DEBRE BERHAN UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF MANAGEMENT

POSTGRADUATE STUDIES MPM PROGRAM

FACTORS AFFECTING THE EFFECTIVENESS OF PROJECT RISK MANAGEMENT PRACTICE: IN THE CASE OF DEBRE BERHAN UNIVERSITY CONSTRUCTION PROJECT.

BY

NEGASH GEBEYEHU

JUNE 2024

DEBRE BERHAN, ETHIOPIA

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NEGASH GEBEYEHU

ADVISOR: SOLOMON MELESE (Ph.D.)

Thesis submitted to the Department of Management College of Business and Economics, Debre Berhan University in Partial Fulfillment of the Requirement master's degree in project management.

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STUDENT'S DECLARATION

I, Negash Gebeyehu, the undersigned, confirm that this is my original work and has not been submitted to any other college, institution, or university other than the Debre Berhan University for academic credit. I declare that the thesis proposal entitled **"Factors Affecting the Effectiveness of Project Risk Management Practice In Case of Debre Berhan University Construction Project"** is my original work. I have carried out the present study independently with the guidance and support of the research advisor, Dr. Solomon Melese (Ph.D.). Any other contributors or sources used for the study have been appropriately acknowledged.

Signed: _____ Date: _____

Negash Gebeyehu

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CERTIFICATE

This was to certify that Mr. **Negash Gebeyehu** has completed his thesis entitled "**Factors Affecting the Effectiveness of Project Risk Management Practice In Case of Debre Berhan University Construction Project**". In my opinion, this thesis was appropriate to be submitted as a partial fulfillment requirement for the award of a Degree in Master of Project Management.

Solomon Melese (Ph.D.)

Advisor _____ _____13/10/2016 E.C

Signature and Date

APPROVAL OF THE THESIS
DEBRE BERHAN UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF MARKETING MANAGEMENT

As members of the Board of examiners of the final thesis open defense examination, we certify that we have read and evaluated the thesis prepared by Negash Gebeyehu entitled "**Factors Affecting the Effectiveness of Project Risk Management Practice In Case of Debre Berhan University Construction Project**" is recommended that the thesis be accepted as fulfilling the thesis requirement for the degree of master's degree in Project management**.**

Board of Examiners

Dagim Woldie(Ass.Prof) _____ _____

Name of Internal Examiner Signature Date

Alemayehu Shiferaw(PhD) _____ _____

Name of External Examiner Signature Date

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LIST OF ACRONYMS

LC---------- Leadership Commitment

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

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

PM----------Project Management

PRM----------Project Risk Management

RA----------Risk Analysis

RI----------Risk identification

RMP---------- ----------Risk Management Plan

RMP---------- ----------Risk management Practices

RM----------Risk management

RP----------Risk planning

RRS----------Risk response Strategy

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ABSTRACT

The main purpose of this research was to examine the factors affecting the effectiveness of project risk management practice in the case of the Debre Berhan University construction project. It investigated the influence of six dimensions of risk effectiveness including risk planning, risk identification, risk analysis, risk response strategy, risk monitoring and controlling, and leadership commitment. The study population includes 586 employees, from whom 238 respondents' were selected and given questionnaires out of which 226 correctly filled and returned questionnaires were used for analysis purposes. The collected data were analyzed using SPSS version 24 and an overall analysis was performed using descriptive statistical analysis, Pearson correlation, and regression analysis. The analysis of the descriptive statistics suggests that the organization exhibits a generally medium to high level of effectiveness in its risk management practices, with risk analysis being a particular strength and leadership commitment being a relatively weaker aspect, in general, these are implemented with a medium level of effectiveness. The result of correlation analysis showed that all the independent variables have positive relationships with the dependent variable. The medium levels of each independent variable are associated with higher levels of effective risk management Practices. Finally, the regression analysis indicated that all the variables related to risk management practices (risk planning, risk identification, risk analysis, risk response strategy, risk monitoring, and controlling, and leadership commitment) have a significant positive relationship with the effectiveness of project risk management practices at 5% margin of error level. The study concludes that addressing these dimensions of risk management effectiveness is crucial for enhancing the overall effectiveness of project risk management practice. Recommendations include strengthening leadership commitment, improving risk identification processes, developing effective risk response strategies, enhancing risk analysis capabilities, implementing robust risk monitoring and controlling mechanisms, and comprehensive risk planning.

Keywords: Risk Planning, Risk Identification, Risk Analysis, Risk Response Strategy, Risk Monitoring and Controlling, Leadership Commitment, and Project Risk Management Practice.

CHAPTER ONE

1. INTRODUCTION

This Chapter discussed the introductory part of the research, the background of the study, the Background of the organization, the statement of the problem, the research questions, the objectives of the study, the significance of the study, the scope of the study, the definition of key terms, and lastly organization of the paper will be discussed in this chapter.

1.1 Background of the Study

Management can be different from one organization to another but in every company; it relies on three basic fields: strategic management, operational management, and risk management. Risk management is an iterative process conducted during the entire life duration of a project and it helps identify and analyze risks to find the right answers for each one. It is one of the essential components of project management.

According to the Project Management Institute (**PMI, 2017**), all projects are risky since they are unique undertakings with varying degrees of complexity that aim to deliver benefits. They do this in the context of constraints and assumptions while responding to stakeholder expectations that may be conflicting and changing. Organizations should choose to take project risk in a controlled and intentional manner to create value while balancing risk and reward. Organizations undertake different projects to solve existing problems or to introduce new products or services and attain company goals. Projects are undertaken to fulfill objectives by producing deliverables. An objective is also defined by the institute as an outcome toward which work is to be directed, a strategic position to be attained, a purpose to be achieved, a result to be obtained, a product to be produced, or a service to be performed.

Risk management is a known concept these days in the manufacturing industry. Lately, serious study has been led in the field of undertaking project risk management (RM). Project RM is viewed as one of the most significant and basic factors in the ten knowledge areas of project management recorded in the PMBOK Guide (**Project Management, 2016**). Risk management is a procedure whose application will realize an all-out decrease

in expenses in the long haul and thus the right decision-making by the manager. Risk management implies a movement of strategies, which are required for the unmistakable verification, assessment, and response opposite the project's risk with a particular ultimate objective to help the effects of positive events and limit the results of horrible scenes. This can influence the time, cost, quality, advantage, and execution of the project.

Project risk management is one of the tools to lessen the impact of the negative downside of risk and utilize the positive side of risk. Project Risk Management is the process 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 (**PMI, 2013**). Moreover, Risk management is a known concept these days in the manufacturing industry. Lately, a serious study has been led in the field of undertaking project risk management (RM).

Currently, risk management is an organized and regulated practice in developed countries. In countries such as the United States of America, the United Kingdom, and Canada, risk management has become a universal management process involving quality of thought, quality of process, and quality of action in contrast, in developing countries there are still problems on understanding and implementing risk management (**Keci & Mustafaraj, 2013**).

