ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

THE PRACTICE AND CHALLENGES OF RISK MANAGEMENT IN THE CONSTRUCTION SECTOR: THE CASE OF SELECTED HIGH-RISE BUILDING IN BOLE SUB-CITY, ADISS ABABA

BY:

EYOB AZANAW

JANUARY, 2024

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ID. NO. SGS/0053/2015B

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A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF ST. MARY'S UNIVERSITY IN PARTIAL FULFILMENT OF THE REQUIRMENTS FOR THE DEGREE OF MASTERS OF ARTS IN PROJECT MANAGEMENT

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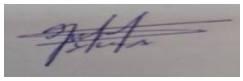
Yilkal Wassie (Asset Prof)	
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Declaration

I, the undersigned, hereby declare that this thesis entitled "**The Practice and Challenge of risk management in the construction sector: the case of selected high-rise building in bole sub city, Addis Ababa**" is my original work and that all sources of materials used for this study have been identified and acknowledged as complete references. This research study has not been previously submitted in full or partial fulfillment for a degree in this or any other recognized educational institution. This research study is being submitted in partial fulfillment of the requirement for Master of Arts in Project Management.

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ADVISOR's APPROVAL

This is to certify that the thesis entitled: "The Practice and Challenge of risk management in the construction sector: the case of selected high-rise building in bole sub city, Addis Ababa" submitted in partial fulfillment of the requirements for the degree of Master of Science in Project Management, is a record of original research carried out by Eyob Azanaw, under my supervision. No part of the thesis has been submitted for any other degree or diploma. The assistance and support received during the course of this investigation have been duly acknowledged. Therefore, I recommend it for acceptance as fulfilling the thesis requirements.

Name of Supervisor/Advisor	Signature	Date
Dr. Muluadam Alemu		**01/08/2025**

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ACRONOMY

BC	Building Contractors
GC	General Contractors
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute
PRM	Project Risk Management
RM	Risk Management
EBCS	Ethiopian Building Code Standards

Abstract

Construction is a risk prone industry. Occurrence of risks in construction could affect project objectives negatively. Involvement of risk management plan and process is the best possible way to exist in this hasty environment. This is because analysis of risks gives better understanding of risks and the resulting impact of the risks, if they occur. This enables the project management team to have a better estimate of the impacts of risks. The estimated project cost is the sum of the baseline cost and an allowance to handle the cost impact of risks (i.e. contingency). Having a realistic estimate of this allowance would mean better estimate of project cost. This study focuses on the practice and challenges of risk management within the construction sector, specifically analyzing high-rise building projects in Bole sub-city, Addis Ababa. The research identifies key shortcomings in the implementation of risk management strategies, which have negatively affected project objectives. It highlights that while some studies have explored the practical aspects of risk management, there is a notable gap concerning the specific risk factors affecting project outcomes and the corresponding mitigation strategies. The research employs an exploratory design to analyze risk management practices among Grade-1 construction companies. Both quantitative and qualitative data collection techniques, including questionnaires distributed to industry professionals. The findings reveal that the primary challenges in risk management include insufficient resources, lack of training, and inadequate risk identification processes. Data analysis indicates that a significant portion of construction firms recognize the importance of risk management but often lack dedicated departments to manage these aspects effectively. The study identifies critical risk factors such as high inflation, delayed payments, poor resource management, and economic instability, all of which frequently contribute to project delays and cost overruns. The research concludes with recommendations for enhancing risk management practices to improve project delivery in the Ethiopian construction sector.

Key Words: Building Construction project, High-rise, Risk, Risk Management, Risk identification, Risk analysis and Risk response.

CHAPTER-ONE:

INTRODUCTION

1.1 Background of the study

Construction is a unique industry, with complicated process, financial intensity and involves collaboration of participants from different field of studies. This special behavior exposes the industry to various types of risks that causes deviation from the objective of the project, particularly the cost, time and quality of a project. (Bahamid & Doh, 2017). The industry must be dynamic to be able to respond to the changes that the world is constantly facing (Alhassan, 2016; Marco, 2014). Thus, due to the development of construction industry in the world in general and in developing countries in particular, construction sector is considered as a vital sector in today‘s economy.

Risks are considered as the probability of an unfavorable outcome arising from a decision (Wood and Ernest, 1977). In the construction management domain, Perry and Hayes (1985) define risk as an exposure to economic loss or gain arising from involvement in the construction process.

The most important definition of Risk Management (RM) for this study purpose is the one given by PMI (2013) which defines risk management as systematic processes of conducting risk management planning, identification, analysis, response planning, and controlling risk on a project. The objectives of project risk management are to increase the likelihood and impact of positive events, and decrease the likelihood and impact of negative events in the project. A good RM procedure will support better decision-making concerning risk, as there will be a better understanding of the risks, how these risks will affect the project and the responses to these risks if they should occur.

Risk management is a concept, which becomes very prevalent in a number of businesses. According to Gajewska and Ropel (2012). The process of accepting or implementing actions to a known risk to minimize the probability of occurrence or the effect of adverse event is called risk management. (Wissem, 2013). Risk management is an iterative process comprises of risk identification, analyzing and rating of risks, developing a response plan and monitoring the application throughout the process. (Schieg, 2006).

A project is said to be successful when the objectives of that project are met within allocated time, budgeted cost, and within required specifications. One of the most single important things someone can do to ensure a successful project is managing risks. A risk is anything that could adversely affect project schedule, cost, quality or scope. That is a risk may impact project performance, cost, time and scope targets (Lewis, 2011).

Project risk management in the construction sector, focusing on selected high-rise buildings in Bole Sub City, Addis Ababa, involves recognizing the inherent complexities and uncertainties associated with construction projects. High-rise buildings present unique challenges such as structural integrity, safety considerations, and coordination of various stakeholders.

In the context of Addis Ababa, a rapidly growing city with a huge construction sector, the need for effective project risk management practices is paramount to ensure the successful completion of high-rise building projects. The increasing number of high-rise developments in Bole Sub City underscores the importance of understanding and addressing the specific risks that these projects face.

Previous research has highlighted the significance of project risk management in construction, emphasizing its impact on project outcomes, costs, and timelines. However, there is a gap in the literature regarding the specific practices and challenges of project risk management in the context of high-rise buildings in Addis Ababa, particularly in Bole Sub City.

By delving into this topic, the study aims to contribute to the existing body of knowledge by shedding light on the current state of project risk management in high-rise construction projects in the area. Understanding the background and context within which the study is situated is essential for identifying areas of improvement, informing best practices, and ultimately enhancing the success of high-rise building projects in Bole Sub City, Addis Ababa.

1.2 Background of the Selected Projects

Ethiopia has experienced significant economic growth which results urbanization, architectural development, infrastructure and urban planning over the past two decades. Addis Ababa, the capital city stands at the intersection of tradition and modernity. Bole Sub-city, one of the ten sub-cities of Addis Ababa, Ethiopia's capital has become a focal point for urban development and modernization in recent years. This area is characterized by its vibrant commercial activities, cultural diversity, and strategic location, making it a prime spot for high-rise construction.

This study employed a multiple case study and focused on three selected high-rise building projects. The sample projects were chosen purposively for the study. They are a huge project regarding to the cost and scope of work so that they are representative sample of other projects, which is affected by Risk management practices severely.

1.3 Statement of the Problem

The construction industry is highly risk and is vulnerable to various technical, external, organizational, and project management risks. The track record to cope with these risks has not been very good in the construction industry especially in developing countries like Ethiopia. As a result, the people working in the industry bear various failures, such as failure of achieving the required quality and operational requirements, cost overruns, and uncertain delays in project completion. (Ayalew, Dakhli, & Lafhaj, 2016) To minimize these losses effective systems of risk management for the construction industry need to be developed.

Risk management in the construction project management context is a systematic way of identifying the risks in a project, analyzing them and managing the risks by developing a proper response plan to achieve the project objectives (Banaitis & Banaitiene, 2012). In the past five years, several studies were done on risk management practices in construction projects. According to these researches, risk management practice in construction projects in Addis Ababa, Ethiopia is not satisfactory and needs improvement. The research papers are consistent with their conclusion that there has been a negative impact on the financial, schedule, and quality of construction projects due to an unsatisfactory risk management system. This conclusion is also supported by a study done on performance and challenges in Ethiopia construction industry in 2016 which claims that there is a schedule slippage that ranges from 61-80% and while there is an increase in the initial project budget that ranges between 21-40%. (Ayalew, Dakhli, & Lafhaj, 2016).

This research aims to identify risks that severely affect the financial and schedule of construction projects and the management practices to be used for a different type of risk. The risks will be identified, the probability of occurrence and the effect they have on the project's cost and time and the risk responses will be identified by distributing questioner to project stakeholders. Therefore, these findings can contribute to the knowledge database for the use of project managers to identify the major risks that frequently occur in building construction and suggestions on how to treat these risks to minimize cost and time overrun due to these risks.

1.4 Research Questions:

1. What are the potential risk factors influencing High-rise building construction projects with particularly in Bole Sub-city Addis Ababa?

2. What are the key challenges faced by stakeholders in implementing effective project risk management strategies in the construction sector in Bole Sub City?

3. What are the current practices of project risk management employed in high-rise building projects in Bole Sub City, Addis Ababa?

1.5 Research Objectives:

1.5.1 General Objective

The main objective of this study is to assess practice and challenges of risk management in the construction of high-rise buildings in Addis Ababa, bole sub-city.

1.5.2 Specific objectives

1. To describe the risks factors influencing construction projects with respect to High-rise Building project.

2. To identify the key challenges faced in implementing effective project risk management strategies in the construction sector.

3. To examine the current practices of project risk management in high-rise building projects in Bole Sub City.

1.6 Significance of the study

The degree of confidence of the available information is crucial to decision-making at any point during a building project. Understanding the risks that could arise, the uncertainties, and the best ways to manage them is essential to ensuring that project goals are reached. Risk analysis helps to quantify the degree of severity that each risk has on project objectives by estimating the likelihood that they will occur and assigning a fair value to the potential effects of significant risks that have been identified.

The result of this research will be used as guide to the process of risk identification and analysis which could be applied to high-rise building construction projects. Using the output of risk analysis enables exhausting the best possible management solution to minimize negative effect of risk events and hence determine the project duration and project cost.

Risk management is a continuous process. It is a cyclical process that must be completed at predetermined intervals over the course of the project. This is to ensure the efficacy of the risk management process and to address the dynamic nature of risk and its relationship to the amount of information available at various phases of a building project. The project team can be well-prepared and react appropriately by putting the risk management method into practice.

1.7 Scope of the Study:

The scope of the study is delimited to risk management practices and challenge of high-rise building construction projects in A.A, Bole sub city.. It is confined to assess the application of risk management processes and techniques to the projects. The study also focused mainly on the project main actors such as project managers and project teams. Clients, contractors and consultants were also included in the study so as to get robust and valid data from the participants. From methodological perspectives, the study is designed to employ mixed methods research approach so as to examine risk management practices of the selected three building contractor projects. Thus, mixed method research design was employed in the study.

