability of occurrence during the overall process of the construction project. Risk can be or might be happen in two reasons; from them the first one is when we plan or make a decision wrongly from the starting. This can due to lack of knowledge

and experience on the area, negligence in the side of the responsible body second we might face risk due to unprecedented and predictable situations. The definition of risk is not only those it is very vast and diverse but it can be assessed by negative and positive impacts, injuries, probability and reliability and effects occurred on the project. According to (Hill son, 2004) the distinction and relationship between uncertainty and risk may be described as the risk being measurable uncertainty whereas uncertainty is immeasurable risk. It is the interaction of uncertainty on objectives that gives rise to risk, which means that only relevant uncertainties that have the potential to affect project objectives can become risks. In other words, a risk is an uncertainty that matters and the importance is defined in relation to the particular objectives in question. All in all risk means those uncertainties that could affect the project objective and the project itself.

2.3.Mega Projects

Megaprojects are large-scale, complex ventures that typically cost a billion dollars or more, take many years to develop and build, involve multiple public and private stakeholders, are transformational, and impact millions of people (Hirschman, 1995). Megaprojects are a unique type of project because of their high cost, stakeholder engagement, difficult borders, and prolonged planning process, all of which make their development a considerably riskier process.

Megaprojects, according to Flyv bjerg (2014), often cost $1 billion or more. Cost, on the other hand, should not be a limiting factor in defining megaprojects. According to Warrack (1985), projects with a lesser budget, such as $100 million, might use a relative approach depending on the circumstances. Megaprojects are defined by five factors: high cost, high complexity, high risk, lofty principles, and high visibility (Fiori & Kovaka, 2005). Examples of megaprojects are high-speed rail lines, airports, seaports, motorways, hospitals, national health or pension ICT systems, national broadband, the Olympics, large-scale signature architecture, dams, wind farms, offshore oil and gas extraction, aluminum smelters, the development of new aircrafts, the largest container and cruise ships, high-energy particle accelerators, and the logistics systems used to run large supply-chain-based companies like Amazon and Maersk (Flyvbjerg, 2006).

Megaprojects are a different type of project because of their greatness of objective, impact on the public, economy and environment, required time and budget, complexity, and stakeholder involvement making them very a different type of project to manage. Flyvbjerg (2014) proposed

the ‘iron rule of Megaprojects,' saying that megaprojects are certain to fail due to the ‘iron triangle' requirements of time, budget, and scope. Nine out of 10 projects, according to Flyvbjerg (2006), have cost and timing overruns. According to Flyvbjerg (2014) and (Aaltonen & Kujala , 2010) the following characteristics are important for megaproject development, yet they are often disregarded or overshadowed:

- The development of megaprojects is a risky process due to the lengthy planning process and complex interactions.
- It is necessary to have strong internal project management and leadership capabilities.
- The scope and objectives of megaprojects WAS almost always evolve over time.
- A thorough analysis of the problem to determine whether the proposed initiative is necessary
- Decision-making, planning, and management are multi-actor processes involving public and private stakeholders with competing interests.
- Cost and time overruns, as well as benefit deficits, WAS come from underestimating expenses and overestimating benefits.

2.4.Project Risk Management

Risk management is one from the 10 Project Management Knowledge areas that covers an adequate overview of what you need to do to manage risk on the project. By introducing risk management from the starting (even before planning) helps the project managers, workers, participants, all stakeholders. Managing risk means getting the key for the project success. Since the study area is on construction projects and as we all know and try to mention before construction is very risky in terms of the country economy and the resources that use to complete one’s project; risk management is very important. Risk management is not started after the risk has happened rather it goes in parallel to the project. This means when there is a plan for the project, there should be a plan for risk management alongside. (Schieg, 2006) emphasized that risk management does not only mean taking a measure after the negative effect happened but it also involves the establishment of risk consciousness, integration of basic principles of risk policy and organizational integration to prepare the project for unsolved negative risks and increased transparency in between the responsible organs and other stakeholders and employees. Managing risk is the ongoing process in the entire life of the project.

According to (Potts, 2008) risk management is not a sudden activity that takes place once the risk happened. Rather it should be a process that begins from early stages of a project with an

independent management crew to identify, analyze, assess and respond for the arisen risk. Mainly, the process of risk management helps to identify and understand the specific risks in the project, it was supported decisions by detailed analysis and a buildup of historical data that can be used to assist future risk management procedures. But (Smith et al., 2006) believes most project managers do not get the importance of project risk implementation as an integral part of the delivery of a project.

Construction risk management have also its own processes from planning to implementing and evaluating the process and helps to reduce the impact of risk in the projects. In construction risk management plan is as other activities developed at the early stage of the project. The plan included what risks or uncertainties might occur and how to mitigate and resolve it before it drops the negative effects on the project by assigning and forming the crew to be responsible for the process.

2.5.Project Risk Classification

To generalize the classification we can mainly classify in to two:-

Known risks: (Smith et al., 2006) described as known risks are risks that frequently happen in most of the construction projects. It is the cognitive condition of uncertainty, where at least the risk source has been identified.

Unknown risks: As (Winch, 2010) described unknown risks are risks that the source cannot be identified and the risk event cannot be known.

What Are the Types of Risk in Construction Projects?

In general, risk is anything that was delay the project or create further costs. There are many sources of risk on a construction site. To create a better risk management plan, it's essential to know what risks there are, and where they was occur:

Safety Risk: Your crew is your most valuable resource. Nothing can be done without them. They are also subject to safety hazards, as many of the tasks assigned to them can be dangerous. While your crew is skilled and experienced, accidents can happen. Know the safety risks to your crew, what hazards they might fall prey to and create a safety plan to ensure employee safety.

Financial Risk: Without money, nothing happens. No one gets paid, you can't rent equipment—you get the idea. That's why any factors that can interrupt your cash flow need to be identified. This can include a cost increase for materials, competition in the market and so on. The more you understand the financial risk, the more likely you'll stay within budget.

Legal Risk: Managing a construction project involves more than the constraints of time, cost and scope. There are legal constraints, such as regulations, code violations and contract terms disputes with your clients, vendors and subcontractors. Any of these things can send your construction project off track.

Project Risk: Project risks are universal project management risks associated with managing any project. These include poor management of the resources, missing deadlines and falling behind schedule. The construction project manager must be thorough and aware of difficulties that can throw the project off track.

Environmental Risk: AKA an "act of God," such as floods, earthquakes and other kinds of natural disasters. Anything nature unexpectedly unleashes that makes the construction site inaccessible is costly and potentially destructive for a construction project.

2.6.Project Management

Project management is defined as the application of knowledge, skills, tools, and procedures to project activities in order to achieve project requirements. (Charvat, 2003) Defines project management as a set of tools, techniques, and knowledge that, when applied, helps to achieve the three main constraints of scope, cost and time. Project management is accomplished through the appropriate application and integration of the project management processes identified for the project. Project management enables organizations to execute projects effectively and efficiently (PMI, 2013). Project management is also defined by PMI (2003) as the application and integration of logically grouped processes that are divided into five stages: initiating, planning, executing, monitoring& controlling, and closing, all of which are carried out within a given scope, quality, schedule, budget, resources, and risk. Because of the increasing use of projects in businesses, a strategy for efficiently managing these temporary activities that are essential to the organization's strategic goals was required. As a result, academics and experts in the area devised a strategy for effectively managing projects. Managing a project is a difficult and complex activity that necessitates the identification and commitment of resources to assure

the project's completion and, as a result, the achievement of organizational goals. (Schwalbe, 2009)

2.7.The Construction Risk Management Process

The process of mitigating risk for a construction project is no different than any other project. The only difference is the type of risks you're managing in the construction industry. Here are the five steps of the risk management process.

Identification: First, make a list of every possible issue that could arise. Do the research, talk to your crew and explore historical data from past construction projects that are similar to yours. While this identification list is always open for edits and updates, you should have a set deadline so that you don't get bogged down in analysis.

Assessment: Not all risks are equal. Some are more likely to occur, others less so. One way to assess your list of risks is to use a risk assessment matrix, which charts the likelihood of each risk and the size of the impact it can have on your project. Creating a risk assessment matrix helps you when addressing the risk if it appears.

Mitigation: This is where you implement a contingency plan that WAS reduce the likelihood and impact of the risks you identified earlier. The top priority, of course, is those you defined as highly likely and having the greatest impact. These should be given an owner, who WAS be responsible for identifying the risk (if it occurs) and managing its resolution.