Different researchers conducted a study on different projects to assess the practice of risk management on different projects in Ethiopian contexts (**Berhe, 2016**; **Fekadeselassie, 2015**; **Y. Frezewd, 2016**; **Hintsay, 2016**; **Negash, 2017**; **Nigussie, 2016**) and found that risk management is not practiced effectively. (**Lyons, 2002**) described that although numerous papers have been written about risk management, little current information exists on the actual use of risk management in practice.

Delays, cost overruns, and compromised quality are significant problems commonly encountered in Ethiopian construction projects. These issues can arise from various factors, including modifications, changes, and inadequate risk management practices. While delays are more visible and tangible, it is important to recognize that the underlying

problems related to risk management often go unnoticed. This lack of attention to risk management issues can lead to stakeholders accusing one another of the project's setbacks. Therefore, it is crucial to address and prioritize the problems of risk management to mitigate the negative impacts on project outcomes.

One of the key factors that contribute to delays, cost overruns, and compromised quality is the lack of effective risk management practices. In many construction projects, risk management is not given sufficient attention, and stakeholders tend to focus mainly on addressing the visible delays. However, neglecting risk management can exacerbate the problems and lead to even more significant setbacks.

Effective risk management encompasses various elements that need to be addressed. Firstly, risk planning plays a crucial role in identifying and evaluating potential risks. This involves systematically analyzing the project's scope, objectives, and constraints to identify and prioritize risks that may impact the project's timeline, budget, and quality. A comprehensive risk plan helps in developing strategies to mitigate and manage these risks effectively. Supporting this fact, **Adams (2008)** states giving attention to risk management at the beginning of the contractual stage is important in reducing and controlling the effect of risk on project successes and objectives. Construction projects, particularly large-scale undertakings like university campus developments, are inherently complex and riddled with uncertainties. These uncertainties, if left unaddressed, can morph into full-blown risks, jeopardizing project objectives in terms of time, cost, and quality. Therefore, effective project risk management (PRM) is crucial for the success of any construction project.

Tesfaye (2020) conducted a comprehensive analysis of project risk management practices in the Ethiopian construction industry. Their findings highlight the significance of factors such as stakeholder collaboration, communication, risk identification, and risk analysis in influencing the effectiveness of project risk management. **Ahmed and Tadesse (2021)** focused on the challenges faced by construction projects in Ethiopia, including issues related to risk management. Their research indicates that factors such as inadequate risk assessment, poor risk response planning, and limited resources for risk management can hinder the effectiveness of project risk management practices.

Effective project risk management is crucial for ensuring the successful execution of construction projects. It helps identify and mitigate potential risks that can impact project timelines, costs, and quality. However, many construction projects, including the Debre Berhan University Construction Project, encounter challenges in effectively managing project risks, leading to adverse consequences.

The Debre Berhan University Construction Project is a significant endeavor aimed at expanding the university's infrastructure and facilities to accommodate the growing student population. Like any construction project, it involves numerous uncertainties and risks that need to be addressed to ensure its successful completion. These risks can include factors such as design changes, material shortages, labor issues, weather conditions, and stakeholder expectations.

Hence, this study aimed to identify and analyze the key factors that influence the effectiveness of project risk management practices within Debre Berhan University's construction projects. Specifically, the study aims to investigate the effect of risk planning, risk analysis, risk response strategy, and other relevant factors on the successful implementation of risk management strategies. By examining these factors, the study seeks to identify their impact on the effectiveness of risk management practices within the construction projects at Debre Berhan University. Understanding these factors is essential for enhancing risk management practices, minimizing project risks, and improving decision-making processes.

1.2. Background of the organization

Debre Berhan University, which is a 16-year-old university, is established in the 600-year-old historical town- Debre Berhan a town situated in Amhara Region, North Shoa zone, 130 km away from Addis Ababa in the north. The most powerful explanation for the establishment of the University is the government`s commitment to the expansion of quality higher education as well as ensuring a reasonable distribution of higher education in the country. Based on these organizing explanations the foundation stone was laid down on 9th May, 2005 G.C by her Excellency w/ro Genet Zewdie, the then Ministry of

Minister of Education of the Federal Democratic Republic of Ethiopia. Thereafter, the construction of the university was started on a total land area of 102 hectares which was given by the City Administration of Debre Berhan Town.

The initial intake capacity of the university (in Jan. 2007 G.C.) was 725 students who joined into 5 departments with 68 instructors and 7 administrative staff. But now, the enrollment has significantly increased to around 29,304 regular, extension, distance, and continuity and summer students who joined 53 departments/ programs under ten colleges 43 regular postgraduate and 2 PhD programs.

Hence, it is adamantly and unrelentingly working and undertaking massive organizational activities in terms of human resource development and construction with an overview to further enhancing its institutional capacity in areas of producing competent graduates, conducting problem-solving research & offering community services.

Currently, the university is staffed with more than 1032(first-degree to third-degree) academic staff (330 are on study leave), and 1199 administrative staff including technical workers. By 2016 E.C/2024 G.C, the intake capacity of the university will have grown to 27,000 regular, extensions, distance, and summer trainees, and staff upgrading, and employment will be achieved as planned.

1.2. Statement of the Problem

Project risk management plays a critical role in the successful delivery of construction projects, ensuring they are completed on time, within budget, and meeting quality and safety expectations (**El-Sayegh, 2014**). However, in the context of Debre Berhan University's construction projects, there is a lack of understanding of the specific risk management practices and challenges, and how they relate to broader issues in project risk management. Existing literature provides insights into risk management practices in general project environments but fails to address the unique challenges faced by organizations, particularly in establishing or maintaining a leadership position in the construction industry (**Mansour & El-Sayegh, 2015**).

Moreover, research on risk management practices in Ethiopian construction projects, including those at Debre Berhan University, is limited. While several studies have been conducted on project risk management practices in Ethiopia, there is a lack of sufficient documentation and comprehensive studies addressing risk management as a proactive and consistent process throughout the project life cycle(**Bereket, 2017**; **Frezewud, 2016**; **Getachew, 2014**; **Kalkidan, 2017**; **Temesgen, 2015**; **Yimam, 2014**). This gap in the literature hinders the development of effective risk management strategies tailored to the specific context of Debre Berhan University's construction projects(**Ayalew et al., 2016**).

As stated by **Ayalew et al. (2016)**, the findings of this study will hold significant value for stakeholders within the construction industry. It will enable them to devise strategies and adopt practices that lead to improved project outcomes, cost reduction, and enhanced overall project performance. Moreover, this research aligns with the broader objective of promoting project success and mitigating risks in the construction sector. By directly addressing the unique challenges and dynamics encountered in Debre Berhan University's construction projects, this study has the potential to bridge the gap between theoretical knowledge and practical implementation of project risk management.