1.8 Limitation of the Study:

One of the shortcomings of the study is that in building construction the risks faced during the process can be widely different and includes unpredictable risks. Therefore, it is hard to conclude that all risks are identified and the responses recommended for the risks are sufficient for the successful completion of the project. Therefore, it is important to understand risk management is a continuous process and should be implemented in every stage of the construction process. Other limitations of the study are the number of units of analysis used for the research. From a considerable number of contractors in Ethiopia, due to limited time and resources, the study only focused on the ISO certified construction companies in Addis Ababa. Additionally, there were some challenges faced during data collection; such as some of the questioners distributed were not responded to and others responded late, which delayed the analysis time of the paper. The researcher was also forced to redistribute the questioner to some of the participants.

In addition, response strategy was limited only to the overall perception and preference of participants from the possible risks that might occur. Fourthly, the probability of occurrence of risk factors associated with building construction projects used a five point Liker Scale in this study. Respondent requested to rate the likelihood of occurrence of these risk factors, possible risks and response strategies as (1) Very Infrequent, (2) Infrequent, (3) Neutral, (4) Frequent, and (5) Very Frequent respectively. However, Scale number (3) should have been termed and used as Moderate scale.

The study is also delimited to risk management in high-rise building construction projects in Addis Ababa, bole sub city.

Moreover, the participants involved in the study were delimited to grade-one contractors and consultants: who are playing a major role in the construction industry that includes Addis Ababa. These stakeholders are operating in construction and designing of building projects and are expected to have higher performance capacity, machineries, equipment and technical capability. As a result, the study findings would be applicable to those participants with lower grades of contractors and consultants.

1.9 Organization of the paper

This research organized in to five chapters. Chapter one introduced the topic, presented a background to the study, put forward a problem statement, enumerated the research proposal objectives and questions, will be discussed the significance of the study to the various stakeholders, exposed the scope of the study, limitations and organization of the chapters making up the study.

Chapter Two review present literature and preceding studies relating to the subject. The chapter compare the findings and theoretical keystones of other studies and assessed their correlations to this study. The study consider other literary works, textbooks, journals, reviewed web articles, and other reliable sources of data.

Chapter Three present the methodology used in undertaking the study. The chapter take an in-depth look into research design, research population, the data collection, method of data analysis, sample and sampling technique are discussed.

Chapter Four analyze the data collected and discussions of the study. The chapter give a detailed presentation of the collated data, analysis of the data and a discussion of the findings

Chapter five present a summary of the research findings, itemizing all the findings made under the various research objectives and making recommendation based on the findings obtained. The recommendations were mostly geared towards the management and staff of the selected work units. The conclusion of the study put the entire study into perspective and summed up the theme, findings and the directions for future studies.

CHAPTER-TWO:

REVIEW OF RELATED LITERATURES

2.1 Introduction

This chapter covers the Review of Related Literature by a wide range of academics and writers, with a focus on project risk management specifically in relation to building construction projects. From the perspectives of multiple scholars, theoretical ideas related to projects, project management, the project risk management process (risk identification, risk assessment, risk response methods, and risk monitoring), and risk management tools and methodologies were presented. Additionally, the literature was empirically reviewed from the standpoint of the research findings and techniques employed. Ethiopia's construction sector, risk management, and conceptual framework are examined. The thorough analysis of relevant material carried out with the intention of addressing the study's goals.

The word risk is quite modern, it entered the English language in the mid-17th century, coming from the French word risqué and in the second quarter of the 18th century, the Anglicized spelling began to appear in insurance transactions

The Oxford Advanced Learners Dictionary Adefines risk as the possibility of something bad happening at some time in the future; a situation that could be dangerous or have a bad result. Unlike the usual dictionary definition of “risk” which refers only to undesirable events, interpretation of risk includes both down side and upside variations in the values involved. Bowen [2005] stated that despite the largely negative connotation of risk that prevails today, it has to be conceded that one person's risk maybe another's opportunity to profit.

Project is characterized by a distinctive set of coordinated temporary activities undertaken by an individual or team to meet specific objectives within defined time, cost and quality/performance constraints. Project management can be defined as the planning, organizing, monitoring and controlling of all aspects of the project to achieve the objectives on time and to the specified cost, quality and performance. According to Project Management Institute (PMI. 2008) Body of Knowledge (PMBOK), projects, which are temporary endeavors undertaken to meet unique goals and objectives within a defined scope, budget and period, typically go through a life cycle. The project life cycle, which is a logical sequence of activities to accomplish the project‘s goals, is made up of five stages viz., the Project Initiation stage, the Project Planning stage, the Project Execution stage, the Monitoring and Controlling stage, and the Project Closure stage. Attention

to detail, along with the involvement of key stakeholders and proper documentation at each stage ensures the success and quality of the project. The sequential phases are generally differentiated by the set of activities that are carried out within the phase, the key actors involved, the expected deliverables, and the control measures put in place (Project Management Institute [PMI], 2008) Chatfield, (2007) as cited in Ofori, (2013), also defines project management as the discipline of planning, organizing and managing resources to bring about the successful completion of specific project goals and objectives.

Risk was defined simply by the Project Management Institute (1996) as a distinct event that could have a positive or negative impact on the project. Risk has been described as the likelihood of certain uncertain, unpredictable, and even unpleasant occurrences occurring that might alter the prospects for the profitability of a particular investment. This definition is used to highlight the eight main goals of the survey on risk management practices (Kartam, 2001). As a result, risk can imply different things to different people; in other words, the idea of frisk differs depending on one's perspective, attitudes, and experiences. Risk is often viewed from a technological standpoint by engineers, designers, and contractors; from an economic and financial standpoint by lenders and developers; and from a safety and environmental standpoint by chemical engineers, environmentalists, and health professionals.

2.2 Theoretical framework of the study

2.2.1 Project management and project risk management

According to PMI 2017, p.10 Project management, is that the application of information, skills, tools, and techniques to project activities to fulfill the project necessities and accomplished through the suitable application and integration of the project management processes well known for the project. (PMBOK Guide) mostly used as an inclusive outline of project management procedures and major sources, and it is the foundation for PMI certification.

One of the project management knowledge areas that is the subject of the analysis is project risk management. It consists of numerous subprocesses that deal with achieving the project's predefined goals and have a significant impact on its final result. The process of categorising, assessing, and ranking various risk categories, as well as planning, implementing, and tracking risk mitigation strategies, is known as risk management. It is a step in the process of thinking critically about potential risks, complexities, or disasters before they happen and developing a strategy to avoid the risk, lessen its impact, or cope with its aftermath (Rumane, 2018).

In their research Smith, Merna, & Jobling (2006, p.2) revealed that risk management as "one of the most creative tasks of project management" and consist of four steps; that is, to recognize the risk sources, to measure their effects (risk assessment and analysis), to expand managing responses to risk, and finally to provide for residual risk in the project estimates. "The language of project risk management explains this phenomenon: Known unknowns represent identified potential problems and unknown unknowns are the problems that arrive unexpectedly" (Verzuh, 2016, p.138).

Project management body of knowledge defined project risk management as:

Project Risk Management includes the processes of conducting risk management planning, identification, analysis, response planning, response implementation, and monitoring risk on a project. The objectives of project risk management are to increase the probability and/or impact of positive risks and to decrease the probability and/or impact of negative risks, in order to optimize the chances of project success (PMBOK Guide 2017, p.395*).*

2.3 Classification of Risks

Besides, to the diverse meanings of risk, there are several approaches for classifying risk for varied objectives as well. Some of the following listed below

I) According view of Cooper et al. (2005, p.3) risk is classified as business risks, project risks, operations and processing risks.

a) Business risks include all those risks that might affect the viability of the enterprise, including market, industry, technology, economic and financial factors, Government and political influences.

b) Project risk includes all those risks that might influence the cost, schedule or quality of the project.

c) Operational and processing risks include all those risks that might influence the design, procurement, construction, commissioning, operations and maintenance activities, including major hazards and catastrophic events.

II) According to Jayasudha & Vidivelli (2016, pp.6944-6945) risks are either acceptable or unacceptable.

a) An acceptable risk is one that negatively affects a task on the non-critical path.

b) An unacceptable risk is one that negatively affects the critical path.

III) Risks are either short or long term.

a) A short-term risk has an immediate impact, such as changing the requirements for a deliverable.

b) A long-term risk has an impact sometime in the distant future, such as releasing a product without adequate testing.

IV) Finally, risks are either internal or external.

a) An internal risk is peculiar to a project, such as the inability to get the parts of a product to work (labor, materials, sub-contractor, design (consultant) contractual, construction, financial, management, and environmental, etc.).

b) An external risk originates from outside the scope of the project, such as economic, physical, political, and technological change, etc.

2.4 Source of Risks

Furthermore, research on the topic has tended to identify the following sources or types of risks. However, there is currently no complete study that explains the sources of hazards among construction organisations. (2001, Estate Management Manual): Commercial, financial, legal, political, social, environmental, communications, geographic, geotechnical, construction, technological, operational, demand/product, and management hazards are all examples of risks.

These sources of risk relate to project-specific and non-project-specific risks, as both these types of risk need to be considered when identifying the risks in a project or a process. The institution, assisted by the project team, need to define the boundaries of these sources and to break down these sources into detailed risk elements. This will allow a common understanding amongst those attempting to identify the risks in a project.

The division of risks into source elements can be difficult. It also creates the potential for increased personal subjectivity. It can also lead to the possibility of "double-counting" some risks by attributing the same risk to more than on source. This may, however, beneficial in understanding the relationships between risk sources and elements (Estate Management Manual, 2001). The obvious problem with categorizing risk, apart from the cultural perceptions noted by the royal society report, is that there is a danger of confusing sources, causes, effects and fields of study for the risk domain. It is proposed that the risks can be considered with respect to six categories: financial and economic, political and environment, design, site construction, physical and Environmental factors. While the list of potential risks in every category is neither complete nor exhaustive, it does represent the majority of typical project risks and demonstrates the advantage of a logically developed classification scheme (Enshassi & Mayer, 2001).

2.5 Risks in Construction project

Every human endeavor involves risk and the success or failure of any venture depends crucially on how those risks are dealt with (Deyand Ogunlana, 2004). According to Ogunsami, Salako and Ajayi (2011) it was argued that risk occurs in every dimensions of human life and as such construction projects are not an exception from this as they are characterized by activities that are prone to different types of risks ranging from political to construction risk. According to Oxford Advanced Learners Dictionary (1995), it defined risk as the „chance of failure or the possibility of meeting danger or of suffering harm or loss. In specific relation to construction, Hackett and Statham(2007) defined risk as „the possible loss resulting from the difference between what was anticipated and what finally happened".

Common consequences of project risks are cost overruns, time overruns, poor quality, and disputes among parties to a construction contract. Risk is an important issue to all stakeholders of the industry. However, the problems of risk assessment are complex and sometimes, poorly understood in practice. According to Baloi and Price (2003), different people attach different meanings to the concept of risk and it varies according to viewpoint, attitudes and experience. Engineers, designers and contractors view risk from the technological perspective; financial managers and developers tend to view it from the economic and financial side; health professionals, environmentalists, chemical engineers view risk from safety and environmental perspective.