Monitoring: This step is always ongoing, as you attempt to identify these risks when they show up. That includes monitoring the effectiveness of your mitigation plan. Also, stakeholders should be consulted and kept updated on these project risks. Engage other department leaders to help, and empower the team to respond to risk. Have them note if a risk has moved to a different spot on your risk assessment matrix.

Reporting: Your construction risk management plan should be analyzed and shared with the crew and stakeholders. These reports on risk mitigation allow you to evaluate the effectiveness of the contingency plan. While this can be done with an Excel spreadsheet, using project management software is more efficient. Online tools gather the data automatically, create dashboards to illustrate progress and even generate reports that are easily distributed.

2.8.Fundamentals of Risk Management

(Serpella et al., 2014) and (Potts, 2008) risk was ignored in construction projects; this days it become an important and essential part. The vend ran et al (2004) described the concept of effective risk management as ongoing and monitored process help to achieve the overall project objective.Pialles (2017) describes the model as a circular project that emphasizes that risk management is a time-learning process that uses the same four elements or steps as Bazin (2017) and Hillson (2020). In the literature, the basic premise of risk management is the same, but the process may vary by sector and organization. A typical risk management process starts with a definition phase; the purpose of this phase is to establish the context. This is both to Bahamid & Doh (2017) and Hillson (2020) seen as an important phase due to in this phase the objectives for the project are being understood and agreed on. The output of this phase is a definition document with the purpose to record the decision on the scope and details of the risk process, this document is often called a Risk Management Plan (Hillson, 2020).There are many risk management methods or models in various small and medium projects, but the main risk management process involves four stages namely: Identification and classification of sources of risk, analysis of risk assessments, development of a risk management response and monitoring and control (Bazin 2017). The risk management framework followed at Nokia Siemens Networks provides guidelines for (Ogunde et al., 2017):

- Risk Planning
- Risk Analysis
- Risk Response
- Risk Evaluation And Feed Back

The risk management approach allows organizations to observe and identify all the risks associated with a project in the hope of making an informed decision with a consistent and economical use of resources to control and reduce the impact and overall probability of a project. Events considered undesirable (Dehdasht et al., 2015). Thus, transparency is enhanced by risk management and the project can be prepared for the inevitable problems. Many risks may also differ from the beginning by preventive measures of the project (Rostami, 2016).

2.9.Empirical Literature review

Due to the nature of the construction projects which consists of many related and none-related operations, many risk factors WAS contribute in a project. To have an effective risk management

plan, at first step the key risk factors which have the most effect on project objectives should be identified and classified (Rezakhani, 2012). It was observed that, majority of decisions on construction risk management are done based on intuition, previous experience, and the manger's professional judgment. As a result of ignorance and doubts on the sustainability, formal methods available are not been applied for the activities of the construction (Jarkas, 2015). Construction risk is generally perceived as events that influence project objectives of cost, time and quality. Risk analysis and management in construction depend mainly on intuition, judgment and experience. Formal risk analysis and management techniques are rarely used due to a lack of knowledge and to doubts on the suitability of these techniques for construction industry activities. The role and contribution of the Construction Industry are pivotal and the primary conduits for infrastructure development and maintenance. In construction industries and the various project stages, one of the silent day to day realities are risks and uncertainties. And construction industry is inherently risky and uncertain and these arise from the nature of the industry itself (Okema, 1999). Risk in the construction industry is perceived to be a combination of activities that adversely affect the project objectives of time, cost, scope and quality (Ehsan, 2010).

Risk is a multi-facet concept. In the context of construction industry, it could be the likelihood of the occurrence of a definite event/factor or combination of events/factors which occur during the whole process of construction to the detriment of the project (Faber, 1979). Project risks have significant impact on construction performance in terms of cost, time and quality. Thus, managing the risks has been recognized as a very important management process in order to achieve the project objectives. (Tsegaye, 2009). There is little evidence of application of risks and uncertainties management in construction in developing countries and yet it is apparent how they influence the course of construction projects and poses immerse challenges. This should be of particular concern in developing countries because they need every coin and accelerated progress to propel them to develop.

In addition, most developing countries import quite a lot of construction materials, equipment and machinery for use in the construction industry, and balance of payment instability that can occur due to sharp fall in terms of trade can pose serious risks and uncertainties to projects (Okema, 1999). Construction organizations in developing countries, approach risk management in construction projects by using practices that are typically inadequate, produce poor results frequently, and limit the realization of desirable project outcome (Serpil, 2015). Construction

risk in developing countries offers contractors a heightened degree of risk than can be expected from a developed nation. Consequently, many contractors chose not to participate in these markets. Contractors evaluating risks in developing markets are often charged with having to be more creative with their risk outlook. For example, if a contractor was looking to build in a politically hostile environment, the initial perception may be that the risk is too high despite the potential for higher profits (Taylor, 2004). The consequences of risk in construction industries of developing countries, including sub-Saharan region are more severe than in established Western Construction industries (Wang, 2014). The construction industry in Ethiopia is challenged by several problems and thus making efforts in developing the construction industry is very difficult and complex (Mitikie, 2017).

The government of Ethiopia constructed high-rise condominium houses to achieve its purpose of easing infrastructure service provision for the densely settled people (Weldemariam, 2017). Managing risks in construction projects has been recognized as a very important management process in order to achieve the project objectives in terms of time, cost, quality, safety and environmental sustainability. Majority of the parties involved in Ethiopian building construction projects believe that the effect of risk on project objectives can be greatly minimized if construction risk management techniques are used (Mihret, 2017). Lack of risk management in Construction projects is one of the major setbacks for construction projects performance in Ethiopia. It includes identification, assessment, monitoring, and sharing.

As observation and impacts of risk that show from literature show the current status of risk identification, assessment, monitoring and risk sharing in is not practiced and modeled. But the future risk management practice must be developed from the western risk management practice. This is timely identification of risk, assessments of risk, monitoring and controlling to minimize the impact of risks. Even construction project risk can- not be ignored, but it can be managed, minimized, shared, transferred or accepted. The identification of their causes might lead to their reduction, possible elimination and subsequent improvement in overall project performance in civil work construction project. (Mitikie, 2017). Yadeta, 2020, in his study shows that inadequate schedule is the first ranked most critical risk in the Ethiopian construction industry which contributes the most significant negative impacts on construction project performance in terms of time, cost and quality. He put late, nonpayment and minimum amount of interim payment and submittals and approvals of construction documents in the second and the third most critical risks in Ethiopian construction industry

Accordingly, these risks are among financial and management risks respectively and are likely to affect the project progress due to delay in payment and document approvals by the client and the consultant. This could be due to lack of timely decision of the managers. The fourth ranked critical risk in the industry is price inflation which is among the economic risks. Many construction projects progress are affected and some of them are terminated in the country due to price inflation occurred by increment in dollar value on imported construction materials. As he was found from the interview result inflation is among the risks they pointed. (Yadeta, 2020).

A study indicates that Assessment of Project Risk Management Practices in land Projects in Addis Ababa conducted in an exceedingly descriptive method found that there's a poor practice in terms of developing a policy or a tenet. Risk management isn't treated as a continual process in these projects. It's also found that there's no exclusively assigned responsible person to handle the chance management process therefore; the burden happens to get on the project manager. The project team members don't participate in any of the danger management processes. Risks don't seem to be identified and analyzed appropriately and no risk register is ready. Moreover, projects are missing out opportunities only that specialize in identifying and mitigating negative risks and planning just for threats and disasters. Overall the chance management is being practiced very poor and an enormous gap is noticed between what should be theoretically applied and what's actually being practiced (Kalkidan, 2017).