According to **PMI (2017)**, this research has the potential to make a substantial educational impact in Ethiopia by supporting the successful implementation of construction projects at Debre Berhan University. By addressing issues of the effectiveness of risk management practices, the study can improve project outcomes, ensure timely completion, and foster a proactive risk management approach among project stakeholders. By acquiring a deeper understanding of these factors, the study can advance the existing knowledge on project risk management and provide practical insights and recommendations for enhancing risk management practices in construction projects at Debre Berhan University.

Hence, no research has been conducted to explore the factors that influence the effectiveness of project risk management practices in construction projects at Debre Berhan University. This study examined ongoing construction projects, including the main campus (main gate, landscape and approach roads, and compound road), the Mehal Meda Highland Agriculture and Tourism Development Center, the Institute of Technology, the

campus staff apartment, and the Hakim Gizaw Hospital laboratory and community pharmacy.

Therefore, this study aims to investigate and analyze the factors affecting the effectiveness of project risk management practices in Debre Berhan University construction projects. This study aims to fill the research gap by examining the factors that influence risk management effectiveness within this context.

1.3. Research Questions

Based on the problem stated in this study, the following research questions in which the study would be answered the following questions.

1. What is the effect of risk planning on the risk management practices at Debre Berhan University?
2. What is the effect of risk identification on the risk management practices at Debre Berhan University?
3. What is the effect of risk analysis on the risk management practices at Debre Berhan University?
4. What is the effect of risk response strategy on the risk management practices at Debre Berhan University?
5. What is the effect of risk monitoring and controlling on the risk management practices at Debre Berhan University?
6. What is the effect of leadership commitment practice on the risk management practices at Debre Berhan University?

1.4. Objectives of the Study

1.4.1. General Objective

The main objective of this study was to investigate and analyze the factors affecting the effectiveness of project risk management practices in Debre Berhan University construction projects.

1.4.2. Specific Objectives

The specific objectives of the study are:

1. To examine the effect of risk identification on the effectiveness of project risk management practice in Debre Berhan University construction projects.
2. To investigate the effect of risk planning practice on the effectiveness of project risk management practice in Debre Berhan University construction projects.
3. To examine the effect of risk analysis practice relationships between the identified factors and project risk management practices on the effectiveness of project risk management practice in Debre Berhan University construction projects
4. To examine the effect of risk response strategy practice on the effectiveness of project risk management practice in Debre Berhan University construction projects
5. To investigate the effect of risk monitoring and controlling practice on the effectiveness of project risk management practice in Debre Berhan University construction projects
6. To investigate the role of leadership commitment on the effectiveness of project risk management practice in Debre Berhan University construction projects.

1.5. Hypotheses of the Study

According to **Lavrakas (2008)**, a research hypothesis is a specific, clear, and testable proposition or predictive statement about the possible outcome of a scientific research study based on a particular property of a population, such as presumed differences between groups on a particular variable or relationships between variables. Therefore, as described in the objectives, background of the study, and statement of the problem explained, the following hypotheses would have been formulated:

H0: There is no significant relationship between risk planning and the effectiveness of project risk management practices.

H1: There is a significant relationship between risk planning and the effectiveness of project risk management practices.

H0: There is no significant relationship between risk identification and the effectiveness of project risk management practices.

H1: There is a significant relationship between risk identification and the effectiveness of project risk management practices.

H0: There is no significant relationship between risk analysis and the effectiveness of project risk management practices.

H1: There is a significant relationship between risk analysis and the effectiveness of project risk management practices.

H0: There is no significant relationship between risk response strategy and the effectiveness of project risk management practices.

H1: There is a significant relationship between risk response strategy and the effectiveness of project risk management practices.

H0: There is no significant relationship between risk monitoring and controlling and the effectiveness of project risk management practices.

H1: There is a significant relationship between risk monitoring and controlling and the effectiveness of project risk management practices.

H0: There is no significant relationship between leadership commitment and the effectiveness of project risk management practices.

H1: There is a significant relationship between leadership commitment and the effectiveness of project risk management practices.

Therefore, the above hypotheses aim to examine the individual effects of each independent variable (risk planning, risk identification, risk analysis, risk response strategy, risk monitoring, and controlling, and leadership commitment) on the dependent variable (the effectiveness of project risk management practices) in the context of the Debre Berhan University Construction Project. Statistical analysis and data evaluation will be conducted to determine the significance and strength of the relationships between these variables. The findings contributed to understanding the factors that influence the effectiveness of project risk management practices and their impact on overall risk management outcomes in the construction project.

1.6. Significance of the study

For Debre Berhan University**,** the outcome of this study was to drive attention to the importance of a high level of awareness of risk management problems. By understanding

the factors influencing risk management practices, the university can implement targeted improvements, leading to projects that are more likely to be completed on time, within budget, and to the desired quality standards. This can save money, avoid delays, and ensure the successful delivery of important infrastructure projects.

The study can identify areas where current practices are strong and areas where they can be improved. This can lead to the development of more robust risk management procedures, better equipping the university to handle future projects effectively. By understanding the risks associated with construction projects, the university can make more informed decisions about project selection, resource allocation, and mitigation strategies.

For the construction industry in Ethiopia**,** the study can contribute to the body of knowledge on project risk management practices in the Ethiopian construction industry. This can be valuable for other construction companies and organizations, helping them to improve their risk management practices. By focusing on a specific project within Ethiopia, the study can provide insights that are relevant to the local context, considering factors like cultural norms, regulations, and resource availability. This can be more applicable than generic studies conducted elsewhere. The findings can serve as a benchmark for other construction projects in Ethiopia, allowing them to compare their practices and identify areas for improvement.

For academic research, the study can contribute to the development of theories and frameworks related to project risk management in the construction industry. This can inform future research and provide a deeper understanding of the complex factors involved. The Debre Berhan University construction project can serve as a valuable case study for researchers interested in understanding risk management practices in developing countries. The findings can be compared with similar studies conducted in other countries, providing insights into the similarities and differences in risk management practices across different contexts.

1.7. Scope of the Study

The scope of the study "Factors Affecting the Effectiveness of Project Risk Management Practice in Case of Debre Berhan University Construction Project" would encompass a comprehensive examination of the various factors that impact the effectiveness of project risk management within the specific context of the Debre Berhan University construction project. This study may involve a detailed analysis of the following aspects:

The scope of this research focuses on Geographical Scope; the study would be focused on risk management practices in the Debre Berhan University construction project. The study was focused on all ongoing construction projects at Debre Berhan University.

The temporal scope of the study was likely to cover the duration of the construction project, including the planning, execution, and post-construction phases. It may also consider historical data related to the project's risk management practices. The primary unit of analysis for this study will be the Debre Berhan University construction project itself, with a focus on its unique characteristics, challenges, and risk management framework.