Risks specific to a project are interactive and sometimes cumulative that they affect cost and benefits associated to the project (Smith, 1999). Furthermore, risks in construction projects arise from a variety of sources; environmental/political; health and safety/hazard; market conditions; and technical/functional sources. Fong (1987) argued that those risks sources generally recognized within the construction industry are continually faced with a variety of situations involving many unknowns, frequently undesirable and often-unpredictable factors that include timing schedule slippage of the project tasks, technological issues, people- oriented issues, finance, managerial and political issues (Lockyer and Gordon, 1996). According to Osama and Salman (2003), three kinds of construction risks were highlighted and they include: financial- where project exceeds its budget and endangers the financial health of the company, time and design–related risks.

It has been generally established that in the execution of building project, the final contract sum often varies from the budgeted sum of the contract. This could be caused by either a decrease or

an increase to the original contract sum and sometimes it is due to the complex nature and time span required for the execution of projects.

2.6 Risk factors Affecting construction Projects

Risks can be related to business, operational or technical part of projects. Construction industry risk factors are best categorized in to:

a) Technical risks: unfinished design, unsatisfactory site investigation, Suitability of specification, Uncertainty over the source and availability of materials

b) Financial risks: changes/fluctuation in foreign exchange, Return of funds, delays in payment, local Taxes and Inflation.

c) Management related risks: industrial related problems, unsure productivity of resources, clash of interest and wrong decisions.

d) Logistical risks: availability of necessary facilities for transportation and construction equipment that will be needed for the progress of the work.

e) Socio-political risks: difficulties in disposing of plant and equipment; limitations on the availability and employment of emigrant staff; and persistence on use of local firms, methods and agents.

f) Environmental risks: climate changes, weather implications, and natural disasters.

2.7 Risk management in construction industry

Although risk management has been firmly established across business sectors, it has only lately expanded to encompass the construction industry [Norman, 1993]. Risk management is now universally seen as a crucial element in project management. Construction projects, which are the most prevalent and typical project types, have a number of characteristics, including a specific goal, a time limit, financial constraints and economic requirements, unique organisational and legal conditions, complexity, and systematic characteristics. As a result, individual investment projects are complex systems.

According to the PMI's 2013 project management book of knowledge, risk management is the methodical process of recognising, evaluating, and mitigating project risk. It entails minimising the likelihood and effects of events that are detrimental to project objectives and optimising the likelihood and effects of events that are favourable. Below is a discussion of each risk management component from the standpoint of building projects.

2.8 Project risk management processes

Risk management process intended to decrease or remove the risk of some categories of activities taking place or having an influence on the project (Rumane, 2018). Risk management procedures of construction project describe the work of all project life cycle. Project management body of knowledge described risk management processes, "plan risk management, perform qualitative risk analysis, perform quantitative risk analysis, plan risk responses, implement risk responses, and monitor risks" (PMBOK Guide 2017, p.395).

According to the Risk Management Task Group (2012), every project risk management technique aims to maximize efficiency and effectiveness. Identifying, analyzing, and taking action are the three fundamental components of risk management, while the specifics of risk processes may differ depending on the project. The Task Group further clarified that before risk could be properly mitigated, it must first be identified, described, implied, and assessed. As illustrated in Figure 2.1 below, a comprehensive project risk management endeavor includes the following steps: Risk Management Planning, Risk Identification, Qualitative Risk Analysis, Quantitative Risk Analysis, Risk Response, and Risk Monitoring.

Risk management process emphases on the requirements and the main concern of the customer and comprises approaches, systems and instruments particularly established for this goal. A risk

chief or expert who is in charge for forming a system for digging out data from project main staffs by means of risk identification and assessment (Smith et al. 2006) frequently leads the procedure. The process is repetitive with rounds in return to preceding phases that acquires confirmation and project group control. One of the very significant aspects in the risk management procedure is the assembly of crucial staffs with single aim only: to talk over, evaluate, and if possible, measure the risks that might influence the project's goals.

According to Cooper et al. (2005) risk, management method encompasses the organized use of management policies, processes, and procedures: to the responsibilities of making the circumstance, recognizing, and examining, measuring, handling, observing, and interconnecting risk and applies across all phases of the project.

Fig 2.1 Risk management planning process

Source: Cooper et al. (2005)

2.8.1 Plan risk management

For risk management to be successful, careful preparation is essential. The project risk management plan, which outlines the risk management methodology, roles and duties, cost and schedule requirements, risk categories, and probability and impact matrix, is the primary product of this process (PMBOK, 2004). Therefore, risk management planning is expected for building projects, and planning activities must be carried out on a regular basis. To establish risk management activities and create the project's risk management strategy, project teams convene risk management planning meetings.

Table 2.1 planning risk management

INPUT	TOOL & TECHNIQUE	OUT PUT
1. Project management plan	1. Analytical Technique	1. Risk Management Plan
2. Project charter	2. Expert judgment	
3. Stakeholder Register	3. Meetings	
4. Enterprise Environmental factor		
5. Organizational Process Asset		

Source: PMBOK, 2004

2.8.2 Risk Identification

Risk identification is the process of identifying risks that can adversely affect the project cost and schedule and the opportunities that can reduce project costs or result in a reduction in project duration [Touran, 2006].

The objectives of risk identification are to identify and categorize risks that could affect the project and to document these risks and the outcome of risk identification is a list of risks [NCHRP, 2009].The main objective is to see that the major risks that could affect the project most adversely. Most commonly a relatively small percentage of key risks are likely to account for the majority of the time and cost implications of the entire risk [Mead, 2007].

Risk identification is often under taken through a variety of methods which may include checklists, brainstorming, visits to site, corporate experience (or drawing upon consultants or subcontractors who have experience in the particular industry segment), analysis of prior projects, the use of organizational chart store view internal structures and flow charts to review process issues and through research, interviews and surveys of parties likely to be impacted by the proposal [Mead, 2007].

The process of identification and analysis of risks should be continuous process from concept to operation phase of the project to maximize the risk control mechanism of the project and ensure the completion of the project on time and budget. There result of this process will be recorded in the risk register for subsequent identification process [Asnake, 2010].

The development of a building construction project involves several stages and takes a long time, from conceptualization to viability analysis and principle design to project completion. It calls for a number of people with a range of interests and specialties, as well as the use of machinery

and equipment and a suitable material procurement plan. All of these complex situations must be properly balanced in order to provide a seamless sequence of occurrences. The phases of risk management analysis and control are built upon the basis of risk identification.

Risk classification in the literature for effective constructing project management; have been proposed in several methods. Szymanski (2017, pp.176-177) classified risks in to five major categories in a building project: “Preliminary design, tender, detailed design, construction works, and financing the investment.”

Table 2.2 Identified Risk Factors and their Category in building Construction Projects

Input	Tools & Techniques	Output
1. Risk management. plan	1. Checklist analysis	1. Risk Register
2. Cost management. plan	2. SWOT analysis	
3. Schedule management. plan	3. Expert Judgment	
4. Human resource plan		

Source: PMBOK, 2004

2.8.3 Risk Analysis

Risk analysis involves quantifying the impact and the probability of occurrence of risks. After identification and classification of the probable risks, their impacts on the project objectives need to be assessed to develop proper response. Risk analysis can also be described as short listing risks with the highest impact on the project, out of all threats mentioned in the identification phase [Cooper et al. 2005].

The choice of modelling and analysis tools has been found to be influenced by the type of hazards being considered [Baloi, 2012]. There are two ways to assess project risks: the qualitative approach and the quantitative technique. To determine the likelihood that a risk will materialise and its effect on the project, quantitative analysis uses statistics. On the other hand, the qualitative approach depends on judgements and determines results using criteria. The following is a brief presentation of the two main categories of risk analysis techniques:

Methods of Risk Analysis

a) Qualitative Risk Analysis

Qualitative risk analysis assesses the priority of identified risk suing their probability of occurring, the corresponding impact on project objectives if the risks do occur, as well as other factors such as the period and risk tolerance of the project constraints of cost, schedule, scope, and quality [OSPMI, 2007]. It involves assessment of risks using risk matrix to determine their likelihood and potential effect on the project objectives.

A common qualitative approach is the precedence diagramming method, which uses ordinal numbers to determine priorities and outcomes. Another way of employing qualitative approach is to make list of the processes of a project in descending order, calculate the risks associated with each process and list the controls that may exist for each risk [Nadeem, 2010].

b) Quantitative Risk Analysis

The quantitative risk analysis process, although not very common in construction projects, is very useful to support project management decisions. This process uses techniques such as sensitivity analysis, probability analysis, Monte Carlo simulation and decision analysis to determine many project assumptions [PMBOK, 2013].

Quantitative risk analysis is the most sophisticated technique and involves determination of the level of impact and probability of occurrence of projects risks [Thomson, 1992].The quantitative analysis is required for risks that are analyzed in qualitative analysis and have significant effect. The quantitative analysis usually uses the project program and cost estimates to quantify the effect of risk son time and cost constraints of the project.

The likelihood of accomplishing the project's goals, which include cost, time, and quality, is one of the quantitative analysis's outputs. The outcome can be used by employers and contractors to estimate the contingency amount that could be needed to respond for the likely risks in order to meet the project objectives. Project risk analysis must take into account the risks' overall effects on the project's duration, which can be done by calculating the net present value (NPV) of every potential combination of risk impacts using computer-based analytical tools such Monte Carlo simulation [ERA-SMEC, 2008].

Table 2.3 Risk Analysis

Input	Tools & technique	Output
1. Risk mangt. plan 2. Risk Register 3. Scope baseline	1. Risk probability & impact assessment 2. Probability & impact matrix 3. Risk categorization 4. Expert judgment	1.Project document updates

Source: PMBOK, 2004

2.8.4 Risk Response

Once the risks of the project have been recognized and examined, appropriate risk response strategy adopted in order to take the necessary steps to minimize the negative effects of risk on project objectives. The nature and potential consequences of the risk will be bases for the mitigation measures to be established. The central goal is to avoid as much as possible the likely effect and to raise the degree of control of risk. The more effective the measure is on one risk, depends on the more control of one mitigation measure (Wang et al. 2004).

Furthermore, Banaitiene & Banaitis (2012) proposed four different methods for handling risks in a building project: risk acceptance, risk transfer, risk mitigation, and risk avoidance. Risks must be identified and assigned in a unique manner in order to be managed effectively. Agreed bodies can be genuine if they are aware of their risk obligations, risk event conditions, and risk treatment capabilities. Following the identification of every risk that exists or could arise during the project, steps must be taken to provide specific solutions for each risk.

These actions can be dual. Firstly, they might target to finish removal of negative impacts on the project or emphasis on decreasing the negative effect. These responses grouped into four key parts: acceptance of risk, transfer of risk, reduction/mitigation, and avoiding risk. Nevertheless, the Risk Management Group (2012) discusses by dividing the risk response strategies in to two main categories, i.e. responses for treats (avoid, transfer, and mitigate) and responses for opportunities (exploit, share, and enhance); and acceptance being common for both categories.

Avoiding risk:

An avoid strategy may be used if the overall project risk is substantially negative and falls outside of the project's established risk criteria. This entails taking targeted effort to bring the

project back inside the thresholds and lessen the detrimental impact of uncertainty on the project overall. Eliminating high-risk project scope components is an example of avoidance at the entire project level. The project might be cancelled if it is not feasible to bring it back within the thresholds. This is the highest level of risk avoidance and should only be applied when the overall threat level is and will continue to be intolerable (PMBOK Guide, 2017, p. 445).