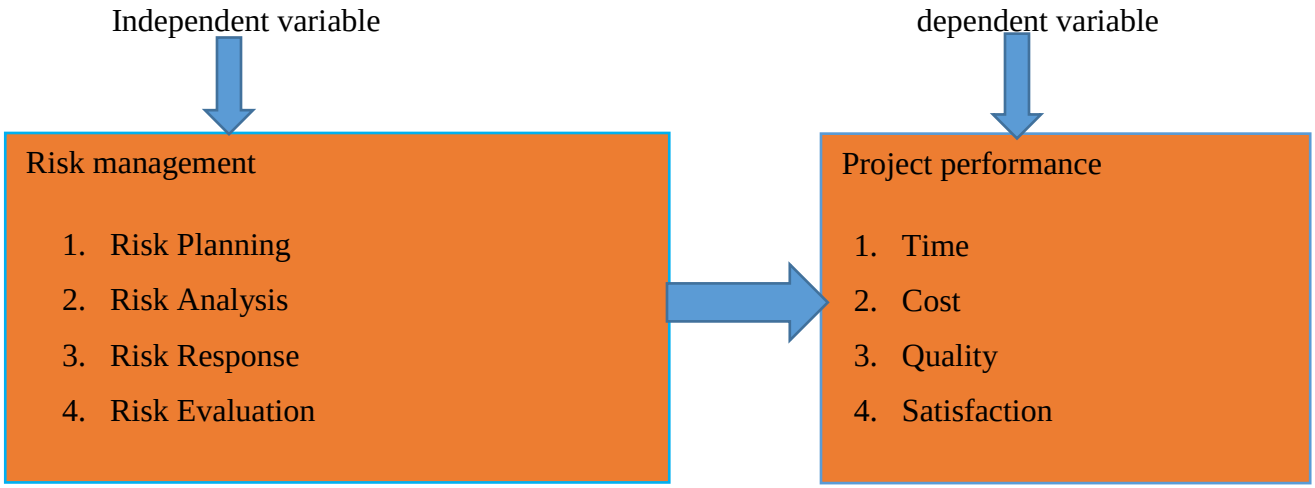
There are many different descriptions of the construction industry including that of the risks in Ethiopian building construction sector, drawn from different specialist disciplines. This vagueness is compounded by the fact that the construction involves such a wide range of activity that the industry's external boundaries are also unclear (Murdoch and Hughes, 2000). Although risks in construction are so broad, Abrahmson, (1984) tried to summarize those wide range of risks in the following way.

- **Management, direction and supervision**: greed; incompetence; inefficiency; partiality; unreasonableness; poor communication; mistakes in documents; defective designs; inadequate briefing, consultation or identification of stakeholders; compliance with statutory requirements; unclear requirements; inappropriate choice of consultants or contractors; changes in requirements.

- **Physical works**: ground conditions; artificial obstructions; weather; defective materials or workmanship; tests and samples; site preparation; inadequacy of staff, labour, plant, materials, time or finance. Delay and disputes: possession of site; late supply of information; inefficient execution of work; delay outside both parties‟ control; layout disputes.
- **Damage and injury to persons and property**: negligence or breach of warranty; uninsurable matters; accidents; uninsurable risks; consequential losses; exclusions, gaps and time limits in insurance cover.
- **External factors:** environmental regulation; government policy on taxes, labor, safety or other laws; planning approvals; financial constraints; energy or pay restraints; cost of war or civil commotion; malicious damage; intimidation; industrial disputes.
- **Payment**: delay in settling claims and certifying; delay in payment; legal limits on recovery of interest; insolvency; funding constraints; shortcomings in the measure and value process; exchange rates; inflation.
- **Law and arbitration**: delay in resolving disputes; injustice; uncertainty due to poor records or ambiguous contract; cost of obtaining decision; enforcing decisions; changes in statutes; new interpretations of common law.

2.10. Conceptual framework

From the theoretical literature review the following conceptual framework was developed for the study. this frame work was modified to fit the requirement of this study.it shows the relationship and impacts of the selected factors, as expressed by selected dimensions and impact of project risk management in construction projects.



Source: Researcher own-20 Figure 2:1 conceptual framework

CHAPTER THREE

RESEARCH METHODOLOGY

3.1.Introduction

This chapter provides the research methods employed to conduct the study. Accordingly, this chapter presents research design and technique, data type and source, total population, sampling design technique, method of data collection, data processing & analysis, pilot survey, Validity & Reliability and Ethical consideration. Zikmund, Babin, Carr and Griffin (2010) describe a research methodology as a part that must explain technical procedures in a manner appropriate for the audience. It achieves this by addressing the research and sample designs that was be used for the study, the data collection and fieldwork conducted for the study and the analysis was done to the collected data. Dawson (2009) states that research methodology are the philosophy or general principle which guides the research. Kombo and Tromp, (2009) concur with Zikmund et al. (2010) that research methodology deals with the description of the methods applied in carrying out the research study.

3.2.Research Design

As to nature of this research, basically by far it was employ descriptive research nature in line with explanatory research design. This study is expected to investigate on the assessing the impact of project risk management in construction projects. Moreover, the relationships of the four project risk management dimensions towards the dependent variables are clearly examined. Descriptive studies are designed to obtain data that describe the characteristics of the topic of interest in the research. The objective of descriptive study is to represent an accurate profile of persons, events or situations. In descriptive research, the research problem is structured and well understood (Ghauri and Gronhaug, 2005).Furthermore, for this study the type of research used to conduct is explanatory type of research. Explanatory studies are showing the causal relationship between variables (Saunders, Lewis and Thornhill, 2009), and explanatory study used to analyze for data collected from internal auditors. The reason behind was using explanatory type of

research to explain, understand and predict the relationship between variables through statistical tests such as correlation and regression.

3.3.Research Approach

This study used deduction approach because; the empirical framework is built based on the previous studies and testing the proposed hypotheses. The deductive approach also it helpful for identifying the causal relationships among factors by collecting data using a quantitative method testing the hypothesis. Quantitative aspect of the study is intent to find data needed to generalize the result to the population as stated (Marczyk, DeMatteo and Festinger, 2005). And Quantitative research uses positivist knowledge claims (such as cause and effect thinking, reduction to specific variables and hypothesis, use of measurement and observation, and test of theories) employs strategies of inquiry such as experiments and surveys and collect data on predetermined to instrument that yields statistical data (Creswell, 2009).

3.4.Data Type and Sources

The necessary data for this study was collect from both primary and secondary sources. According to Kothari (2004), Primary data are fresh data that are gathered for the first time and thus happened to be original in character. Louis, Lawrence and Morrison (2007), describes primary data as those items that are original to the problem under study while Ember and Ember (2009). Describe primary data as data collected by the investigator in various field sites explicitly for the major excluding secretaries, guards and other supportive staffs who are irrelevant for this study. The study were employed mixed approach data such as, both qualitative and quantitative data. The qualitative data was include those data that were primarily collect through interview whereas quantitative data were include objective items through the questionnaires. Regarding the data sources, the study was used to primary sources. Ember and Ember (2009) describe secondary data as data collected by others and found by the comparative researcher in ethnographies, censuses and histories. Therefore, the secondary data was collect from different sources such as, websites, books, and Journals, periodicals released by the social media and articles national and international and magazines.

3.5.Target Population and Sample size

According to Lavrakas (2008), defines a population as any finite or infinite collection of individual elements. To describes a population as the entire collection of 'things' in which we are interested. According to Zikmund et al. (2010) and Kothari (2004), a population refers to all items in any field of inquiry and is also known as the 'universe. 'Polit and Beck (2003) refer to population as the aggregate or totality of those conforming to a set of specifications. The target population for this research are Adwa zero project are 110, Zewuditu memorial (expansion) 112, transport office (megenagea)115, Akakikality industrial Mega project 110,Kilnito industrial park 110,Agricultural market place 115 and women's rehabilitation Mega project 110 excluding employees who are irrelevant for this study. Therefore, the following formula were used for the calculation of the sample size since it is relevant to studies where a probability sampling method used to the research Yamane (1967:886) cited in Israel (1992) which is revised on April 2009 and again reviewed on June 2012 provides a simplified formula to calculate sample sizes.

Assumptions: A 95% confidence level, and e = ±5%

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

$$n = \frac{782}{1+782\ (0.05)2}$$

$$n = \frac{264}{}$$

Where

n = the sample size

N = the population size

1 = designates the probability of the event occurring.

e= the level of precision (Sampling error)

The researcher usually follows the method of proportional allocation under which the sizes of the samples from the different strata are kept proportional to the sizes of the strata. The researcher was employ proportion allocation method to determine the sample size.

Accordingly, the table below shows the proportionate sampling for each journalist working based on the above given formula. The 782 sample Mega project construction employees are distributed among the selected Addis Ababa mega constriction project in their proportion. Accordingly, the table below shows the proportionate sampling above given formula.

Table 3.1: proportionate sample distribution form mega project in Addis Ababa

No	**Mega project in Addis Ababa employees**	**Total number of employees**	**No. of Sample**
1	Adwa Zero project	110	37
2	Zewudtu memorial (expansion)	112	38
3	Transport office (Megenaga)	115	39
4	Akakikality industrial Mega project	110	37
5	Kilnto industrial park	110	37
6	Agricultural market place(Kolfe)	115	39
7	Women's Rehabilitation (Akaki)	110	37
	total	782	264

Source: Own computation based on census taken mega project (2022).