The study considered both dependent and independent variables related to project risk management. The dependent variables could include project success, cost overruns, schedule delays, and quality deviations, while the independent variables may encompass factors such as risk identification, risk planning, Risk analysis, Risk response strategy, risk monitoring and controlling, and Leadership commitment

This study utilized primary data sources. This primary data would be collected through structured questionnaires and interviews. The methodology may involve, a quantitative and qualitative approach, and also descriptive and explanatory research designs were used to analyze the factors that affect project risk management effectiveness.

1.8. Terms and Definitions

A project is a sequence of unique, complex, and connected activities that have one goal or purpose and that must be completed by a specific time, within budget, and according to specification(**R. Wysocki, 2014**).

A risk is some future event that happens with some probability and results in a change, either positive or negative, to the project(**R. Wysocki, 2014**).

Control Risks: is the process of implementing risk response plans, tracking identified risks, monitoring residual risks, identifying new risks, and evaluating risk process effectiveness throughout the project(**PMI, 2013**).

Plan Risk Management: is the process of defining how to conduct risk management activities for a project(**PMI, 2013**).

PMI (Project Management Institute): is the professional association for project managers that promotes project management as a profession, thereby raising the perceived status of project managers, and it has developed a certification process that confers on those who meet the requirements for the designation of Project Management Professional(**Lewis, 2011**).

Project management processes: These are the logical sequence of stages project management follows. It begins with the feasibility study and initiating, planning, execution, monitoring, controlling, and closing(**Project Management, 2013**).

Project risk identification: is the process of determining which risks may affect the project and documenting their characteristics(**Project Management, 2013**).

Project success criteria: Project success criteria are the set of principles and standards by which the project will be judged at the end to decide whether or not it has been successful. Project success criteria adopted the so-called Iron Triangle of 'Time, Cost, and Quality' as the set of principles for evaluating the success of a project(**Pinto, 2013**).

Qualitative Risk Analysis: is the process of prioritizing risks for further analysis or action by assessing and combining their probability of occurrence and impact(**Project Management, 2013**).

Quantitative Risk Analysis: this is the process of numerically analyzing the effect of identified risks on overall project objectives(**Project Management, 2013**).

Risk management is a process of identifying the risks, assessing the risks either quantitatively or qualitatively, choosing the appropriate method for handling the risks, and then monitoring and documenting the risks(**Kerzner, 2006**).

1.9. Organization of the paper

The research was organized into five chapters as follows:

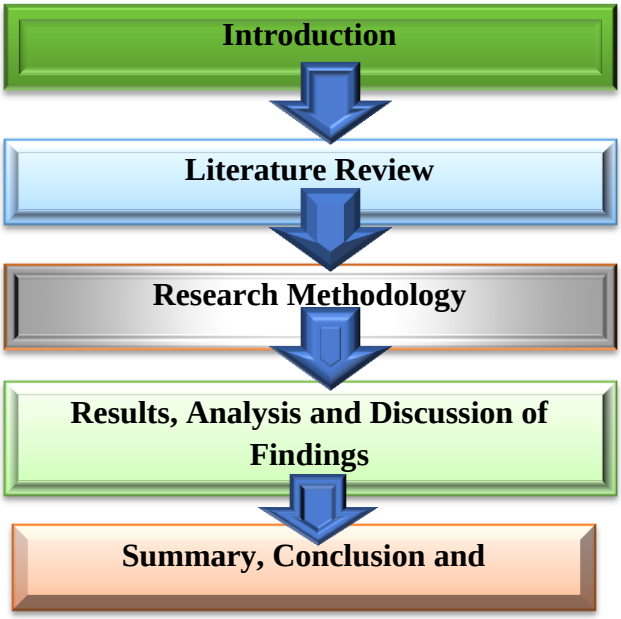

Figure 1 Organization of the Study

Chapter one deals with the introduction, statement of the problem, research questions, objectives of the study, hypotheses of the study, significance of the Study, Terms, and Definitions, and Scope of the Study. Chapter two deals with a review of related literature, a Theoretical Review, a Review of Empirical Studies, and a Conceptual Framework. Chapter three deals with research design, sampling technique, source data, and data collection technique & data analysis. Chapter four deals with data analysis and interpretation of the study and finally, chapter five deals with an emphasis on the conclusion and recommendations of the study.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Introduction

The purpose of this chapter is to present a review of the literature related to the purpose of the study and it is organized according to the specific objectives of the study. The review would be undertaken to eliminate duplication of what has been done and provide a clear understanding of the existing knowledge base in the Problem area.

2.2. Theoretical Literature Review

2.2.1. Project

Different literature could define projects from different angles. Some of the definitions are more comprehensive than others. (**R. K. Wysocki, 2014**)defined it as "A project is a sequence of finite dependent activities whose successful completion results in the delivery of the expected business value that validated doing the project". Moreover, the project is defined by PMI as **"**project is a temporary endeavor undertaken to create a unique product, service, or result". Despite the variation in wording, some peculiarities of the meaning of the project are visible. The temporary level of engagement and unique nature of output are common in all of the definitions though. Projects need to be managed to be successful. After all the strict quality requirements, high cost, and firm schedule expectations call for a high level of skill in managing projects. In addition, (**K. Wysocki, 2014**), in the book Effective project management defined a project as, a sequence of unique, complex, and connected activities that have one goal or purpose and that must be completed by a specific time, within budget, and according to specification.

Furthermore, the phrase project is regularly used, inappropriately, nowadays by various individuals to communicate an attempt, an endeavor, or a business. A project is a distinctive course of action consisting of a sequence of synchronized and controlled activities with start and end periods, conducted to attain the aim. It meets the specific requirements, including the restrictions of time, cost, and resources. It follows from this definition that the project can be understood as a process by which individual activities are

implemented in successive steps(**Honzirokova, 2017**). Also, “A project is a sequence of unique, complex, and connected activities that have one goal or purpose and that must be completed by a specific time, within budget, and according to specification”(**R. Wysocki, 2014**). In addition, Projects are often implemented as a means of achieving an organization's strategic plan. Operations and projects differ primarily in that operations are ongoing and repetitive while projects are temporary and unique. A project is a sequence of finite dependent activities whose successful completion results in the delivery of the expected business value that validated doing the project(**R. Wysocki, 2014**).

2.2.2. Project Management

PMI (2013) defines project management as the application of knowledge, skills, tools, and techniques to meet project requirements. More specifically **R. Wysocki (2014)** defined project management as "an organized common-sense approach that utilizes the appropriate client involvement to meet sponsor needs and deliver expected incremental business value". Here, the business value is the responsibility of the client through their requirements statements. The project manager is responsible for meeting those requirements. Meeting requirements is the cause and incremental business value is the effect.

A more comprehensive definition is given by(**Project Management, 2013**), as “project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements and it is accomplished through the appropriate application and integration of the project management processes identified for the project.” This comprehensive definition emphasizes the importance of applying and integrating the appropriate project management processes specific to the project.