Acceptance of risk: Nicolas and Steyn (2017) described that risk are an escapable, but only the prominent substantial ones that need consideration. If a risk and its effect are important, techniques needs establishment to remove or decrease the risk to a tolerable degree. What is taken in to account "acceptable" is to be determined by on the risk "tolerance" of project participants.

Retaining the risk is being aware of it, its outcome, its probability, and being accommodative by doing nothing. Should the risk materialize, the project team will react. This is a typical strategy when there is little chance of a risk materializing. This approach makes sense as long as the outcomes are less expensive than the remedy (Verzuh, 2009). Furthermore, Carstens, Richardson, and Smith (2013) explained that accepting a risk occurs when a project team acknowledges a potential risk and decides not to reduce the likelihood that the risk will materialise or the impact it would have if it did.

Transfer of risk/Sharing: is relate with the relocation of risk to another body indicating the capacity to resolve risk. One form of relocation is a direct relocation of losses results to another body. The main method of such an action is insurance, which permits lawful relocation of happening results. An example of risk relocation is to contract an 'uncertain task' to the service provider or transportation facilities to the freight firm Szymanski (2017). An approach to relocate the risk is to relocate the support scheme to a different group or another site such as another organization. The accountability of the support scheme exists in another institute, thus relocating the risk to a different group.

Partaking risks also is a form of relocation where a third group could be participated. To transfer the risks to another project is another form of sharing risks (Carstens et al. 2013). Being used a third party is the similarity between transferring threats and sharing opportunities. Those to whom opportunities allocated allowed sharing in the potential benefits and those to whom threats transferred take on the liability (Risk Management Group, 2012).

Reduction/Risk mitigation/: Mitigating a risk happens when a project group is responsive to risks and prepares a strategy of achievement to decrease the effect a risk will have on the project should the risk happen in the course of the project. Effecting primary deeds to decrease the possibility and/or effect of a risk, needs frequent operation than trying to restore the loss later the risk has happened.

Risk mitigation may require resources or time, and as such, it offers a trade-off between doing nothing and the expense of risk reduction (ibid). Activities that reduce the probability of taking action and lessen the impact of risk include, for instance, creating property accounts or matching one risk with another to lower overall risk. At every stage of the project, from planning to managerial actions, the importance of risk reduction may need to be explained (Szymanski, 2017).

2.8.5 Risk Monitoring and control

As the project is maintaining regular control for development, already identified risks, observed attentively and fresh risks are recognized. Risks that do not happen removed from the risk plan; freshly introduced risks supplemented; and the procedure of risk forecasting is continual. Altogether these actions consequences, that informs to the description of work, financial preserve, development statement, work breakdown structure, and the several other project management outputs (Verzuh, 2005).

Kerzner (2009) also stated risk monitoring and control as the procedure that methodically trails and assesses the accomplishment of risk reaction activities compared to recognized metrics during the course of attainment procedure and delivers contributions to informing risk response strategies, as suitable.

Monitoring outcomes may also deliver a foundation for evolving extra risk response plans, or informing prevailing risk response plans, and reexamining recognized threats. In specific situations, monitoring outcomes might also use to classify fresh risks and review specific features of risk forecasting. The basics to the risk monitoring and control procedure are to create a budget, methodological performance, and schedule management indicator system over the program that the program manager and other important staffs use to assess the position of the program. The indicator structure would be planned to deliver timely cautionary of likely difficulties to let management measures (Ibid). "Continuous monitoring by the project risk manager and the project crew confirms that fresh and varying risks noticed and accomplished as well as that risk encounter activities are applied and operational," according to the Risk

Management Group (2012). As a result, risk monitoring continues for the duration of the project. A pipeline of known risks, residual risks, and emerging risks is maintained through risk monitoring and control. Additionally, it evaluates the effectiveness of preset plans for recognized hazards and tracks their performance.

Checking and regulating treats traces recognized risks, checking residual risks, and identifying fresh treats, accomplishing risk response plans, and evaluating their efficiency during the course of the project phase. The key results of this procedure suggested remedial and protective activities, demanded variations, bring up-to-date to the risk record, and reviewed project-managing strategy (Carstens, Richardson, & Smith, 2013, p.388).

Finally, commissioning appropriate risk management and achieving widely acknowledged project outcomes depend heavily on communication and discussion with project participants and sponsors. These aid in the project manager's decision-making and assist everyone understand the risks and balances involved in a project. One important component of communication is regular written evaluation. According to information on the current state of hazards and risk management, all parties are fully informed and understand the risks, which eliminates any unpleasant shocks (Ibid).

2.9 Construction Industry and Risk Management in Ethiopia

Construction industry makes vital contributions to the socio-economic development route of a nation. Based on the Ministry of Urban Development and Construction (MUDC) construction industry policy (first draft) July (2012) the “National Construction Industry Policy” takes into thought of the very fact that the realization of the objectives and goals. The known significance components, like education, health, water, agriculture, manufacturing, tourism, mining, energy, construction, land and good Governance operates on the accessibility of consistent, robust and viable indigenous constructing sector. This, in turn, is proficient in providing services with excellence to its participants.

One of the principal purposes of the constructing sector strategy is to advance the ability and effectiveness of the indigenous constructing firms (contractors, consultants and informal sectors) (Ibid). In step with the report of The Construction Industry in Ethiopia (2018), an outsized range of micro-entrepreneurs characterizes the Ethiopian construction: the large percentage of which operates within the country’s informal economy.

Ethiopia's formal construction sector contains endogenous and indigenized corporation, also as various foreign technology and construction firms. Public and personal expenditure on infrastructure and different construction works has served as a catalyst for Ethiopia's fast economic development. The country has systematically invested greater than 30% of GDP into Gross Fixed Capital Formation (GFCF) expenditure since 2010 (Ibid)

Based on the Ministry of Urban Development and Construction (MUDC) construction industry policy (first draft) July (2012) the proportion share of the development sector to GDP at constant value has augmented from 4.5% in 2000/01 to 5.8% by 2009/10. Similarly, the value of the development sector expected at more than US$7bn. According to African Economic Outlook (AEO, 2017) report, construction activities in Ethiopia accounted for 15.9% of GDP at current costs throughout the 2015/16 fiscal year.

Regardless of this economic impact, maturity of risk management practice on projects, of the construction sector apparently seems to be at its very early stage. A small number of studies that conducted displayed that risk management practices in Ethiopian construction projects are, in general, insufficient. For instance, in his study result, with a specific preference of Ethiopian contractors, Yimam (2011) indicated that generally the maturity of the development aspect of construction project management identified at casual development maturity stage.

It described that risk and safety management are the least matured among project management knowledge areas. Essentially, it reflected that these two knowledge areas are completely unfamiliar or experienced rarely in the construction sector. Based on the outcome of an empirical evidence of the study, about 2/3 of the contractors do not have risk management practice. Nearly, 24% of contractors practiced risk management poorly. Out of the 21 contractors in his study, merely two implemented risk management process entirely at a casual or proper stage. None of the respondents identified to implement risk management at a 'managed' stage. Again, simply 38% showed that they 'identified and documented' risks and 33% assumed they implemented some examination to the probability and effect.

Yet again: quantitative risk analysis, which is using rated by experts as a progressive performance, practiced by none of the respondents. Furthermore, the research result revealed 76% of the respondents determined that there is no recognized project risk management performance or principles implemented in their company. He adds the usage of risk management tools and techniques is largely unknown.

Thus, the researcher recommended facilitation of training and mentoring to the contractors and special attention to resource, risk and change management to improve their project management knowledge and practice are among others (Ibid).

From the above findings, it reached to an agreement that risk management seemingly got very low level of attention. This might show the level of attitude, perception, awareness and significance towards risk management by the practitioners in the building construction industry of the country.

The Ministry of Construction registered and issued licenses and certificates of competence to those involved in the country's construction industry. The Ministry classified the contractors in to four categories, namely: General Contractors (GC); Building Contractors (BC); Road Contractors (RC) and Specialized Contractors (SC); based on some requirements such as experience and qualification, fulfill staff requirement, record of past performance and audited statement of accounts, various equipment requirements depending on the categories to which a contractor is registered, and other resources.

Each category, then sub-divided into 10 grades, which categorized accordingly based on the construction cost of the project that the contractor is seeking to undertake. Likewise, the Ministry classified consultancy firms broadly as follows: Consulting Architects and Engineers (CAE); Consulting Architects (CA); Consulting Engineers (CE), Highway and Bridge Consultancy (HBC) and Specialized Consultancy (SC) based on their resources, experience and other standards.

2.10 Review of Empirical Literature

There are many possible risks, which could lead to the failure of the construction project, and through the project, it is very important what risk factors are acting simultaneously. Besides, too many project risks as undesirable events may cause construction project delays, excessive spending, unsatisfactory project results or even total failure. There are four alternative strategies– risk avoidance, risk transfer, risk mitigation, and risk acceptance, for treating risk sin a construction project.

According by Zaghloul and Hartman [2010], there is no possibility to eliminate all the risks associated with a specific project. All that can be done is to regulate the risk allocated to different parties and then to properly manage the risk. Twenty risk factors were established to be sign if I can tender the internal risks categories. Under the design risk category, design errors/ omissions

and design process delays were the most frequently mentioned risk factors attributed to the contractors.

Under the project management risk category, scheduling errors and failure to comply with contractual quality requirements were the most frequently mentioned risk factors. Under the construction risk category, construction cost overrun sand technology changes were the most frequently mentioned risk factors attributed to the contractors.

An effective risk management process encourages the construction company to identify and quantify risk sand to consider risk contain men and risk reduction policies. Construction companies that manage risk effectively and efficiently enjoy financial savings, and greater productivity, improved success rates of new projects and better decision-making. To manage the risk effectively and efficiently, the contractor must underst and risk responsibilities, risk event conditions, risk preference, and risk management capabilities. (Banaitiene and Banaitis, 2011)

According to the study conducted in Gaza, Palestine by (Hamid, 2005) risk factors were identified and the most ten sever risk factors are appeared as from the contractors and clients side. From the contractors side, Financial failure, Working at hot (dangerous) areas, Closure, Defective design, Delayed payments on contract, Segmentation of Gaza Strip, Un stable security circumstances (Invasions), Poor communication between involved parties, Un managed cash flow, Awarding the design to unqualified designers. On the other hand, the top ten sever risk factors according to owners are Awarding the design to un qualified designers, Defective design (incorrect), Occurrence of accidents because of poor safety procedures, Difficulty to access the site (very far, settlements), Inaccurate quantities, Lack of consistency between bill of quantities, drawings and specifications, Working at hot (dangerous) areas, Financial failure of the contractor, Closure and High competition in bids.

Contractors and owners still depend on traditional approaches to manage risk factors and their consequences; the use of direct judgment to control risk factors was the most applied method used to control risk events (sections 4.7 and 4.8).These results as sure the need to develop the used methods for managing risk factors.

In are cent study conducted to assess the risk management practices of top contracting firms in United States, Shofoluwe and Bogale (2010) found that contractors use a wide variety of techniques in their risk management practices. However, for risk analysis, traditional method of analysis involving in tuition, judgment and experience were found to be the most predominantly used.