3.6.Methods of Data Analysis

The data collected was analyze using qualitative and quantitative data analysis techniques. The qualitative data was Analyze using content analysis; this content analysis is a procedure for the categorization of verbal or behavioral data, for purposes of identified, classification, summarization and tabulation. Also, based on the higher level of analysis is interpretative: This study was be conducted the quantitative (numerical) analysis Upgrade and Shende (2012). The quantitative data collected through the survey questionnaire was be encoded into Statistical

Package for Social Science (SPSS) version 26.0. Then descriptive statistics and inferential statistical were conduct for the study.

3.7.Descriptive Analysis

The descriptive statistical results was presented like tables, frequency distributions and percentages to give a condensed picture of the data. This were achieved through summary statistics, which includes the means, standard deviations values which was computed for each variable in this study.

3.8.Inferential Analysis

3.8.1. Pearson Correlation Analysis

In this study Pearson's correlation coefficient was use to examine the relationship between the independent variables i.e. risk planning and risk analysis, risk response, risk evaluation and feedback, and the dependent variable i.e. time, cost, quality and satisfaction in mega project constriction in Addis Ababa.

3.8.2. Multiple Regression Analysis

Multiple regression analysis was be used to major the risk planning and risk analysis, risk response, risk evaluation and feedback, and the dependent variable i.e. time, cost, quality and satisfaction in mega project constriction in Addis Ababa. And the above independent variables are measures by multiple regressions. In addition, the following multiple linear regression equation was be used.

$$Y= \beta 0+ \beta 1X1+ \beta 2X2+\beta 3X3+\beta 4X4 +E\ldots.$$

Where:

Y= Dependent variable (time, cost, quality and satisfaction)

X1, X2, X3, and X4, are the explanatory (independent) variables

X1= risk planning X4=evaluation and feedback

X2=risk analysis

X3=response

β0 is the intercept term- it gives the mean on effect Y of all the variables excluded from the equation, although its mechanical interpretation is the average value of Y when the stated independent variables are set equal to zero.β1, β2, β3, and β4, refers to the coefficient to their respective independent is the error term

3.9.Validity and reliability

Patton (2002), states that validity and reliability are two factors which any researcher should, be concerned about the while designing a study, analyzing results and judging the quality of the study.

3.9.1. Validity

Healy & Perry (2000), explain that validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are.it estimates how accurately the data obtained in the study represents a given variable or construct in the study (Mugenda, 2008).the study has ensured reduction of construct validity by deriving the research variables from existing theoretical frame works. The pilot study was enabled the researcher to assess the clarity of the questionnaire so that those items found to redundant and misunderstood were discarded or modified to improve the quality of the research instrument, thus increasing its validity.

Validity: Refers to the extent to which the concept one wishes to measure is being measured by a particular scale or index. According to Kothari (2004), validity aims at establishing the results which are linked with the condition. It is concerned with the extent to which the scale accurately represents the construct of interest. To assure the validity of the measurement instrument, the study was conducted based on the accepted conceptual framework that indicates that the theoretical construct was associated with the measurements that are valid to evaluate assessing the impact of project risk management in construction projects where possible this should be

supported and consideration given to practical things. So, pre-questionnaires were distributed to check the validity of questions to further the data collection process. As per the comments and the discussion with the hospital employees the questions prepared for primary data collection for the research objectives were found valid by the researcher

3.9.2. Reliability

Reliability: Aimed at the point that even if the research was repeated they would end up with similar results, showing the consistency or dependability of the measurement technique. It is concerned with the consistency or stability of the score obtained from a measure or assessment overtime and across settings or conditions. If the measurement is reliable, then there is less chance that the obtained scores are due to random factors and measurement error (Marczyh et al., 2005).

Healy& Perry (2000), assert that reliability was the extent to which results are consistent over time and an accurate representation of the total population under study. Cronbach's Alpha was used as measure of Reliability and internal consistency. Reliability can be equated with stability, consistency, or dependability of a measuring tool. According to Zikmund, Babin, Carr, and Griffin (2010), the standard coefficient alpha (α) is stated as 0.80 to 0.95, very good reliability, 0.70 to 0.80, good reliability, 0.60 to 0.70, fair reliability. The reliability test is an important instrument to measure the degree of consistency of an attribute which is supposed to measure. Reliability can be equated with the stability, consistency, or dependability of a measuring tool. Cronbach's alpha was one of the most commonly accepted measures of reliability. It measures the internal consistency of the items in a scale. For further research, the data must be verified and the results are measured as Reliability and valid by using reliability test (Cronbach's Alpha).to provide the following rule of thumb for the Cronbach's>0.9 excellent, >0.8 good,>0.7 acceptable,>0.6 questionable,>0.5 poor and <0.5 unacceptable.

Table 3.2: Cronbach's Alpha reliability and liability test for each field of the Questionnaire

No	**Dimensions**	**Cronbach's Alpha**	**Number of Items**

1	Risk planning (RP)	.763	5
2	Risk analysis (RA)	.787	5
3	Risk response (RR	.828	5
4	Risk evaluation (RE)	.716	5
5	Project performance (PP)	.638	6
The Cronbach's Alpha Total reliability and liability		.880	26

Source: Own Survey result, July (2023)

Cronbach's alpha is one of the most commonly accepted measures of reliability. It measures the internal consistency of the items in a scale. It indicates that the extent to which the items in a questionnaire are related to each other. It also indicates that whether a scale is one dimensional or multidimensional. The normal range of Cronbach's coefficient alpha value ranges between 0-1 and the higher values reflects a higher degree of internal consistency. Different authors accept different values of this test in order to achieve internal reliability, but the most commonly accepted value is 0.890 as it should be equal to or higher than to reach internal reliability (Hair *et al.,* 2003).The Cronbach's coefficient alpha was calculated for each field of the questionnaire. The table 4.1 shows the values of Cronbach's Alpha for each field of the questionnaire and the entire questionnaire. For the fields, values of Cronbach's Alpha ranged from 0.638 and 0.828. This range is considered high as the result ensures the reliability of each field of the questionnaire. Cronbach's Alpha equals was the entire questionnaire which indicates very good reliability of the entire questionnaire. Therefore, based on the test, the results for the items are reliable and acceptable.

3.10. Ethics and Confidentiality

The researcher has provided a letter to participants explaining the study to overcome their reservations about providing sensitive and confidential information. Participants were assured of the privacy of their information, and that their identities would not be revealed. It was made clear that their contribution was voluntary and they had full authority to refuse or to withdraw if they changed their mind about participating. The participants were also allowed to ask any questions and clarify any sort of ambiguity regarding the questionnaire before they answered it, mitigating the chance of faulty responses by giving the participants a;' comprehensive understanding of the study and its aims. To conduct the study the researchers develop a chart for work schedule to complete the research within in certain time frame.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1.Introduction

This chapter presents the results of the study on the empirical analysis of the data collected from the research respondents and discussion of results with respect to previous research finding and literature. Here descriptive on the data analysis and procedures are presented, as stated on the methodology part, the data was collected from currently employees of the Addise Ababa Mega project constriction. The questionnaires were prepared to complete by employees on the organization who left the organization voluntarily. Moreover, out of 782 employees of the organization who were left voluntarily under the period reviewed 264 were selected for the study. Out of this category of respondents 100(%) responded and returned the completed questionnaires. Since the return rate of the questionnaires distributed is 100%, the researcher was confident that the data obtained from the respondents were be sufficient enough to come up with realistic conclusions. In all 264 copies of questionnaires are carefully checked, thus 264 questionnaires were fully and appropriately filled as usable for further analysis. This presents an acceptable response rate of 100%.therfore the whole 264 questionnaires retrieved were used in the analysis of this study. The data analysis was made with the help of statistical package for social science (SPSS) version 21.