2.2.3. Project risk

Guides published by the US Project Management Institute (PMI) and the UK Association for Project Management (APM) have adopted a broad view of project risk in terms of threats and opportunities. Their definitions of project risk are very similar, as follows: Project risk is an uncertain event or condition that, if it occurs, has a positive or negative

effect on one or more project objectives such as scope, schedule, cost, and quality. A risk may have one or more causes and, if it occurs, it may have one or more impacts. A cause may be a given or potential requirement, assumption, constraint, or condition that creates the possibility of negative or positive outcomes(**PMI, 2013**). Project risk is an uncertain event or set of circumstances that, should it occur, will affect the achievement of the project's objectives(**APM, 2006**).

Project risk has its origins in the uncertainty present in all projects. Known risks are those that have been identified and analyzed, making it possible to plan responses for those risks. Known risks that cannot be managed proactively, should be assigned a contingency reserve. Unknown risks cannot be managed proactively and therefore may be assigned a management reserve. A negative project risk that has occurred is considered an issue. Individual project risks are different from overall project risks. Overall project risk represents the effect of uncertainty on the project as a whole. It is more than the sum of the individual risks within a project since it includes all sources of project uncertainty. It represents the exposure of stakeholders to the implications of variations in project outcomes, both positive and negative(**Moseki, 2014**).

Individuals and groups adopt attitudes toward risk that influence the way they respond. These risk attitudes are driven by perception, tolerances, and other biases, which should be made explicit wherever possible. A consistent approach to risk should be developed for each project, and communication about risk and its handling should be open and honest. Risk responses reflect an organization's perceived balance between risk-taking and risk avoidance(**Kothari, 2014**).

To be successful, an organization should be committed to addressing risk management proactively and consistently throughout the project. A conscious choice should be made at all levels of the organization to actively identify and pursue effective risk management during the life of the project. Project risk could exist at the moment a project is initiated. Moving forward on a project without a proactive focus on risk management is likely to lead to more problems arising from unmanaged threats(**Petrovic, 2017**).

2.2.4. Project Risk Management

The term project risk management can be defined differently by different scholar states that project risk management "includes the processes of conducting risk management planning, identification, analysis, response planning, and controlling risk on a project." This indicates that project risk management is not a onetime activity. Rather it is a continuous activity that takes place throughout the project life cycle. The objectives of project risk management are to amplify the chances and impact of positive situations, and reduce the chances and impact of negative results in the project(**Adal, 2019**).

According to the **PMI (2013)**, project risk management is one of the nine most critical parts of project commissioning indicating a strong relationship between managing risks and a project's success. **PMI (2013)**defined project risk management as a systematic process of conducting risk management planning, identification, analysis, response planning, and controlling risk on a project having the objective of increasing the likelihood and impact of positive events and decreasing the likelihood and impact of negative events in the project. Furthermore, **Richardson (2015)**explains the objective of risk management is to increase the probability and impact of positive events and decrease the probability and impact of events averse to the project and is driven by the desire not to fail or fall short of the objectives. Risk management is an aspect of project management that entails identifying risks and developing ways to eliminate or mitigate those risks(**Gudda, 2011**).

2.2.5. Benefit of Project Risk Management

The objective of project risk management is not to avoid risks entirely but to increase the probability and impact of positive events and decrease the probability and impact of events averse to the project. Without risk –taking, new methods of efficiency, originality, and competitiveness can't be achieved, so the project risk process makes sure the cost of risk is weighted the benefits they provide(**PMI, 2013**; **Project Management, 2013**).

Proper risk management is proactive rather than reactive. Hence, proper risk management will attempt to reduce the likelihood of an event occurring and/or the magnitude of its impact(**Kerzner, 2009**). Project risk management is a beneficial process that can be

applied to any type, size, or complexity of project within an organization. The use of the right amount of project risk management by the correct roles with a clear level of responsibility will return benefits in better management of project scope, schedule, and budget(**Marchetti, 2012**).

2.3. Factors Affecting Project Risk Management Process

According to**Marr (2012)**, risk management is a systematic process of planning, identifying, analyzing, monitoring, and responding to project risk. It involves processes, tools, and techniques that help the project team minimize the probability and consequences of adverse events and maximize the probability and consequences of positive events. Moreover, **Richardson (2015)**, divides the process into four basic steps plan risk management, identify risk, plan risk response, and monitor and control risk phases.

*2.3.*1. Project Risk Management Planning

Risk planning is "iterative and includes the entire risk management process, with activities to assess (identify and analyze), handle, monitor (and document) the risk associated with a program." Risk Management Plan is the output of the risk planning process. The Risk Management Plan is "the risk-related roadmap that tells the project team how to get from where the program is today to where the program manager wants it to be in the future". The key to writing a good Risk Management Plan is to "provide the necessary information so the program team knows the objectives, goals, and techniques of the risk management process: reporting, documentation, and communication; organizational roles and responsibilities; and behavioral climate for achieving effective risk management". A risk Management Plan is a roadmap and it can be specific or general. It can be specific in areas such as the assignment of responsibilities for project personnel and definitions and general in other areas to allow users to choose the most efficient way to proceed(**Loru, 2020**).

One of the purposes of risk planning id developing a risk management strategy that includes both the process and implementation approach for the project. Should establish the purpose and objective, assign responsibilities for specific areas, identify additional technical expertise needed, describe the assessment process and areas to consider, define a risk rating approach, delineate procedures for consideration of handling strategies,

establish monitoring metrics (where possible), and define the reporting, documentation, and communication needs(**Liknaw et al., 2017**).

To get the maximum benefit, it is essential to carry out initial risk management planning early in the overall planning of the project, and the corresponding risk management activities integrated into the overall project management plan. It is also important to adapt the risk management plan as the needs of the project and its stakeholders become clearer or change. To effectively manage project risks, assigning a certain budget for project risk management is also recommended though the project risk management processes form an integral part of the overall project management plan. This is essential to better track, control, and defend the corresponding costs throughout the project. The risk management plan will define the monitoring methods to ensure that the corresponding expenditures are tracked appropriately, as well as the conditions under which the approved budget for risk management can be modified(**Guillemette et al., 2015**).

Risk Management is the process of defining how to conduct risk management activities for a project. The key benefit of this process is it ensures that the degree, type, and visibility of risk management are commensurate with both the risks and the importance of the project to the organization. The risk management plan is vital to communicate with and obtain agreement and support from all stakeholders to ensure the risk management process is supported and performed effectively over the project life cycle(**PMI, 2013**).

Effective risk management needs the formation of a risk management plan. Plan risk management is one of the basic stages at which the baseline for project risk management is set. Risk planning is the process of developing and documenting an organized, comprehensive, and interactive strategy and methods for identifying and analyzing risk issues, developing risk handling plans, and monitoring how risks have changed(**Steyn, 2018**).