The construction of risk perception is influenced by a number of elements, including educational background, practical experience, individual cognitive features, project team, and information availability, according to Ritchie and Brindley (2007). These factors—physical, environmental, design, logistics, legal, political, and operational—have been recognised by other analysts as major sources of risk associated with building activities (Perry and Hayes 1985, Mustafa and Al-Bahar 1991). Despite claiming to have established documented procedures for risk management, it was discovered that clients and contractors were risk averse. Their awareness of how crucial risk management is to the construction industry is merely lip service. (UDITH, 2014)

Therefore, understanding the notion of risk and knowing how to effectively manage the risk matrix created when a construction project is launched are crucial for the construction business and those working in it [Bunni, 2003]. Being proactive is preferable to being reactive because risk cannot be completely removed but should be controlled [CIDB, 2004]. According to the client, the project briefing and user handover should be the first steps in the risk management process. In accordance with the procurement technique, clients are the ones that initiate the risk management process and include consultants and contractors at an earlier stage or throughout construction.

According to the study conducted by (Getachew, 2014) all respondents have some knowledge of risk management through reading and practice but the implementation level of risk management among respondents varies. Mainly, contractors and consultants understand risk management through reading and practice than the client and insurance companies.

The client (ERA) mainly uses the opinion of external consultants (design and supervision consultants) as the number one method of risk identification. The consultants and the contractors, on the other hand, mainly use site visit as the number one method of risk identification. By past experience or analysis of prior projects was ranked as second most used risk identification method by consultants and contractors.

In A case study of Iran made by (Ghahramanzadeh,2013)a questionnaire was designed and twenty-five risks were identified and categorized in five main categories as Political and Govern mental, Managerial and Technical, Economic and Financial, Cultural and Social, and Natural. Findings of the research revealed that Economic and Financial risk shave the greatest influence on construction projects in Iran. Moreover, there is a serious lack of risk management knowledge and expertise among all the three key categories of actors. The conclusion raw from the evaluation of risk management strategies was that due to high volatility of the economic and

political situation of the country, reactive risk management is practiced more than proactive risk management.

The three most critical risks, which are influencing construction projects significantly, revealed to be one of the following risks: cash flow, lack of financial resources, inflation, price fluctuations, and late payment, which in a sense all can be considered to be out comes of instable economy –E&F category of risk.

A research conducted in Nigeria by Bashir (2011) have explored the application of risk management in Nigeria, the barriers of risk management or factors that limit its application on and also the factors that will influence risk management development. It identifies that the main problem of risk management application in Nigeria is knowledge. All the factors that lim it the application are caused by lack of knowledge. It was found that the best knowledge get that will effectively manage project risks in the country is cost management and quality management. Materials price fluctuation has been identified as the most certain risk which occur in every construction project in Nigeria. Although increase in inflation rate hashing he possibility but its major effect is on the price of material which makes it the highest occurring risk factor in Nigeria. The attitude of construction participants is another problem to risk management. It was seen that contractors bid for risk prone projects with normal price, which in turn affect their profit margin.

2.11 Research gap

Even though risk management body of knowledge establishes a firm basis for assessing construction risks, several works of literature reviewing the actual practice of risk analysis find that there is a gap between theory and practice. While project management literature is rich in papers addressing risk management, few papers have researched the actual practice of risk management and investigated the practitioners' points of view regarding the available tools. According to a study made by (Hintsay, 2016), risk management is not implemented and practiced in the construction industry in Ethiopia and subsequently revealed that lack of board or senior executive risk management leadership, owners and the board of construction enterprises have been identified as the most important drivers for risk management implementation in construction enterprises. The study also pointed out that there is no established risk management framework that is being used in Ethiopia’s construction industry.

In Ethiopia, there are some researches done on risk management in the construction industry. These studies found that there are shortcomings in implementing risk management in the country, which is impacting the objectives of the projects. Even though these researches found the current

practical use of risk management in the construction industry and the level of deviation of project objective, there isn't much research done on the risk factors that affect the project objectives and the response methods to be followed to minimize their effect. This research does not have a conceptual framework due to its qualitative nature.

CHAPTER-THREE:

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

The purpose of this research is to study risk management related with selected high rise building construction projects, which locate in Addis Ababa, bole sub-city. To achieve this objective, this chapter presents the approaches, methods, instruments, techniques, and procedures, etc. that used to collect and analyze data. It includes research design, sources of data, population, sample size, and sampling technique, instruments of data collection, procedures of data collection, methods of data analysis, and ethical considerations.

3.2 Research design

The research design is the over-all blueprint of how the researcher go about responding the research question (s). It comprise clear objectives resulting from the research question(s), lay down the bases from which the researcher be going to gather data, plan how to gather and evaluate these, and talk over ethical subjects and the limitations that it certainly come across (Saunders, et al. 2016). To achieve the objective mixed method research approach used in the study. It helped to capture the best of both quantitative and qualitative approaches.

The research implemented descriptive research design in order to describe the situations and facts to the research questions of this specific study. It allowed for the collecting of data, review, propose and comprehend it for achieving a precise profile of risk events.

3.3 Description of the study area

This research was conducted on the high-rise Building construction projects performed by the Grade-1 construction company which is located in Addis Ababa targeting to study the practice and challenges of project risk management.

According to EBCS (Ethiopian building code standards), High-rise buildings are characterized by having number of floors greater than 12. Therefore for research purpose I have choose three high-rise buildings that are in different construction phase (excavation, structural construction and on finishing phase respectively) with in bole sub city.

The First one is 3B+G+28 Mixed use Apartment Building Located around millennium Hall. The Client is A.A Vision trading and the contractor is CCECC Chinese contractor.

The second one is a 4B+G+33 mixed used building which have a 3 blocks for commercial and residential purpose which is located around Dembel, Bole sub-city. The client is Dembel City center, the contractor is GC-1 Kibru fitret Construction and the Consultant is YENCOMAD Construction. The initial budget of the project was 2.2 billion.

The third one located around Sheger building. It is 4B+G+22 mixed-use Apartment Real estate. The Client and the contractor is Noah Real estate.

Project selection criteria

- Location: should be in the research focus area which is ADDIS ABABA, Bole sub-city
- Number of floors : they fulfil the required the no. of floor stated on EBCS(a minimum of 12 floors or 36 meters)
- Phase of construction. (Excavation phase, structural construction phase and finishing phase)

3.4 Unit of analysis

The focus of this research is to assess the practice and challenges of high-rise buildings construction project risk management. For this reason, the units of analysis are different construction companies on Grade-1. Employees, clients and Consultants who have been involved in the projects of this selected construction project asked to provide information of their respected job positions regarding the practice and challenges of project risk management; hence the technical staff were the units of observation.

3.5 Research approach and strategy

The purpose of this study was to examine the practice and challenges of high-rise buildings construction project risk management. Cross-sectional field survey using questionnaires was used. Constructs were measured at a particular time. Data was collected at one particular time. Since the study tries to explain the relationship between variables both qualitative and quantitative and exploratory methods will be adopted.

3.6 Target population, sampling size and sampling technique

3.6.1 Population

In this study, the population included three groups of participants. These building contractors, clients and consultants who are the major operators in the construction industry located in the national capital. It enclosed grade-one contractors (BC-1) and consultants (CAE-1). The explanation why those participants were chosen were in thought of that, they possess better financial position, material, and human resources (professionals/expertise, knowledge, and practice) than others. They typically design and perform massive building construction projects compared to the opposite lower grades of contractors and consultants. This enables, successively to have a major contribution to generalize to the population of the study.

In addition, due to constraints of time and finance, the investigator formed and centered on solely to the on top of mentioned participants for manageable samples size. The particular designation of the participants was Project/Technical/Risk Managers for each consultant, client and contractors. This can be as a result of risk management method is often directed by Project/Technical/Risk Managers who are in charge for making a basis for disposing of information from project main staffs with a knowledge of risk identification and analysis.

3.6.2 Sample Size

Before any information collected for getting a sample from a given population, a sample design should be determined with a definite plan (Kothari, 2004, p.14). Sample survey of clients, contractors and consultants employed within the study. This assisted to conclude the parallel value of the population, with less cost and time.

The sampling frame of this study involved a list of all employees and management stuffs from the three project stakeholders.

Therefore the sample size was; 70.

Table 3.1 Target population

Target Population			
High-rise Building Projects	Total no of Contractor employees	Total no of Consultant employees	Total no of Clients
Project-1	24	4	1
Project-2	16	2	1
Project-3	18	3	1
Total	**58**	**9**	**3**

Source: own survey, 2024

3.6.3 Sampling technique

In this study, research questions and objectives required to assess the features of the target population statistically from a sample. Therefore, it necessitated deploying probability sampling. Simple random sampling technique used, since there was an accurate and easily accessible sampling frame that listed the target population of clients, contractors and consultants.

In addition, due to the homogeneous nature of both building construction stakeholders samples nominated using simple random sampling technique. It deployed by choosing the sample at random from the sampling frame using lottery system. First, each of the participants numbered from the sampling frame with a unique number. Then each sample drawn one by one randomly without bias and replacement until it reached the actual sample size. The research deployed 95% confidence level that is a 5% error tolerance. These ensured representativeness of the sample to the population as a whole.

3.6.4 Sources of data

To help attain the research objectives and answer the research questions relevant data was collected mainly using primary sources. In other words, data gathered through questionnaires. This study is not an unprecedented research. For this reason, the researcher was using secondary sources of data to include studies conducted so far in relation to the main objective of this title and based on these previously conducted research the researcher was extended existing knowledge by offering some insight on the degree of variation in the practice and challenges of high-rise building in Addis Ababa, bole sub-city.

3.7 Data Collection Methods

3.7.1 Primary data collection tools:

Questionnaires: self-administered questionnaires distributed to the sample in the target population. Questions will be developed in the questionnaire to answer the research questions and meet the objective of the research.

Procedures of Data Collection

Having established the samples as discussed earlier a questionnaire developed and distributed to the selected project staff (Project Managers down to Site Engineers, and in some cases Engineers at the Head Offices).

The researcher indicate that the data would strictly be used for research purposes only. In addition a collaboration letter issued from the university also be provided to the approval of the surveys.

3.8 Method of analysis

The study has adopted descriptive Analysis (mean and standard deviation).

Mean is a descriptive method used to explain a set of data in a single number. It is used to measure the middle or center of a data. The response of the 66 participants was summarized by averaging the rating of each participants for each risk factor. In this paper, the mean value of the ratings was calculated using SPSS and from this analysis, the risk factors that have high probability of occurrence and high impact on project cost and completion time was identified. To analyze the third part of the questioner, the percentage of answers given for each risk response methods corresponding to each risk factors was calculated. The one with highest frequency is, then, identified for each risk factor.

Whereas, standard deviation is a measure of the amount of variation of the values of a variable about its mean. A low standard deviation indicates that the values tend to be close to the mean of the set, while a high standard deviation indicates that the values are spread out over a wider range.

On this paper, inferential analysis is not computed because here we are trying to assess the practice and challenges of risk management process not the causes and the effects.

3.9 Validity and Reliability

Questioners in a research are used as a means of collecting relevant and reliable in a valid manner. Thus, the validity and reliability of the questioner/ survey is essential. Validity assures

the area of investigation is explained by the collected data while reliability checks whether the questioner provides a stable and consistent result. Therefore, the validity and reliability of the questioner was checked.