4.2.Demographics of Respondents Rate

Table: 4:2 respondents rate by demographics

category		**frequency**	**percentage**
Responded		264	100%
Did not responded		0	0%
Total		**264**	**100%**
position		**Frequency**	**percent**
	General manager	61	23.1

	Deputy general manager	106	40.1
	Technical manager	8	3.0
	Project manager	34	12.9
	Risk manager	44	16.7
	Other filed	11	4.2
	Total	**264**	**100**
Education		**Frequency**	**percent**
	Diploma	72	27.3
	degree	178	67.4
	master	2	0.8
	PhD	0	0
	Other filed	12	4.5
	Total	**264**	**100**
Field of study		**Frequency**	**percent**
	Engineering	56	21.2
	Architecture project	82	31.0
	Construction management	86	32.0
	Other filed	40	15.8
	Total	**264**	**100**
Work experience		**Frequency**	**percent**
	1-5 years	141	30.7
	6-10 years	44	22.9
	11-15 years	35	20.6
	16-20 years	28	16.9
	More than 20 years	16	9.0
	Total	**264**	**100**

Source: Own Survey result, (2023)

Summaries of Demography Data of Respondents

This section discussed the results of the general information about the respondents, including position, Education, filed of study and work experiences in the organization. Tables 4.2 shows the above table that out of the 264 questionnaires which were distributed, all quaternaries distributed 264 were returned. The overall respondent rate was thus found to be 100% and was more sufficient to proceed the data analysis. Position of General Deputy Manager 40.1% of the participants covered all questions in the questionnaire, participated actively the highest response in the quaternaries, gives positive replies for the interviews. Whereas the lowest response of the position in Mega project employees other departments 4.2% it replies small participant of in this organization. The respondent of field of study in construction management 32.6% in the highest participation and respondent of quaternaries in Mega project, whereas the lowest 15.8% other filed this implies that small participation of this organization. The respondent work experiences of this Mega construction of Addis Ababa 1-5 years 47.1% high or majority's participation of this organization the low participation of this more than 20 years 9% low participation of in this year.

4.3.Result of measures of Descriptive statistics (mean and SD) of sample

This study the statement on the impact of project risk management in construction projects. The descriptive statistics of the variables are presented here after; revealing the mean and standard division, of the attributes in each predictor variables. This study mainly focus on risk planning, risk analysis, risk response, risk evaluation and project performance. For the variables the highest value that describes a higher to leave the organization is or strongly agree 5 whereas the lowest value to describe quit is 1 or strongly disagree. The main characteristics of the data are quantitatively described in the descriptive statistics. In The descriptive statistics summaries about the sample population responses are provided. And the Interpretation is made using the grand mean of each independent dimension. The interpretation was made based on the following measurement scale intervals or range. Mean scores 4.51-5.00 excellent or very good, 3.51-4.50 good, 2.51-3.50 average or moderate, 1.51-2.50 fair and 1.00- 1.50 is poor (Conover, 1999). The mean and the standard deviation the variables are presented in the table below.

Table 4:3*. Risk planning*

No	Variable	N	Mean	Std. Deviation
1	Existence of risk management plan and its proper usage	264	2.75	1.176
2	Risk of planning in the project	264	2.85	1.776
3	Under quality is risk in this project	264	2.71	1.176
4	Existence of risk management plan and its proper usage	264	2.02	.934
5	To understanding and application of all kinds of construction insurance in the project planning	264	1.48	.501
	Overall Risk planning Valid N(list wise)	264	2.4393	0.61626

Source own, 2023

Summaries on Risk planning

There were five questions items directed toward measuring Risk planning. The respondents have been asked questions each of which was based on the level of agreement the respondent had been with highest mean score it said Emphasizes the In general In general Risk of planning in the project with mean score of 2.85 and standard division (S.D) =1.776, However, the lowest mean score of To understanding and application of all kinds of construction insurance in the project planning 1.48 standard division (S.D) =0.501 is for the statement Considers me, However, the all over Risk planning is above mid value of mean i.e. 2.4393 and S.D 0.61626. This implies that risk planning is decreases.

Table 4:4*. Risk analysis*

No	Variable	N	Mean	Std. Deviation
1	Poor or narrow understanding of risk	264	3.22	0.985
2	Poor understanding of project scope is observed	264	2.46	0.878

3	Professionals safety hazard is risk in this project	264	2.79	1.331
4	Adequate risk monitoring and controlling mechanism in the project	264	2.34	1.001
5	Tight and supportive project supervision which can bring tangible result	264	2.36	1.063
	Overall Risk analysis Valid N(list wise)	264	2.5214	0.65223

Source own, 2023

Summaries on Risk analysis

There were five questions items directed toward measuring Risk planning. The respondents have been asked questions each of which was based on the level of agreement the respondent had been with highest mean score it said Emphasizes the In general In general Professionals safety hazard is risk in this project with mean score of 2.79 and standard division (S.D) =1.331, However, the lowest mean score of Adequate risk monitoring and controlling mechanism in the project in the project planning 1.48 standard division (S.D) =0.501 is for the statement Considers me, However, the all over Risk analysis is above mid value of mean i.e. 2.5214and S.D 0.65223.

Table 4:5*. Risk response*

No	Variable	N	Mean	Std. Deviation
1	Adequate risk reporting communication system	264	2.75	1.176
2	There is effective risk responding mechanism	264	2.82	1.776
3	Lack of clients managerial capability	264	2.85	1.176
4	high labor and equipment productivity	264	2.77	.934

5	all constriction equipment's are to protected in corruption	264	1.58	.501
	Overall Risk response Valid N(list wise)	264	1.9009	0.80808

Source own, 2023

Summaries on Risk response

There were five questions items directed toward measuring Risk planning. The respondents have been asked questions each of which was based on the level of agreement the respondent had been with highest mean score it said Emphasizes the In general In general Lack of clients managerial capability with mean score of 2.85 and standard division (S.D) =1.176, However, the all constriction equipment's are to protected in corruption in the project planning 1.58 standard division (S.D) =0.501 is for the statement Considers me, However, the all over Risk response is above mid value of mean i.e. 1.9009and S.D 0.80808. In general, the narrower understanding of risk and risk related to the project creates a big gap in risk identification before the construction process starting or even in earlier stage of the project. This inability to clearly identify risks in pre-construction and inception stage makes difficulty to prepare risk management plan or if it's prepared, it be unfit to the project or which doesn't cover most possible risks of the project.

Table 4:6*. Risk evaluation*

No	Variable	N	Mean	Std. Deviation
1	The project control	264	2.75	1.176
2	Assessing the risk in construction	264	2.65	1.786
3	Price escalation is risk in this project	264	2.81	1.177

4	Delay of design variation approval is risk in this project	264	2.07	.934
5	Under quality is risk in this project	264	1.48	.501
	Overall Risk evaluation Valid N(list wise)	264	2.2232	0.80895

Source own, 2023

Table 6 above which is summarized from results of the questionnaire shows the mean value of 4.10 which indicates the level of understanding risk generally is very limited and encompasses of very few possible scenarios and there is a tendency of externalizing the subject to other disciplines. Looking at the value given for risk evaluation is risk in this project which is 2.81 shows the problem of finding out what risks may happen broadly in building construction as well as project wise that the term risk related to construction projects is in a lower level but highly attached to professional safety and hazard, and the last point in risk identification, a mean value of 1.48 shows that there is no notable Under quality is risk in this project to the decision makers or to the stakeholders. In general, the narrower understanding of risk and risk related to the project creates a big gap in risk identification before the construction process starting or even in earlier stage of the project. The aggregate overall risk evaluation of mean 2.2232 and S.D 0.80895. This inability to clearly identify risks in pre-construction and inception stage makes difficulty to prepare risk evaluation.

Table 4:7 Project performance

No	Variable	N	Mean	Std. Deviation
1	All employees are satisfaction	264	2.75	1.176
2	All project works respect their time	264	2.75	1.776
3	Improper cost plan	264	2.75	1.186

4	Delayed payment by clients	264	2.07	.934
5	The project is quality	264	1.48	.502
6	All project equipment's are beautiful	264	2.14	.654
	Overall project performance Valid N(list wise)	264	**2.3125**	**0.84507**

Source own, 2023

There are six questions items directed toward measuring project performance. The respondents have been asked questions each of which was based on the level of agreement the respondent had been with highest mean score it said Emphasizes. In general In general Improper cost plan with mean score of 2.2.75 and standard division (S.D) =2.186, However, the project is quality 2.14 standard division (S.D) =0.502 is for the statement Considers me, However, the all over project risk performance is above mid value of mean i.e. 2.3125 and S.D 0.84507. In general, the narrower understanding of risk and risk related to the project creates a big gap in risk identification before the construction process starting or even in earlier stage of the project.