2.3.2. **Project Risk Identification**

The other important step in the risk management process is risk identification. Risk identification can incorporate a survey of the program, customers, and users for concerns

and problems. It is always inevitable to have risks to some degree in projects. Some of the project risks are cost, funding, schedule, contract relationships, and political risks. **Kerzner (2009)**mentions that cost and schedule risks are often so fundamental to a project that they may be treated as stand-alone risk categories. The understanding of risks advances over time. As a result, risk identification should continue throughout the project phases. There are several methods for identifying risk. The common practice is to classify project risk depending on its source, either objective or subjective. Objective sources are recorded experience from past projects and the current project as it proceeds. Some examples of objective sources are lessons learned files, program documentation evaluations, and current performance data. Subjective sources are experiences based upon experts. This includes interviews and other data from subject matter experts(**Garrido et al., 2011**).

Also, Identify Risks is the process of determining which risks may affect the project and documenting their characteristics. The key benefit of this process is the documentation of existing risks and the knowledge and ability it provides to the project team to anticipate events(**PMI, 2013**).

2.3.3. Project Risk Analysis

Another important phase of the project risk management process is risk analysis. Risk analysis begins with a detailed study of the risk issues that have been identified and approved by decision-makers for further evaluation. Risk analysis has different objectives in the project risk management process. Some of its objectives are to gather enough information about the risk issues to judge the likelihood of occurrence and cost, schedule, and technical consequences if the risk occurs(**Abie & Borking, 2013**).

2.3.4. Plan Risk Response

Plan risk responses are the process of developing options and actions to enhance opportunities and reduce threats to project objectives. The key benefit of this process is that it addresses the risks by their priority, inserting resources and activities into the budget, schedule, and project management plan as needed(**PMI, 2013**). Also, the response strategies, which typically deal with threats or risks that may have negative impacts on

project objectives if they occur, are: accepted, avoided, transferred, and mitigated; while the responses that are suggested to deal with risks of potentially positive impacts on project objectives are to exploit, share, enhance, and accept(**Kerzner, 2009**; **PMI, 2013**).

2.3.5. Monitor and Control Risk

Control risks are the process of implementing risk response plans, tracking identified risks, monitoring residual risks, identifying new risks, and evaluating risk process effectiveness throughout the project. The key benefit of this process is that it improves the efficiency of the risk approach throughout the project life cycle to continuously optimize risk responses(**PMI, 2013**). Moreover, Risk monitoring and controlling is continuous supervision of the risk management process to discover new risks, keep track of identified risks, and eliminate past risks from the risk assessment and project(**PMI, 2013**).

2.3.6. Leadership commitments

Journal of and Opinion (2023), article highlights the connection between leadership styles and employee commitment, emphasizing the crucial role of leadership in fostering dedication and motivation. (**Maas, 2023**), review explores the impact of different leadership styles on employee commitment, emphasizing the need for leaders to adapt their approach based on the context and needs of their team.

Desk (2020), research investigates the relationship between leadership and employee affective commitment, focusing on how leaders can cultivate emotional attachment and identification with the organization. **Hunter (2004)**, investigates the concept of commitment and offers practical strategies for leaders to build and sustain commitment within their teams.

Arbinger (2011), explores the concept of self-deception and its impact on leadership, offering insights on how leaders can improve their communication and commitment to create a more engaged and productive team.

2.4. Influence of Effective Risk Management

Risk management plays a crucial role in avoiding unforeseen disasters and preventing excessive expenditures, including both financial and non-financial resources. However, it is important for risk management to strike a balance by effectively managing risks without eliminating all of them, as doing so would be excessively costly and undesirable. The cost of risk management should not exceed the losses incurred from excluding any risk. Furthermore, the expenses associated with risk management should be accounted for in the project budget. It is also essential to consider the nature of the project, the resources already utilized, and the unique circumstances surrounding each project when working with risks. Risk management should be proactive, employing preventive measures and strategies. This approach differs from reactive management, which only responds to risks that have already materialized(**Honzirokova, 2017**).

2.5. Effective Risk Management

To ensure effective risk management within an organization, compliance with the following principles, as stated by(**ISO, 2009**), is essential:

A. **Risk Management creates and protects value**: Risk management contributes to achieving objectives and enhancing performance.

B. Risk management is an integral part of all organizational processes: It is not a standalone activity, but rather integrated into management responsibilities, strategic planning, and project and change management processes.

C. Risk management is part of decision-making: It assists decision-makers in making informed choices, prioritizing actions, and evaluating alternative courses of action.

D. Risk management explicitly addresses uncertainty: It considers and addresses the nature of uncertainty and how it can be managed.

E. Risk management is systematic, structured, and timely: Adopting a systematic and well-timed approach to risk management enhances efficiency and yields consistent and reliable results.

F. Risk management is based on the best available information: Inputs for managing risk are derived from various sources, such as historical data, stakeholder feedback, expert

judgment, and forecasts while recognizing the limitations and potential divergences in data and models.

G. Risk management is tailored: It aligns with the organization's internal and external context and risk profile.

H. Risk management takes human and cultural factors into account: It acknowledges the capabilities, perceptions, and intentions of individuals within and outside the organization that can influence goal achievement.

I. Risk management is transparent and inclusive: Involvement of stakeholders and decision-makers at all levels ensures relevance and up-to-date risk management, considering stakeholder perspectives in determining risk criteria.

J. Risk management is dynamic, iterative, and responsive to change: It continually monitors and responds to external and internal events, evolving contexts, and emerging risks while reviewing and adapting risk strategies.

K. Risk management facilitates continual improvement of the organization: Organizations should strive to enhance their risk management maturity alongside other aspects of their operations.

2.6. Risk and Construction Project Phases

Construction projects inherently come with risks at every stage, regardless of size. This commonality across projects, which can be divided into phases with established practices, suggests a universal framework for risk consideration. In essence, a standardized risk management approach adapted to various phases and contexts could benefit the entire construction industry. While each project phase holds unique risks requiring tailored management, all phases should integrate seamlessly under a comprehensive project plan.

A well-defined risk management methodology should be applied throughout each project phase according to plan. As each phase concludes, risks are reevaluated and analyzed for the subsequent stages, with recommendations for successful mitigation tailored to their specific context. **Smith (2022)**highlights the evolving focus of risk management through project phases: early stages emphasize value management for clear design objectives, while the design phase prioritizes value engineering for efficient functionality at minimum cost. Finally, the construction stage concentrates on quality management to ensure proper execution of the design and prevent costly rework.