The face validity of the questioner was checked by distributing the questioner to managers in construction companies. The Face validity involves the expert looking at the items in the questionnaire and agreeing that the test measures the characteristics or traits of interest (Bolarinwa, 2015). Cronbach's alpha (α) is the most common measure used to check the reliability of a Likert scale question. The Cronbach's alpha, for the questioner used in this research, was determined by running reliability analysis in SPSS. 0.911

Reliability Statistics

	Cronbach's Alpha	N of Items
Preliminary and detailed design	0.901	7
Tender	0.756	6
Construction Work	0.854	15
Finance And Economy	0.922	8
Political and Legal	0.676	5

3.10 Ethical considerations

All of the participants that responded to the questioner of the research were properly informed about the purpose of the research. Their identity as well as the names of the company they belong to has been kept confidential. Additionally, all the secondary data used in this paper have been properly cited all the information collected throughout this research only be used for the purpose of this study.

CHAPTER- FOUR

RESULT AND DISCUSSION

INTRODUCTION

This chapter presents data analysis and interpretations, which draws from the objectives of the study. The analyses are both qualitative and quantitative. The chapter is structured according to the questions in the questionnaire and provides discussion of the findings, their implications. Moreover, the additional data and observations, gained from the survey as well incorporated into the discussion. In addressing the research questions raised in the first chapter, a survey instrument and semi-structured interview questions were designed to capture information on risk management practices through risk identification techniques, possible risk description and analysis techniques, risk response strategies, risk monitoring and control and risk management techniques. Construction project risk management practices help determine what project risks or hazards exist or are anticipated, their remoteness in time, duration period and possible outcomes. Therefore, 70 questionnaires were administered to the sample participant and 66 responses were received. In a Likert scale of 1-5, the respondents were required to indicate the level of applicability of project risk management practices and challenges to their projects. A level of 1 indicated that the practice was very frequent to the project while a level of 5 indicated that the practices were very infrequent to very great extent to the project. Thus, biographical profile of the respondents sets off the discussion.

4.1. Analysis and Discussion of results

4.1.1 Socioeconomic Profile of the Respondents

Table 4.1 Summary of General Information

1. Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	22	33.3	33.3	33.3
	Male	44	66.7	66.7	100.0
	Total	66	100.0	100.0	
2. Age					

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-30 years	42	63.6	63.6	63.6
	31-40 years	22	33.3	33.3	97.0
	41-50 years	2	3	3	100.0
	Total	66	100.0	100.0	
3. Educational Background					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bachelor's degree	50	75.8	75.8	75.8
	Master's degree or above	16	24.2	24.2	100.0
	Total	66	100.0	100.0	
4. Role in the Construction Project					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Project Manager	14	21.2	21.2	21.2
	Consultant	6	9.1	9.1	30.3
	Office Engineer	22	33.3	33.3	63.6
	Site Engineer	18	27.3	27.3	90.9
	Client	2	3	3	93.9
	other	4	6.1	6.1	100
	Total	66	100.0	100.0	
	5. Work Experience				
	Below 1 year	2	3	3	3
	1-5 years	36	54.5	54.5	57.5
	5-10 years	24	36.4	36.4	93.9
	10-20 years	4	6.1	6.1	100
	Total	66	100.0	100.0	

6. field of Specialization					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Engineering	34	51.5	51.5	51.5
	Architecture	4	6.1	6.1	57.6

	Project Management	4	6.1	6.1	63.7
	Construction Management	22	33.3	33.3	97
	other	2	3	3	100
	Total	66	100.0	100.0	

Source: own survey, 2024

1. Gender

From the table, it can be seen that 66.7% of the participants were Male while the remaining 33.3% were Female. Paraphrasing, of the 66 valid responses fed into the SPSS software, 44 were male while 22 were female. The gender composition shows that the sample population on building construction companies in Addis Ababa is slightly dominated by male respondents.

2. Age

From the above table, it can be seen that 63.6% of the participants were from 20 to 30 years old and 33.3% of the participants were ranged from 31- 40 Years old while the remaining 3% were ranged from 41 to 50 Years old.

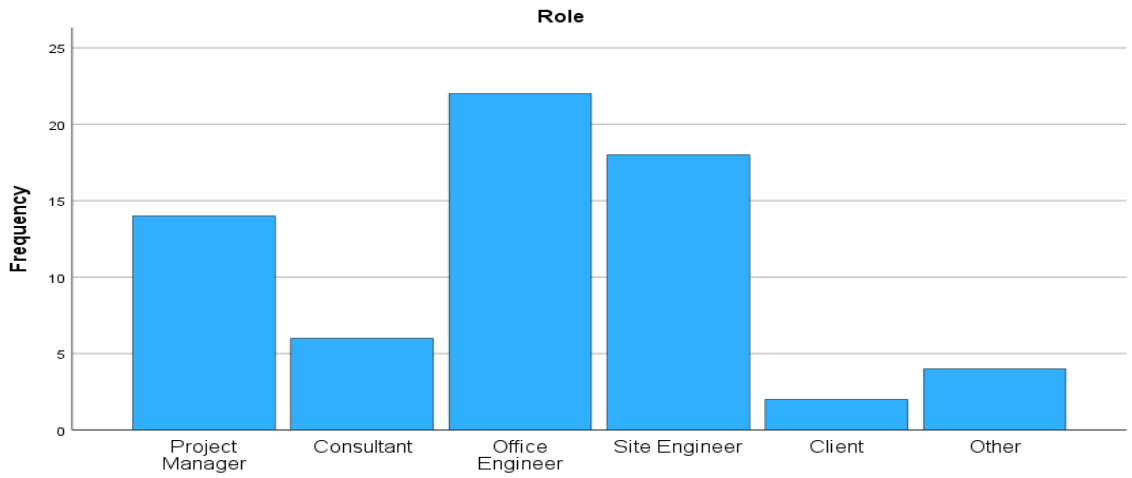
3. Educational Background

From the summary table above it can be seen that the number of respondents with a Bachelor's degree qualification is higher that the Master's degree qualification. From the total sample 75.8% of the respondents have a Bachelor's degree while 24.2% of the respondents have a Master's degree.

4. Role of Responders

The bar chart below summarizes the roles of the respondents. The positions held by the respondents were grouped into 6, namely, Project Manager, Consultants, Office Engineers, Site engineer, Clients and Other. Accordingly, 14 of the respondents were found to be Project Managers (21.2%), 6 were Consultants (9.1%), 22 were Office Engineers (33.3%), 18 were Site Engineers (27.3%), 2 were Clients (3%) and the remaining 4 were occupied other sectors (6.1%).

Fig 4.1 Role of responders



Source: own survey, 2024

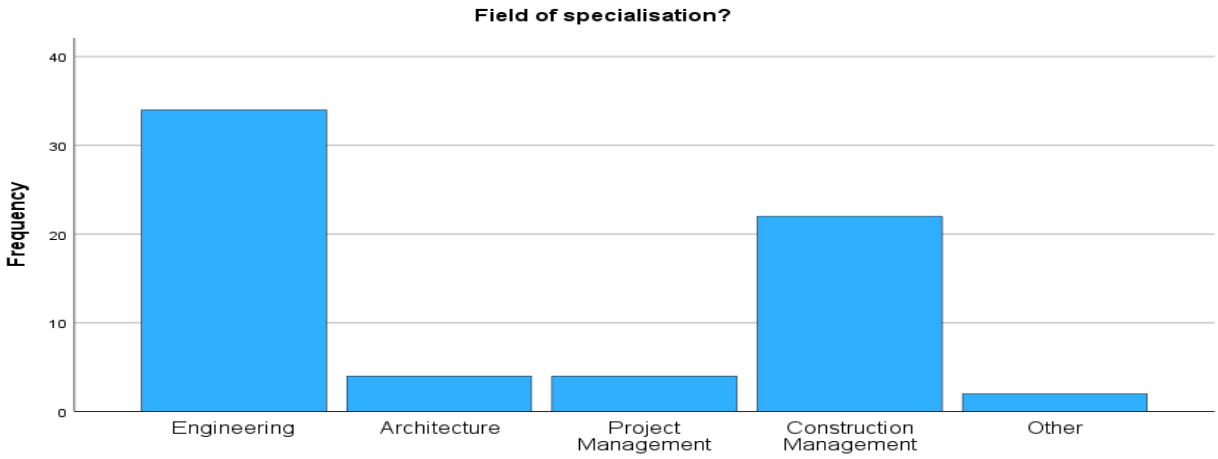
5. Work Experience

Years of working experience was grouped into four: 1 years or less, 5-10 years, 10-15 years and over 15 years. Analysis showed that of the total 66 respondents 2 had below 1 year working experience (3%), 36 respondents had working experience between 1-5 years (54.5%), While 24 worked 5-10 years (36.4%) and 4 had over 10-15 years of working experience (6.1%).

6. Field of Specialization of Responders

The bar chart below summarizes the field of specialization of the respondents. The positions held by the respondents were grouped into 5, namely, Engineering, Architecture, Project Management, Construction Management and Other. Accordingly, 34 of the respondents were found to be Engineering (51.5%), 4 were Architecture (6.1%), 4 were Project Management (6.1%), 22 were Construction Management (33.3%)and the remaining 2 were occupied in other department (3%).

Fig 4.2 Field of specialization of responders



Source: own survey, 2024

4.1.2 Risk Management Practice and Challenges Awareness Related Questions

The second section of the survey asked questions relating to risk management practice and challenges in high-rise building construction. The data gathered from the respondents was fed into SPSS. A question 1 through 11 of the second section in the questionnaire appears to be focused on assessing risk management practices and challenges in building construction projects. The respondents were asked to respond on various aspects related to current practices, challenges, and stakeholder involvement in managing risk -related issues. The analysis of responses is elucidated below.

Table 4.2 Risk Management Practice and Challenges Awareness Related Questions

Question 1. Do you take any risk management courses?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	54	81.8	81.8	81.8
	No	12	18.2	18.2	100.0
	Total	66	100.0	100.0	

Question 2. Is there any separate department in your organization that handles risk management?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	24	36.4	36.4	36.4
	No	42	63.6	63.6	100.0
	Total	66	100.0	100.0	

Question 3. Would you rate the importance of risk management in building construction project?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Important	48	72.7	72.7	72.7
	Important	18	27.3	27.3	100.0
	Total	66	100.0	100.0	

Question 4 . Does your company have a mechanism to identify risks in high-rise building construction projects?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	50	75.8	75.8	75.8
	No	16	24.2	24.2	100.0
	Total	66	100.0	100.0	

Question 5 . How you often conduct risk assessment during the project life cycle?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Weekly	14	21.2	21.2	21.2
	Monthly	46	69.7	69.7	90.9
	Quarterly	4	6.1	6.1	97.0
	Annually	2	3	3	100.0
	Total	66	100.0	100.0	

From a total of 66 responses gathered, 54 (81.8%) responders took courses related to risk management and 12(18.2%) were never took these kind of courses. a significant 42 respondents (63.6%) stated that a separate department that handles cost management was not present in their companies whereas Twenty Nine (36.4%) of respondents stated that a separate department was present in their organization.

While 48 respondents (72.7%) stated that the cost management is very important in building construction and the remaining 18 respondents (27.3%) stated the importance of cost management in building construction.

Fifty responses (75.8%) were indicated that their firm has the trend to identify the occurrence of price escalation at the planning stage whereas sixteen (24.2%) responded that there is no trend of identification of the occurrence of price escalation at the planning stage by their firms.