4.4.Correlation analysis

Like the descriptive statistical methods, i.e. demographic factories, and the scale typed questionnaire entered to the SPSS software version 21.0 to process inferential statistics methods employed such as: simple correlation and multiple regression to test the hypothesis. Pearson correlation test was conducted to know the degree of relationship between the independent variable i.e. risk evaluation, risk planning, risk response and risk analysis and the dependent variable (project performance). Correlation measures the strength of the linear relationship between two variables. Thus, Pearson's correlation is used to identify whether there are relationships between the variables and to describe the strength and the direction of the relationship between two variables. According to Berndt ET. Al (2005), the level of association as measured by Pearson's coefficient falls between -1.0 and +1.0, which indicates the strength

and direction of association between the two variables. The interpretation of the result is as follows; a correlation result between 0 to 1 implies positive relationship, 0 (zero) for no relationship, 1 for perfect positive relationship, -1 for perfect negative relationship and between - 1 to 0 indicate the existence of negative relationship. Though it indicates the existence of a positive or negative relationship, the strength of such a relationship is not high when the results fall below ±0.61 (Oogarah-Hanuman et. al, 2011). It is also supported by According to Berndt ET. Al (2005), the rules of thumb proposed by Burns & Bush (in van Heerden, 2001) suggests that "moderate" ends at ±0.60, and "strong" starts at ± 0.61. Since all variables are interval, the relationship between the independent variables i.e. compensation and package, risk evaluation, risk planning, risk response and risk analysis and the dependent variable i.e. project performance was investigated using Pearson product –moment correlation coefficient. The results of correlation analysis in all the independent variables were positively except one variable's such significantly correlated with the dependent variable i.e. risk planning style at 95 percent confidence level (P<0.05).Correlation coefficient is a very use full means to summarize the relationship between two variables with single number that falls between -1 and +1 (Field 2005).a correlation analysis with Pearson's correlation coefficient was conducted in this study. According to godliness suggested by field (2005) to interpret the strength of relationship between variables, the correlation coefficient (r) is as follows: correlation coefficient falls between; 0.1to 0.29 weak relationships,0.3 to 0.49 moderate relationship And >0.5 strong relationship. in this study, Pearson correlation was used to identify the relationship between each of the independent variables and the dependent variable's using a two tailed test of statistical significance at the level of 99%confidence and significance >0.05.

Table 4:8 correlations

		RP	RA	RR	RE	PP
RP	Pearson Correlation	1	-.052	-.206**	-.141*	.268**
	Sig. (2-tailed)		.000	.001	.000	.000
	N	264	264	264	264	264
RA	Pearson Correlation	-.052	1	.740**	.830**	.455**
	Sig. (2-tailed)	.000		.000	.000	.000

	N	264	264	264	264	264
	Pearson Correlation	-.206**	.740**	1	.637**	.674**
RR	Sig. (2-tailed)	.000	.000		.000	.000
	N	264	264	264	264	264
	Pearson Correlation	-.141*	.830**	.637**	1	.565**
RE	Sig. (2-tailed)	.000	.000	.000		.000
	N	264	264	264	264	264
	Pearson Correlation	.268**	.455**	.674**	.565**	1
PP	Sig. (2-tailed)	.000	.000	.000	.000	
	N	264	264	264	264	264

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

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

Where

Risk planning (RP), Risk Evaluation (RE),

Risk analysis (RA), project performance (pp)

Risk Response (RR),

Correlation analysis conducted to determine the factors the project performance (i.e. Risk planning, Risk analysis, Risk Response, Risk Evaluation and, project performance revealed that project have positive significant relation with the project performance as r1 = 268**, p <0.01, risk planning positive and significant positive relationship with project performance as r2=.455** at p<0.01, risk analysis have positive and significant relationship with project performance r2=.674**at p<0.01, risk response have positive and significant relationship with project performance as r2=.427**at p<0.01, risk evaluation and significant relationship with project performances r2=.565**at p<0. In Mega project in Addis Ababa's based on the Pearson correlation test shown in the all dimensions have positive and significant correlated with project performance. Therefore, all factors of project performance correlation coefficients were less than the agreed standard).

4.5.Linear Regression Analysis

Regression model was applied to test how far the factors affecting the project performance. Coefficient of determination R is the measure of proportion of the variance of dependent

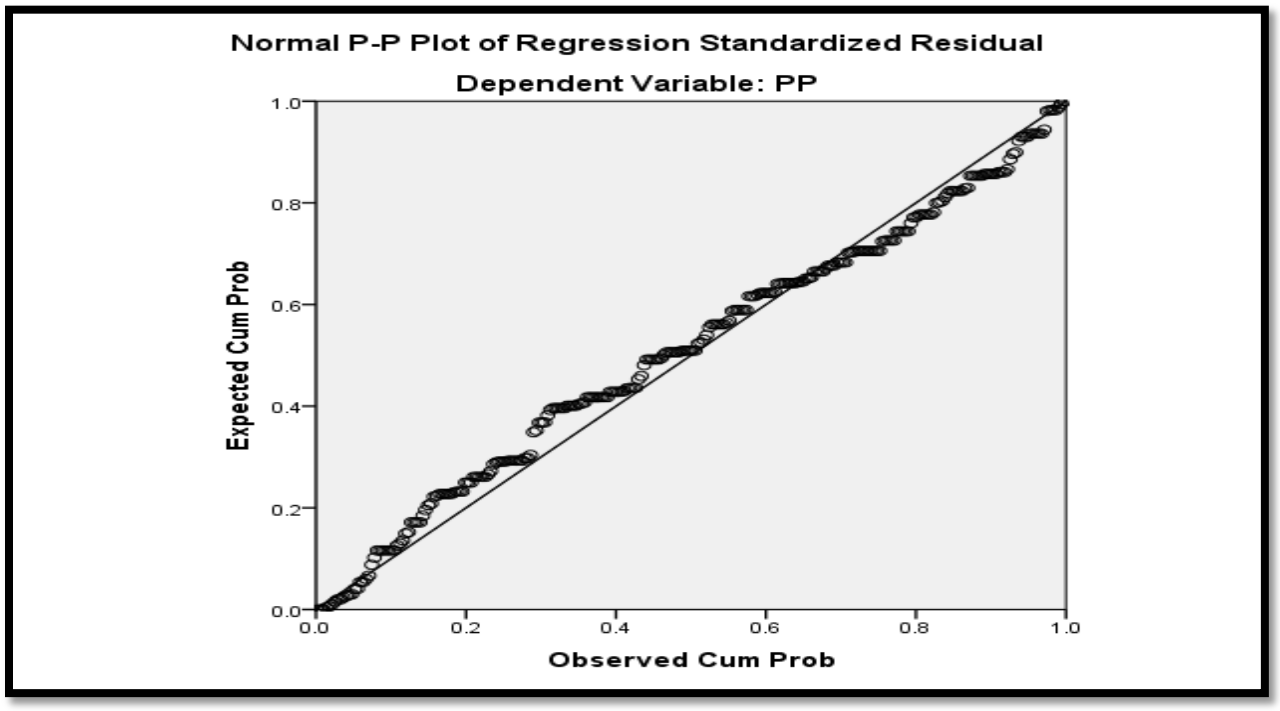
variables about its mean that is explained by the independent or predictor variables. It is conducted to investigate the factors of independent variables on the dependent variable and identify the relative significant influence; i.e. independent variables (Risk planning, Risk analysis, Risk Response, Risk Evaluation) and the dependent variable; project performance in Mega project of Addis Ababa construction. Higher value of R represents greater explanatory power of the regression equation. The proposed hypotheses were tested using multiple regression analysis.