All phases contain numerous important requirements that must be fulfilled before deciding to continue the next process. As the project progresses, the information is obtained in a way that approves or refutes the starting assumptions. If the information or data show the starting assumptions are denied, then entirely new risks that have to be managed may appear. To support this fact, **Smith (2022)**states that risks should be reduced as the project progresses towards the end. This means uncertainties and associated risks are the highest in the early phases of the construction projects. As the project progresses from the initial phase to the last phase, the number of risks and uncertainty decreases. Therefore, the levels of uncertainties are inversely related to the development of the construction project. In the same way, according to **Godfrey (1996)**, as a project phase advances, cost expectations become facts and cost ambiguities, therefore reducing. As a result, the risk related to finance can be easily managed. In the same way, contingency can be retired gradually giving better control of the project by preventing surpluses from being used later to cover up mismanagement. Risk exposure can change within a project phase. Construction projects take a long time to complete and similarly, completing one phase can take several months or even many years to complete. Hence there is a chance and time to work on risk identification and analysis throughout the phases, not only at its end. From the view of project phases to construction projects, risk management is an uninterrupted process and takes place during phases of the sequence.

Projects rarely unfold smoothly across distinct phases. Progress can be disrupted by numerous factors—resource shortages, market swings, political instability, and more—that transcend any single phase and pose fundamental risks. This highlights the need for risk management to be integrated with the overall construction process, not just confined to distinct project phases. Decision-makers at all levels must consider risk and its impact throughout the entire project lifecycle. In essence, effective construction risk management should be process-driven to effectively address these dynamic challenges.

2.7. Risks in Construction Project

While inherent risk permeates all aspects of human life, the multifaceted nature of construction amplifies its presence in this particular field(**Godfrey & Olamiwale, 1996**). Compared to other endeavors, construction risks are both diverse and highly variable due to this inherent complexity(**Dey & Ogunlana, 2004**).

Researchers have proposed various definitions of risk, often customized to suit the goals of individual projects at specific points in time. However, the core understanding of risk hinges on the importance placed on effective management within a given scenario(**Simu, 2006**). Risk signifies a situation where historical data and practices inform decision-making to achieve potential outcomes(**Oztas & Okmen, 2004**). The very act of making a decision encompasses a spectrum of possible consequences, each with associated probabilities, constituting inherent risk(**Smith et al., 2006**). Furthermore, (**Abassi et al., 2005**)argue that risk is infrequently generously defined, beyond financial, as a possibility of damage, harm, loss, delay, drawback, or devastation. Likewise, **Al-Salman (2004)**shows that risk relates to a deficiency of information or earlier practice in a given condition being managed by a decision-maker. Further, the risk is considered as the probability of an investor's assertion in construction work failing to achieve the expected measures of feasibility(**Warszawski & Sacks, 2004**). In short, all the above authors suggest that risk is disagreeable happening; a consequence of supposable but unpredicted conditions. Conceivable circumstances are happenings that announce their manifestation, while unpredicted circumstances are happenings that occur without any notice. Numerous definitions have revealed that risk has an influence or effect on any construction project at any phase. The effects thereof may be computed using many terms of financial loss, delay, property damages, injury to workers, and sometimes a combination of these(**Abassi et al., 2005**). Mills (2001) indicates that project performance, quality, potency, capacity financial cost, and completion time could be altered if an element of risk is involved.

Construction activities, including planning, design, and development, are particularly vulnerable to external influences due to the inherent uncertainties of the environment, according to **Creedy (2006)**. This means construction projects are carried out in a context characterized by varying degrees of risk and unforeseen circumstances, which can arise

from both predictable and unpredictable sources(**Smith, 2006**). These unforeseen circumstances represent unexpected events with unknown probability distributions, adding further complexity to the risk landscape.

Construction project risks can be categorized in various ways, reflecting different perspectives. Some classifications focus on the likelihood of occurrence, while others categorize risks based on their potential impact on construction activities, types, and sources. Despite these diverse approaches, all classifications share a common goal: to support effective risk management. By aiding in the creation of comprehensive risk lists, these classifications help identify and address potential issues(**Wong & Hui, 2006**). These researchers further emphasize that risk categorization can be based not only on the impact on the project but also on the source of the risk.

Several frameworks exist for classifying construction project risks. **Smith (2006)** proposes three categories: 1) Minimal deviations**:** common, unavoidable occurrences inherent to construction. 2) Foreseeable risks: events with known likelihood and impact. 3) Unforeseeable risks**:** events with unknown probability of occurrence. **El (2011)** adds a stakeholder-based classification, including time, environmental, cost, and safety risks. **Kishan et al. (2014)**further detail human-related risks into technical, political, social, economic, legal, financial, health, managerial, and cultural subcategories. Notably, additional risk categories beyond these examples might be applicable depending on the specific project context.

Building construction projects face a multitude of legal, environmental, construction-related, cultural, financial, and political risks. Legal risks include ambiguous legislation, permitting difficulties, slow dispute resolution, contractual disputes, and lack of specialized arbitrators. Environmental risks encompass adverse weather conditions. Construction risks involve gaps between implementation and specifications due to misunderstandings, design changes, time constraints, poor communication, unclear planning, and resource management. Cultural factors like religious or customary considerations can also impact projects. Financially, risks include delayed payments, unmanaged cash flow, inflation, contractor failure, and currency fluctuations. Politically, unstable security situations pose threats.

2.8. Review of Empirical Studies

Empirical studies provide important insight into the study project. In addition to the theoretical and empirical studies reviewed so far, this section highlights some important empirical studies conducted. A study titled Managing Project Risk: a Case Study From the Universities Sector by Paul Elkington and Clive Smallman from the University of Cambridge in January 2000 published in the International Journal of Project Management identified that there is a strong link between the amount of risk management undertaken in a project and the level of success of the project, more successful projects use more risk management(**Elkington & Smallman, 2000**, **2002**). Also, the earlier that risk management was used in a project, the more successful it was. The significant statistical relationship between the level of risk management and the level of project success may be a result of the managers who undertook the project. The pattern that the level of risk management undertaken at the project brief stage would influence the level of success of the project may also be due to a more thorough approach to project management.

Another risk management study conducted by**Tesfamichael (2018)**, it is found risk management is a continuous process, and having a department to handle risks plays an important role in employing guidelines and defined standard risk management processes that can help minimize uncertainties in the project. In addition, the author indicated, that despite there are tools like expert judgment, meetings, or others and relevant stakeholders are utilized for risk planning, the approach is not systematic overall. Though a risk management plan is incorporated with the project plan, project team members didn't get the required training to handle risks, and environmental factors were not considered as input to plan risk. This gives an important insight since risk management is just about planning but the following activities are needed to properly manage risk and uncertainties.