46 respondents (69.7%) stated that their firm was conducting risk assessment reviews and updates during the project life-cycle in a monthly basis while the other 14 respondents (21.2%) stated that their firm was conducting risk assessment reviews and updates in a Weekly manner. On the other hand, four respondents (6.1%) stated that their firm was conducting risk assessment reviews and updates Quarterly. 2 respondents (3%) stated that it was conducted as the contractor submitted and the other two respondents (2.9%) stated that it was conducted annually.

Question 6 . How do you prioritize risks once they are identified?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Quantitative	38	57.6	57.6	57.6
	Qualitative	28	42.4	42.4	100.0
	Total	66	100.0	100.0	

Question 7 . What strategies do you employ to mitigate identified risks?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Avoid	22	33.3	33.3	33.3
	Transfer	8	12.1	12.1	45.5
	Mitigation	32	48.5	48.5	93.9
	Acceptance	4	6.1	6.1	100.0
	Total	66	100.0	100.0	

Question 8 . What are the primary challenges you face in the risk management process?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Lack of training	22	33.3	33.3	33.3
	Insufficient resource(time, budget, personnel…)	28	42.4	42.4	75.8
	poor communication	4	6.1	6.1	81.8
	inadequate risk identification	10	15.2	15.2	97.0
	resistance to change	2	3.0	3.0	100.0
	Total	66	100.0	100.0	

Question 9. Have you experienced any project delay or cost overrun due to unmanaged risks?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	34	51.5	51.5	51.5
	No	32	48.5	48.5	100.0
	Total	66	100.0	100.0	

Question 10. If Yes to Q.9, can you provide an example of specific incident and its impact on the project?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cost overrun due to Inflation	6	9.1	17.6	17.6
	Cost overrun due to lack of quality performance from the contractor	4	6.1	11.8	29.4
	delay due to adequate planning of resources	6	9.1	17.6	47.1
	Design change by the client side	6	9.1	17.6	64.7
	Project delay due to un appropriate design selection	2	3.0	5.9	70.6
	delay due to boundary issue	2	3.0	5.9	76.5

	Delays caused by price escalation request by contractor side	4	6.1	11.8	88.2
	environmental risk(unexpected soil erosion)	2	3.0	5.9	94.1
	Project delay due to un appropriate design selection	2	3.0	5.9	100.0
	Total	66	100.0	100.0	

Question 1 1 . In Your opinion what improvements could be made to enhance the risk management process in the high-rise building constructions?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	training staffs about risk management	18	27.3	27.3	27.3
	allocation of adequate budget and resources	10	15.2	15.2	42.4
	developing a good Communication among staffs	14	21.2	21.2	63.6
	monitoring and evaluation	4	6.1	6.1	69.7
	Proper risk management planning	20	30.3	30.3	100.0
	Total	66	100.0	100.0	

Source: own survey, 2024

When it comes to prioritizing identified risk 38 responders (57.6%) stated that risk prioritize on a Quantitative analysis, whereas 28 responders (42.4%) says it is on quantitatively.

Out of the 66 responders, 32 of them (48.5%) says they use mitigation strategy to manage identified risks, 22 responders (33.3%) choose Avoidance strategy whereas 8 of them (12.1%) conduct transferring the risk and 4 responders (6.1%) choose accepting strategy once they identify possible risks.

Twenty-eight respondents (42.4%) stated that the primary challenge they face in the risk management process is to be insufficient resource like time, budget and personnel, 22 responders (33.3%) says is it lack of training, 4 out of the 66 responders (15.2%) stated that the major

challenge is to not having the adequate risk identification process whereas 4(6.1%) satted it is poor communication among employees and 2 responders (3%) say it is the resistance to change.

Thirty- Four (51.5%) Stated that they have experienced project delay or cost overrun due to unmanaged risks whereas the remaining Thirty-two responders (48.5%) did not experience any situation related to unmanaged risks.

Another open ended question was communicated to the respondents to provide an example of specific incident if they experience any delay or cost overrun due to unmanaged risk.

From the descriptive analysis of frequencies it can be said that risk management is considered as the most important aspect in the building construction projects, however a separate department for the cost management of the building projects were not assigned in most of the selected high-rise building construction projects.

Alternatively, rating items were developed to further study the practice and challenges of risk management in selected high-rise building construction. Here I tried to categorize risks five categories and let the responders answer the frequency of the factor. The scale rating description was 5= very infrequent, 4= infrequent, 3= neutral, 2= frequent, 1= very frequent.

Table 4.3 Preliminary and detailed design

A. Preliminary and detailed design

	N	Minimum	Maximum	Mean	Std. Deviation
poorly recognized preferences of the clients	66	2	5	3.76	.860
Underestimating the costs of the project	66	1	4	2.30	.841
Improper design team selection	66	1	4	2.18	.763
overestimating the cost of the project	66	1	4	2.18	.802
Delays in material and shop drawing approval	66	1	5	1.73	.937
Inadequate and ambiguous specification	66	1	5	2.85	.899
Design change by clients	66	1	4	2.30	.976
Average				2.47	.868

Section A of part III in the questionnaire asked questions relating to the preliminary and detailed designs of the projects. Respondents were asked if there is a proper selection of design team, regularly estimate the cost of the project, and if there occur a design change by client side.

The following descriptive analysis presents the responses from the stakeholders of the selected high-rise building construction projects. Responses showed Delays in material and shop drawing approval has a mean and standard deviation of 1.73 and 0.937 respectively. The item that was found to show the least mean is the most frequent challenge to practice risk management processes.

On the other hand, poorly recognized preferences of the clients has a mean and standard deviation of 3.76 and 0.860 respectively which shows it have a least impact on managing risks.

Table 4.4 Tender

B. Tender

	N	Minimum	Maximum	Mean	Std. Deviation
Poorly recognized competition	66	1	5	3.21	1.183
Awarding design to unqualified design consultant	66	1	5	3.09	1.367
Risk of Corruption	66	1	3	1.58	.703
Using predatory pricing by competitors	66	2	5	3.52	1.056
Risk of tender cancellation	66	2	5	3.18	.763
Quoting bad estimation for the project	66	2	5	3.27	1.001
Average				2.975	1.012

Source: own survey, 2024

As can be seen from the table above, all items except item no.3 (mean=1.58 and standard deviation=0.703) had a score above the average cut-off point of 2.5. The risk of corruption requires careful consideration to ensure there is fair and reasonable competition among all parties involved in the bid. The other five items found to be low on having a significant impact on the risk management practices.

Table 4.5 Construction work

C. Construction Work

	N	Minimum	Maximum	Mean	Std. Deviation
Lack of competent & qualified professionals	66	2	5	3.67	.847
Employees absence at the work place	66	2	4	2.85	.749
poor employees work performance	66	2	5	3.12	1.074
high employee turn over	66	2	4	2.97	.803
poor resource management	66	1	5	2.33	1.232
poor construction material quality	66	1	4	1.97	.764
insufficient control of work	66	1	4	2.88	.920
extended scope of work	66	1	4	2.24	.745
poor communication among staffs	66	1	3	2.39	.742
inappropriate change order by the client	66	1	4	1.91	.759
defect in construction work	66	1	4	2.06	.782
low labor and equipment productivity	66	1	3	1.94	.653
lack of skilled/ unskilled labor	66	1	4	2.27	.795
accidents and injuries on project site	66	1	2	1.45	.502
Unrealistic construction schedules	66	1	5	3.21	1.157
Average				2.48	.835

Source: own survey, 2024

Section C of part III in the questionnaire asked questions relating to Construction works. Respondents were asked the frequency of challenges that may occur focusing on project task and their methodologies, communication of project staffs, skill of labors, scope and schedules of performed activities, accidents, defect and quality of construction materials and so on.

According to the responder's data, some items shown a significant impact on the risk management process. Accidents and injuries found to be very frequent in construction work scoring a mean and standard deviation of 1.45 and 0.502 respectively. Whereas, lack of competent and qualified professionals found to be the least possible challenges with a mean of 3.67 and standard deviation of 0.847.

Table 4.6 Financial and Economical

D. Financial and Economical

	N	Minimum	Maximum	Mean	Std. Deviation
Economic instability	66	1	3	1.55	.612
High interest rate	66	1	4	2.09	.799
High inflation rate	66	1	3	1.64	.737
improper cost plan	66	1	3	2.00	.744
Recession in the industry	66	1	3	1.97	.803
delayed payment by clients	66	1	4	2.09	.759
poor cost control	66	1	4	2.15	.899
Delays in approval of payment certification by the client	66	1	5	2.24	.993
Average				1.96	.793

Source: own survey, 2024

Section D of part III in the questionnaire asked questions relating to Financial and Economic Issues. Respondents were asked the frequency of challenges that may occur focusing on economic stability, inflation and interest rates, payments from clients and cost plan of the contractor. According to the responder's data, Economic instability of the country and inflation rate show a higher rate of impact on managing a project.

Table 4.7 Political and Legal

E. Political and Legal

	N	Minimum	Maximum	Mean	Std. Deviation
Political instability	66	1	3	1.58	.658
Weak law compliance & enforcement	66	1	4	2.52	.864
Changes in legislative regulations	66	1	4	2.36	.922
Difficulty in obtaining permits and ordinance	66	1	4	2.52	.864
Average				2.245	.777

Source: own survey, 2024

Section D of part III in the questionnaire asked questions relating to political and legal Issues. Respondents were asked the frequency of challenges that may occur focusing on political instability, law enforcement, change in rule and legislatives. According to the responder's data, political instability of the country and inflation rate show a higher rate of impact on managing a project.

Table 4.8 Possible Risks

Possible Risks	N	Minimum	Maximum	Rank	Mean	Std. Deviation
Cost overrun	66	1	2	1	1.36	.485
Time overrun	66	1	2	2	1.64	.485
Low quality deliverables	66	3	4	3	3.36	.485
Low performance	66	3	4	4	3.64	.485

Source: own survey, 2024

Part IV in the questionnaire asked questions relating possible risks that can emerge due to the above challenges in risk management practices. Respondents were asked to rank the following Risk factors and their answer summarizes in the table below. According to the responder's data, Cost overrun has the highest possibility of occurrence.

Table 4.9 Response Strategies

Response Strategies	N	Minimum	Maximum	Rank	Mean	Std. Deviation
Avoid	66	1	1	1	1.00	.000
Reduce	66	2	3	2	2.24	.432
Accept	66	2	3	3	2.76	.432
Transfer	66	4	4	4	4.00	.000

Source: own survey, 2024

In Part IV is also asked questions relating Response strategies for the above possible risks. Respondents were asked to rank the following Response strategies and their answer summarizes in the table 4.9. According to the responder's data, Avoidance been the best response strategy.

The results of the study evidenced that among the risk factors identified Accident and injuries on project site (mean=1.45 & St. Deviation=0.502), economic instability (mean=1.55 & St. Deviation=0.612), political instability (mean=1.58 & St. Deviation=0.658), Corruption (mean=1.58 & St. Deviation=0.703), and delay in material and shop drawing (mean=1.73 & St. Deviation=0.937), are considered as having the higher degree of affecting construction project.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summaries of the findings, conclusions derived from the analysis and the recommendations that are suggested will help to improve project risk management practice in road construction projects.