4.6.Assumptions of Linear Regression Model

4.6.1. Test for Normality

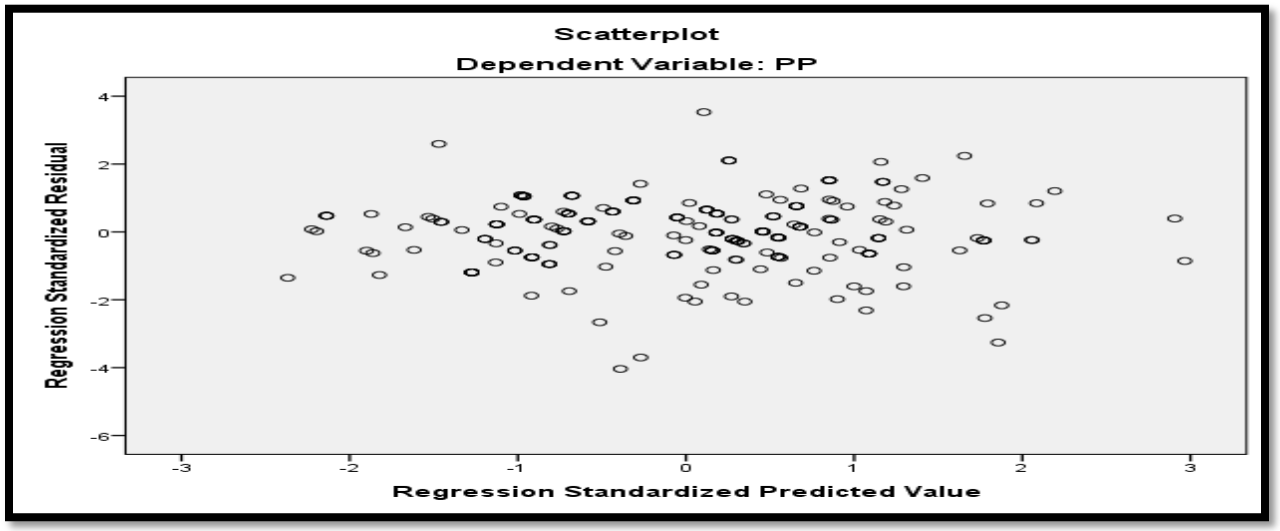
Test of normality is determining whether the data is well modeled by normal distribution or not. This test of normal distribution could be checked by graphical (histogram and dot plot) method of tests. The normality assumption assumes a critical role when a study is dealing with a small sample size, data less than 100 observation. (Gujarati, D. 2004). Even though the normality assumption is not a treat since the observation or sample size of the study is large enough, more than 100 observations, the researcher tested it using normal probability plot (NPP). The decision rule is, if the fitted line in the NPP is approximately a straight line, one can conclude that the variables of interest are normally distributed. (Gujarati, D. 2004).

Table 4:9 analysis of variance



4.6.2. Test for Linearity

Multiple linear regression models assume there must be a linear relationship between the independent variables and the dependent variables. Homoscedasticity assumption means the range of variance for the dependent variable is uniform for all values of the independent variables. Both assumptions can be checked by scatter plot diagram stated below.



Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	84.353	4	21.088	245.196	.000[b]
	Residual	22.276	259	.086		
	Total	106.629	263			

a. Dependent Variable: PP

b. Predictors: (Constant), RE, RP, RR, RA

In the table 4:9 the above show that the analysis of variance. It also identified as model fit marks. The interest in this table are the F-statistics and its associated sig, value. The result show that the F-statistics is significant at sig=0.000.the questions of the model was that model has no power to predict. However, the result pronounced that the questions can be reject and accept the alternative hypothesis like, model has power to predict project performance from impact of scores significantly.

Table 4:10 model summery

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.889[a]	.791	.788	.29327

a. Predictors: (Constant), RE, RP, RR, RA

On model summery box there is value given under the heading adjusted R square. This tells how much of the variance in the dependent variable (project performance) is explained by the model (, risk evaluation, risk planning, risk response and risk analysis). In this case, the adjusted value R square highlights that R-0.791 of the variability in the project performance can be explained by independent variables. The standard regression analysis model degree of predicted the dependent variable was found to be R=0.791 and the remaining 21% of the variance in project performance may be explained by other factors which are not included in this study, because they are beyond the scope of study. R square captures the percent of deviation from the mean in the independent variable that could be explained by the model. This means that the model risk evaluation, risk planning, risk response and risk analysis, explained 0.791% of the variance in project performance.

Table 4:11 coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.144	.099		1.450	.148
	RP	.432	.025	.512	17.195	.000
	RA	-.540	.042	-.767	-12.765	.000
	RR	.154	.007	.902	20.675	.000
	RE	.515	.038	.699	13.500	.000

a. Dependent Variable: PP

Examining the above table clear that four independent variables in the standards model were significantly predictive of the dependent variables. The justification of the Beta coefficients of risk analysis references are importance of an effective risk analysis framework was underlined in the Beta coefficient is insignificance or negative 2009 on The Risk analysis Lessons from the Financial Crisis. The present review complements the insignificance beta coefficients 2009/10 reviews with a survey of member and partner jurisdictions participating in the Corporate Governance Committee, with a view toward drawing lessons about the adequacy of existing corporate governance principles, guidelines, and practices in this area. And From the standpoint of an institution, the existence of a risk analysis insignificance has less to do with actual risk reduction than it has to do with the impression of risk analysis" (Taleb, 2004).The absolute value of β (Beta) indicates the order of important of independent variable. Gulden and Nese Guler (2013).the higher the absolute value of beta the stronger the importance effect. The coefficient of β weight is an estimate and so should be accompanied by a confidence interval that indicates its precision (Tom 2007).Looking the contributions must be the predicting variables in the model, it was found that risk evaluation of unstandardized coefficients made the highest contribution with the value of (β=0.515, P=0.000) followed by the score of. Therefore, to determine by Descriptive variables such as risk evaluation, risk planning, risk response and risk analysis. The value of Unstandardized Coefficients shows that, constant value (α=-0.515 risk evaluation, risk planning 0.432, risk analysis 0.-540 and risk response 0.154 As per the SPSS results generated, the regression equation that can be formulated based on the information obtained is as follows:

$$Y = \beta 0144 + \beta 1X10.432 + \beta 2X20.540 + \beta 3X30.154 + \beta 4X4\ 0.515 + E$$

Where

Y= project performance

X1 = risk evaluation

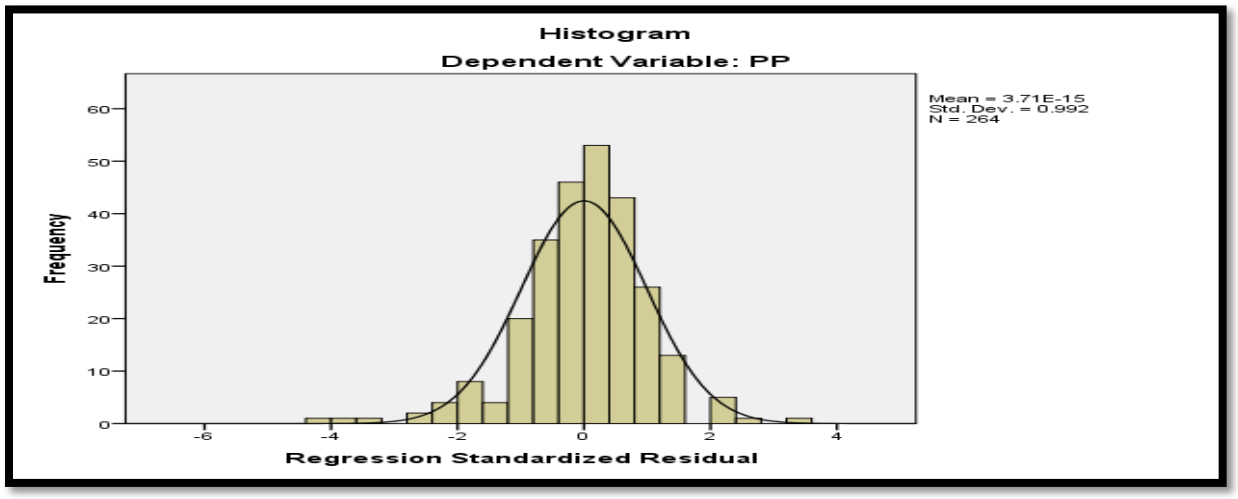
X2 = risk planning

X3 = risk analysis

X4= risk response

E = Error term

Y =0.144 + 0.432X1+0.540X2+ 0.154 X3+ 0.515X4 E**.** This regression equation indicates that taking (risk evaluation, risk planning, risk response and risk analysis) respectively.



4.6.3. Homoscedasticity test of the scatter plot

This enable to check for violation of the assumptions of linearity and Homoscedasticity. Inspection of the scatter plots also gives a better idea of the nature the relationship between the variables. This helps to test whether regression model of the residual variance inequality occurred on one observation fixed, fits fixed it is called Homoscedasticity and if it is not it called heteroscedasticity. Refers to the degree to which the change in the dependent variable is related to the change in the independent variables. The mean values of the performance variable for each increment of the predictor(s) lie along a straight line. If the model is a non-linear relationship of using a linear model then this obviously limits the generalizability of the finding.to determine whether the relationship between the dependent variables and the independent variables is linear, scatter plots of the regression residuals for each model through SPSS 21 software had been used. The scatter plot of residuals showed that the points lie in a reasonably straight line from bottom left to top right. This therefore, can show that the assumption of linearity is not violated. The plot

is shown below. The P-P plot compares the observed cumulative distribution function (CDF) of the standardized residual to the expected cumulative distribution function of the normal distribution.