5.1 Summary of key findings

The purpose of this study was to examine the practice and challenges of high-rise buildings construction project risk management. Cross-sectional field survey using questionnaires was used. To achieve the intended objectives, mixed method research approach used in this study. The study also applied descriptive research design for describing situations and facts to the research questions.

The analysis revealed that majority of the respondents have a good understanding about risk management. Most of the responders replied that their organization have a mechanism to identify risks and assess them monthly in a project life cycle.

The financial and economic factor was the most frequent risk category recognized by participants with mean value of 1.96. Moreover, among the category risk factors, following to the financial, political and legal factors, construction works, preliminary and design issues and tender were the most significant factors.

The study revealed risks of cost overrun and time overrun with frequent probability of occurrence as the first and second most possible risks. In this study, perception of risk response strategies by participants, allocated first and second were Risk Avoidance and Risk Reduction

5.2 Conclusion

The overall goal of risk management process is to maximize the opportunities and minimize the consequences of a risk event. According to the Guide to the Project Management Body of Knowledge (PMBOK/PMI, 2013), risk management in a project consists of risk identification, risk assessment, risk response and risk monitoring and control processes. This step concludes the risk management process. The level of competition and complexity of construction projects add to the regular construction risks. In response to these risks and challenges, companies need to develop and implement risk management processes. Participants in the current study indicated that they apply these practices especially risk identification, and risk management techniques. Even though construction companies employ risk management practices to some extent, there is a great disparity between the companies regarding their maturity level.

Based on the assessment conducted to describe risk factors, addressed by the first specific objective, five critical risk factors identified. Accident and injuries are the most critical risk factor that has effect on constructing projects. For the achievement of development objectives, this factor should draw extraordinary consideration from government bodies and other institutions responsible for preparation of policies and its implementation. Following this, participants observed economic instability as the second most dominant risk factor among the variables examined. This factor needs special attention by financial institutions and the government that are in charge for fixing collateral requirement to issue guarantees for project financing. In addition, clients should secure adequate budget before commencing any project. As a result, projects could get sufficient finance on due time that can facilitate availability of resources on specified schedules. This also increases efficiency of project operation that enables to achieve objectives. Political instability, rated as the third critical risk factor by participants that have effect on project objectives. This factor should get consideration by government bodies. The fourth factor which needs consideration by all stakeholders, was risk of corruption, it is involved in and has significant role in the construction industry. It requires professional ethics in preparing design, specification, tendering and implementation of projects. Moreover, all responsible bodies should develop the necessary controlling mechanism to decrease possibilities of corruption. Hence, projects would have to complete with less cost, better quality, on schedule and becomes successful. As perceived by participants, the fifth dominant risk factor that has significant effect on project objectives is delay in material and shop drawing. etc.

The second specific objective that addressed by this study is identifying the key challenges faced in implementing risk management strategies in building construction projects. All recognized critical risk factors contributed to the possible occurrence of risks that have effect on project objective in terms of schedule, budget, performance, and quality. The study revealed that insufficient resource allocation is the major challenge to apply the risk management strategies. The third objective, also determined by participants, was to assess the current practice of risk management in high-rise building construction. Once risks identified, they assess qualitatively and quantitatively. According to the research results, quantitative approach took the major role. After assessing, risk response planning follows. Allocating risk response strategies for the identified critical risks. The most important allocations of strategies to attain project success were Risk Avoidance.

5.3 Key Recommendations

Based on the findings and conclusions the following are the recommendations provided by the researcher so as to improve Practice and challenges of risk management in high-rise building construction projects.

1. Construction firms (local and international), who are undertaking projects in Ethiopia, need to incorporate project risk management plan into their projects. Companies should assign project risk manager as a key professional in their construction projects.

2. Project risks (by both local and international contractors in the country) need to be professionally and technically handled by experts starting from risk identification to the risk monitoring and control.

3. All stakeholders in construction industry in Ethiopia, need to be aware of the importance of project risk management in building construction and act accordingly.

4. Construction companies in Ethiopia should consider risk management system during bid processing (methods of implementation) and they are required to identify risks as early as possible, hold meetings to analyze all the risk matrix and make as detail as possible, improve their record keeping practices to enhance their ability to estimate and assess probabilities of potential risks.

5. The government therefore should enforce the contractors to incorporate risk management guidelines and policy in their project management planning especially whenever multi story buildings are undertaking.

6. Developing strong communication with all parties in a project and conducting periodic meetings with project managers and project team staff regarding risk management as one of the core element of project management tools (in addition to cost, time and quality). Conducting risk identification discussion, risk mitigation plan, monitoring and reviewing the mitigation plan timely.

These recommendations are geared towards addressing the identified gaps in current risk management practices in the Ethiopian construction industry, particularly within high-rise building projects.

5.4 Future research directions

The study's conclusions significantly add to the growing body of knowledge about and emphasis on the significance of risk management in building construction firms. Furthermore, it has broadened the existing knowledge by connecting the risk management to the critical success factors of building projects in Addis Ababa.

Future research can be conducted by expanding on the leads from this study and changing its context. Future research could be done on various construction sectors, such as the construction of roads, bridges, or water works, as the focus of this study was the building construction industry. A further modification in context would be to relocate the study and contrast Addis Ababa with other Ethiopian cities' risk management strategies for new construction.

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Appendix: Questionnaire

ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIE

DEPARTMENT OF PROJECT MANAGEMET

Dear Respondents,

My name is Eyob Azanaw and I am a Master's student in Project management at St Mary's University. This is a questionnaire survey I have developed to gather the necessary data for fulfillment of my Master's project on the practice and challenge of risk management in construction sector: the case of selected high-rise building in bole sub city, Addis Ababa.

First of all, I want to express my gratitude for giving up some of your time to complete this survey. Please note that your replies to this survey will remain secret as it will only be used for academic reason.

Moreover, your sincere answer will be really important in achieving a clear comprehension of the construction practices in relation to risk management. To this purpose, I sincerely request that you kindly supply the necessary data in a genuine manner so that it is possible to advance the knowledge risk management in Ethiopia.

Part I. General Profile

Please place a "✔" mark to all your responses in the box provided besides each statement

1. Sex
   - □ Male
   - □ Female
2. Age
   - □ 21-30
   - □ 31-40
   - □ 41-50
   - □ Above 50
3. What is your Educational Background?
   - □ Diploma
   - □ BSc
   - □ MSc
   - □ PhD

□ Others

4. What is your job position?*

□ General manager

□ Project manager

□ Consultant

□ Office engineer

□ Site engineer

□ Client

□ Other

5. What is your field of specialization?

□ Engineering

□ Architecture

□ Project management

□ Construction management

□ Other

6. Work experience in related projects?

□ Below 1 year

□ 1-5 years

□ 5-10 years

□ 11-20 years

□ Morethan 20 years

Part II. Question Related to Risk Management

Please tick on the box for a response you fee; appropriate for the following questions.

1. Do you take any risk management courses?*

□ Yes

□ No

2. Is there any separate department in your organisation that handles risk management?

□ Yes

□ No

3. Would you rate the importance of risk management in building construction project?

□ Very important

□ Important

□ Neutral

□ Unimportant

□ Very unimportant

4. Does your company have a mechanism to identify risks in high-rise building construction projects?

□ Yes

□ No

5. How you often conduct risk assessment during the project life cycle?

□ Weekly

□ Monthly

□ Quarterly

□ Annnualy

6. How do you prioritise risks once they are identified?

□ Quantitative analysis

□ Qualitative analysis

7. What strategies do you employ to mitigate identified risks?

□ Avoidance

□ Transfer

□ Mitigation

□ Acceptance

8. What are the primary challenges you face in the risk management process?*

□ Lack of training

□ Insufficient resources (time, budget, personnel..)

□ Poor communication among stakeholders

□ Inadequate risk identification methods

□ Resistance to change

9. Have you experienced any project delay or cost over run due to un managed risks?

□ Yes

□ No

10. If Yes to Q.9, can you provide an example of specific incident and its impact on the project?

_____

11. In Your opinion what improvements could be made to enhance the risk management process in the high-rise building constructions?

_____

Part III Rating Scale Questions.

1. Preliminary and detailed design

Please tick on the space you feel is appropriate for the following scale rating description. 5= Very infrequent 4= infrequent 3= Neutral 2= frequent 1= very frequent

S No.	. Preliminary and detailed design	Rate				
		1	2	3	4	5
1	poorly recognized preferences of the clients					
2	Underestimating the costs of the project					
3	Improper design team selection					
4	overestimating the cost of the project					
5	Delays in material and shop drawing approval					
6	Inadequate and ambiguous specification					
7	Design change by clients					

2. Tender

Please tick on the space you feel is appropriate for the following scale rating description. 5= Very infrequent 4= infrequent 3= Neutral 2= frequent 1= very frequent

S No.	Tender	Rate				
		1	2	3	4	5
1	Poorly recognized competition					
2	Awarding design to unqualified design consultant					
3	Risk of Corruption					
4	Using predatory pricing by competitors					
5	Risk of tender cancellation					
6	Quoting bad estimation for the project					

3. Construction Work

Please tick on the space you feel is appropriate for the following scale rating description. 5= Very infrequent 4= infrequent 3= Neutral 2= frequent 1= very frequent

S No.	Construction Work	Rate				
		1	2	3	4	5
1	Lack of competent & qualified professionals					
2	Employees absence at the work place					
3	poor employees work performance					
4	high employee turn over					
5	poor resource management					
6	poor construction material quality					
7	insufficient control of work					
8	extended scope of work					
9	poor communication among staffs					
10	inappropriate change order by the client					
11	defect in construction work					
12	low labor and equipment productivity					
13	lack of skilled/ unskilled labor					
14	accidents and injuries on project site					
15	Unrealistic construction schedules					

4. Financial and Economical

Please tick on the space you feel is appropriate for the following scale rating description. 5= Very infrequent 4= infrequent 3= Neutral 2= frequent 1= very frequent

S No.	Financial and Economical	Rate				
		1	2	3	4	5
1	Economic status of the country					
2	High interest rate					
3	High inflation rate.					
4	improper cost plan					
5	Recession in the industry					
6	delayed payment by clients					
7	poor cost control					
8	Delays in approval of payment certification by the client					

5. Financial and Economical

Please tick on the space you feel is appropriate for the following scale rating description. 5= Very infrequent 4= infrequent 3= Neutral 2= frequent 1= very frequent

S No.	political and legal	Rate				
		1	2	3	4	5
1	political instability					
2	weak law compliance & enforcement					
3	Changes in legislative regulations					
4	difficulty in obtaining permits and ordinance					
5	delays in solving contractual issues					

1. Examine and Rank the following possible risks that might occur from the identified sources of risks in ascending order.

S No.	Possible Risks	Rate			
		1	2	3	4
1	Time overrun				
2	Cost overrun				
3	Low quality deliverables				
4	Low performance				

2. Examine and Response Strategies that can apply for identified risks in Ascending order.

N.B: Accept:-accept the potential consequences of the risk.

Transfer:-shifting the impact of a threat to a third party

Reduce:- mitigating when the risk cannot be avoided

Avoid:- is eliminating the threat

S No.	Possible Risks	Rate			
		1	2	3	4
1	Accept				
2	Transfer				
3	Reduce				
4	Avoid				