CHAPTER FIVE

SUMMARY OF MAJOR FINDINGS, CONCLUSION AND RECOMMENDATION

5.1. Summary of major findings

Findings of the study are aimed to answer the basic research questions which were found in chapter one. Each major finding responds across to each of the aforementioned questions Since the first basic research question of my thesis was about how the risk planning, risk identification, risk analysis, risk response and risk monitoring and control applied in practice at Addis Ababa Mega project site. The statistical as well as the interviewed result in chapter 4 indicated that risk management practices are missing in the project and traditional and passive risk management is being practiced in limited parts of the project. The next question that was asked in the research assesses the challenges encountered in implementing risk identification, risk analysis, risk response. Majorities of the project stakeholders are found in a lower level of risk understanding, knowledge and skill of risk planning.

The third one was about finding out the main risks causing quality, cost, scope and time problems in the project and what should be done to monitoring and control the problem consequently lack of risk plan and poor risk analysis is found to be the main risk in the project and its responsible for cost risk and cost risk has a quality and time roots. The fourth and final question which aimed to answer the extent that the main stakeholders influence the risk identification, risk analysis, risk response and risk evaluation and control process in various levels of the project shown that supervision has irreplaceable value in the project to achieve project objectives but found to be light and lacks to have visualize the big goal of risk reduction in a project level.

5.2.Conclusion

Risk plan which is the core point of risk planning is found to missing in organized and satisfactory way that have a capability of managing the actual and potential risks of the project. The understanding and method of managing risks in the project is too traditional and based on past experience rather than scientific and proven methods. On the other hand a huge skill,

knowledge and understanding gap of risk identification, assessment and responding mechanisms to the identified risks. It's vivid that risk planning is not being practiced from the initiation phase and the stakeholders start to think about risk or the management methods after once an immense risk happened in the project. The student researcher observed startups risk management practices in the project but most of them are in paper level and the stake holders have lower and commitment to apply it in to the ground. The only risk that have got a better attention is the risk due to professional safety and hazard and other risks of cost delay and quality risks are under estimated even though the impact is very explicit. Risk of delay is found to be the most prevalent risk in the project which plays its role in aggravating quality and cost risks. There is obviously a quality risk in the project but relatively its managed by applying a bigger safety in structural works but there is still manifested quality problem in nonstructural works, roofing, finishing, sanitary and electrical works Finally, it found that no sufficient work is done by all stake holders to create awareness and induce the concept of risk in the project, methods of managing risks and the additional advantage from project risk management in terms of fundamental project deliverables.

5.3.Recommendation

The first finding in the previous section implies risk management practices are missing in the project and traditional and passive risk management is being practiced in limited parts of the project. Accordingly, managing risks is very essential element of any project especially condominium projects which prone to many innate risks so that the risks in all phases of the project, from inception to handing over to the end client should be managed well. The executing management should give the appropriate consideration to risk management practice throughout the project and it should be mandatory to have risk management team with a clear goal and responsibility. Since our country is developing and resources are scare the trend of most of condominium projects showing a huge deviations from the milestones of the project should be avoided.

Based on the second finding majorities of the project stakeholders are found in a lower level of risk understanding, knowledge and skill of risk analysis. In order to eliminate the observed huge risk and risk management gap, the consultant of the project should prepare a well-organized

document which is specific to the project that refreshes what is risk in that project context and list the main risk areas and expected risk management deliverables should be alerted between stakeholders of the project prior to implementing the project.

The third finding inferred lack of risk management plan and poor risk recognition is found to be the main risk in the project and its responsible for cost risk and cost risk has a quality and time roots. Due to that, risk response plan should be mandatory so as to minimize risks as much as possible and the waste of country's resource, especially attention should be given in the material utilization where the aggregate result have huge cost impact. The plan must be included in the project document with a clear designation of managing cost risk in the project.

Supervision has irreplaceable value in the project to achieve project objectives but found to be light and lacks to visualize the big goal of risk reduction in a project level as per the fourth finding of the study. Hence, tight supervision should be implemented that enable to avoid the risks in either way or to minimize the effects of the risks in the project to enable a better completion with respect to time, cost and quality. Risks of delay and over costing are the main risks to be managed in the project which have many negative implications in the entire project life so that the due level of proper attention should be given by the supervising team.

Summary of Recommendations:-

1. Having risk management team with a clear goal and responsibility is the first recommendation
2. It is recommended to prepare the document on type of risks and the main risk areas by the responsible organ/body
3. Risk response plan is recommended
4. Tight supervision implementation is highly recommend

5.4.Suggestion for further research

Further study is recommended for investigation of the assessing the impact of project risk management in construction projects in the construction of Mega projects as well as construction projects in general to make increase the capacity of controlling risks in the industry. As a researcher I recommended for the upcoming researcher to go further on this topic to make increase the capacity of controlling risks in the construction industry.

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Appendix A

MASTER OF PROJECT MANAGEMENT PROGRAMS

RESEARCH QUESTIONNAIRE ASSESSING THE IMPACT OF PROJECT RISK MANAGEMENT IN CONSTRUCTION PROJECTS: CASE OF CITY GOVERNMENT OF ADDIS ABABA MEGA PROJECT CONSTRUCTION OFFICE

Dear respondent:

This designed to collect information for master thesis on the topic assessing the impact of project risk management in construction projects to fulfill the partial requirements of the master of project management. The purpose of this study is to investigate and assessing the impact of project risk management in construction projects. There is no right or wrong responses only the expression of your real thoughts and feelings is important. Please respond each question by indicating the extent to which you regard the statements. Your participation is of great value for the success of this study, and therefore, I would like to thank you in advance for your kind cooperation in responding to this questionnaire. The information you provide was be kept confidential. Hence it is not necessary to write your name. Please attempt all the questions.

Yours faithfully,

Tinsae Semahegn Mobile no: - 0931225688

Instruction a Please, put "√" mark on the box the answer that you think best suits.

General Profile of the Respondent

1. What is your job position? G/Manager ☐ Deputy G/Manager ☐ Technical Manager ☐ Project Manager ☐ Risk Manager ☐ Other; please specify ☐

2. What is your educational level?

Diploma ☐ B.Sc ☐ M ☐ ☐ other; please specify ☐

3. What is your field of specialization?

Engineering ☐ Architecture ☐ t Construction ☐ agement

Other; please specify ☐

4. How long have you worked in the Building Construction sector?

1– 5 years ☐ 6 – 10 years ☐ 11 – 15 years ☐ 16-20 years ☐

More than 20 years ☐

Appendix B

Rate the following statements by putting in the Likert scale put "√" mark where 1=strongly Disagree (SD), 2=Disagree (D), 3=Neutral (N) 4=Agree (A), 5=Strongly Agree (SA).

No	statement on the impact of project risk management in construction projects	SD	D	N	A	SA
A.	**Risk Planning**					
1	Existence of risk management plan and its proper usage					
2	Risk of planning in the project					

3	Under quality is risk in this project					
4	Existence of risk management plan and its proper usage					
5	To understanding and application of all kinds of construction insurance in the project planning					
B	**Risk Analysis**					
6	Poor or narrow understanding of risk					
7	Poor understanding of project scope is observed					
8	Professionals safety hazard is risk in this project					
9	Adequate risk monitoring and controlling mechanism in the project					
10	Tight and supportive project supervision which can bring tangible result					
C	**Risk Response**					
11	Adequate risk reporting communication system					
12	There is effective risk responding mechanism					
13	Lack of clients managerial capability					
14	high labor and equipment productivity					

15	all constriction equipment's are to protected in corruption					
D	**Risk Evaluation**					
16	The project control					
17	Assessing the risk in construction					
18	Price escalation is risk in this project					
19	Delay of design variation approval is risk in this project					
20	Under quality is risk in this project					
E	**Time**					
21	All employees are					
22	All project works respect their time					
F	**cost**					
23	Improper cost plan					
24	Delayed payment by clients					
G	**Quality**					
25	The project is quality					

26	All project equipment's are beautiful					
H	**satisfaction**					
27	The project employees are satisfaction					
28	Project employees not satisfaction					

Appendix C

Interview

1. Is their risk controlling and monitoring mechanism in the project? How do you handle disputes and how disputes are being handled in the project? ----------
2. Have you noticed terminated project/ consultant/ contractor in the last 3 years in the project?----------
3. How material/manpower/ machinery schedule managed in the project? ----------
4. How cost/ budget/ time schedule managed in the project? ----------

Thank you