On the other hand, **Pimchangthong and Boonjing (2017)**surveyed the effects of risk management practices on the success of IT Projects. The descriptive statistics results found that the risk management practice in the aspect of risk identification, risk analysis, and total aspect was at a high level of importance (x= 3.96, 3.55, 3.69, and SD= 0.644, 0.807, and 0.562). The aspects of risk response planning and risk monitoring and control

were at a moderate level of importance (x= 3.49, 3.32, and S.D.= 0.680, 0.671). The multiple linear regression analysis results found that risk identification, and risk response planning influenced process performance at the statistical significance level of 0.05. The highest beta coefficient is 0.398, which means that risk response planning had the greatest influence on predicting process performance, followed closely by risk identification with a beta coefficient of 0.244. The multiple linear regression analysis results found that risk identification, risk analysis, and risk response planning influenced product performance at the statistical significance level of 0.05. The highest beta coefficient is 0.383, which means that risk identification had the greatest influence on predicting product performance, followed closely by risk response planning and risk analysis with the beta coefficient of 0.367 and 0.135, respectively. The multiple linear regression analysis results found that risk identification and risk response planning influenced IT project success at the statistical significance level of 0.05. The highest beta coefficient is 0.359, which means risk identification had the greatest influence on predicting IT project success, followed by risk response planning with a beta coefficient of 0.333.

Another **Ewelina and Mikaela (2011)** research titled Risk Management Practices in a Construction Project – a Case Study where its findings show that the Professionals in the construction industry are using some of the techniques described in the literature concerning RM. However, it is not implemented as holistically as it should be & at the expected level of standard as the employees are not aware of risk management properly. The research generally showed that unstructured forms of risk management are to some extent used in the construction sector.

Moreover, A study by **Manalebih (2018)** conducted through a descriptive method to assess the risk management practices in the World Vision Ethiopia Wash construction project in terms of the five major risk management processes: risk planning, risk identification, risk analysis, risk response, and risk monitoring and control processes. The study found that the project has a project risk management plan which is prepared with the participation of proper stockholders though; it doesn't include environmental factors as input for the uncertainty management. The findings also accentuate that characteristics of the risk that are considered before analyzing the identified risk result are lower and it shows that risks are not characterized before analysis. Regarding the process of risk

monitoring and control, it happened to be encouraging that risks are properly monitored and well controlled. However, there is no responsible person or department to manage the project risk independently. Generally, the risk management in the WASH project is practiced relatively in a better way however, it still lacks a formal structure and coherence.

Another study by **A. Frezewd (2016)** on project risk management practices in Batu and Dukem town water supply projects revealed that no policy or guideline is stated for the projects that propose how to handle uncertainties that the projects may encounter. Based on the result of the analysis, through the life cycle of the projects, risk management is not performed as a continuous process and is usually applied at the implementation stage. The findings of the result also showed that a standard and defined risk management process does not exist within the projects and that there isn't any person or department specifically assigned to manage uncertainties within the projects.

Moreover, a survey was conducted by **Tigist (2017)** on project management practices in the case of the Japanese Social Development Trust Fund Grant Project. The research assessed the practice of project risk management as one of the project management knowledge areas. The survey used a Likert-type scale ranging from 1(Strongly Disagree/highly dissatisfied) to 5(Strongly Agree/Highly Satisfied)on the practice of developing of risk management plan, identification and registering of risks, risk prioritization, and estimation of impacts, development of risk response plan, monitoring and controlling of the identified risks. Finally, the result found a mean of 2.02, 2.07, 2.05, 2.07, and 2.10 respectively. This implies that the practice of project risk management is poor in the way that projects are expected to be put into practice.

The **Federal Democratic Republic of (2007)** defines construction works as the investment in building, civil engineering, or engineering construction works. (**Tekle & Mahelet, 2009**)also describe the construction industry in Ethiopia as encompassing all economic activities related to civil and building works, including conception, planning, execution, and maintenance. This includes various infrastructure projects such as roads, railways, airports, ports, dams, power stations, and more.

The construction industry in Ethiopia is a sector that fosters the growth of many additional industries, such as metal products, clay works, cement, and furniture. The industry policy

of the Federal Democratic Republic of Ethiopia has paid special attention to the construction industry.

The construction industry covers a wide range of activities, including constructing buildings, roads, railroads, aerodromes, irrigation projects, harbor or river works, gas, sewerage or storm water drains, electricity or other transmission lines, pipelines, oil refineries, and other specified civil engineering projects.

Lawrence (2015)and **Adeleke et al. (2018)** both demonstrated a strong link between risk management and project performance in the construction industry. Lawrence found that risk management practices during the planning stage influenced project performance, while (**Adeleke et al., 2018**) study showed that adopting risk management practices and having a risk manager had a significant positive impact on project success. However, there is a gap in research regarding the impact of Project Risk Management (PRM) on the success of projects in Ethiopian banks, as most studies in Ethiopia have focused on construction risk management.

Furthermore, a study by **Bisrat (2018)** on the assessment of Risk Management Practices of the Ethiopian Public Health Institute found that risk planning is not included in the project plan. There was inadequate risk management training for project members, and there was a major knowledge gap about what project risk management is and how it is implemented. The author also discovered that all risk management stakeholders were not involved in the actual practice. Hence he recommended the provision of risk management training for project team members and also risk management practice in these projects to be participatory and inclusive.

Bahiru et al. (2017)conducted a study on the impact of risk on construction project performance in Ethiopia. Their research aimed to enhance understanding of risk's impact on civil work construction projects in Ethiopia. The study involved identifying risk factors through a literature review, collecting data using questionnaires and focused group discussions, and analyzing the data using the Statistical Package for the Social Sciences (SPSS). The study concluded that the main risk factors affecting project performance were equipment/material failure, labor productivity issues, and shortages of equipment and

materials. Additionally, minor risks such as injuries, earthquakes, winds, landslides, and rock falls were identified. The analysis also revealed that risk management practices were not well-implemented. However, the study did not specify the specific region of Ethiopia or the type of construction projects focused on.

2.9. Summary and gap

Based on the empirical review, it is evident that there is a lack of studies dedicated to investigating risk-related issues in construction projects, specifically focusing on Debre Berhan University projects. Despite the University's involvement in significant construction projects, there is a gap in the existing research regarding the extent to which risk management practices are implemented in these projects. This study aims to fill this gap by providing evidence-based insights into the implementation of risk management in construction projects at Debre Berhan University.

Developing countries, including Ethiopia, exhibit low levels of performance in their construction industries. Therefore, improving the overall performance of the construction industry should be a top priority. In Ethiopia specifically, the practice of construction project risk management, including the adaptation of general project management processes, functions, tools, and techniques, is found to be unsatisfactory. Consequently, various issues such as project, risk plan, risk identification, risk analysis, risk response risk monitoring and control, and leadership commitment for poor quality in project progress are prevalent challenges in Ethiopian construction projects.

2.10. Conceptual Framework

The study primarily focuses on risk management in building construction projects at Debre Berhan University. It examines the methods employed by the parties involved and how they incorporate identified risks into their plans. The study also investigates the major risk factors contributing to project delays and explores how human and material resources are managed about these risks. A conceptual framework for risk management in construction projects is presented based on a literature review and the study's objectives. The research assesses risk management practices against a scientific benchmark presented in the chapter. The study proposes a conceptual model based on the literature review and

research objectives, assuming that successful construction project outcomes depend on the proper implementation of risk reduction practices.

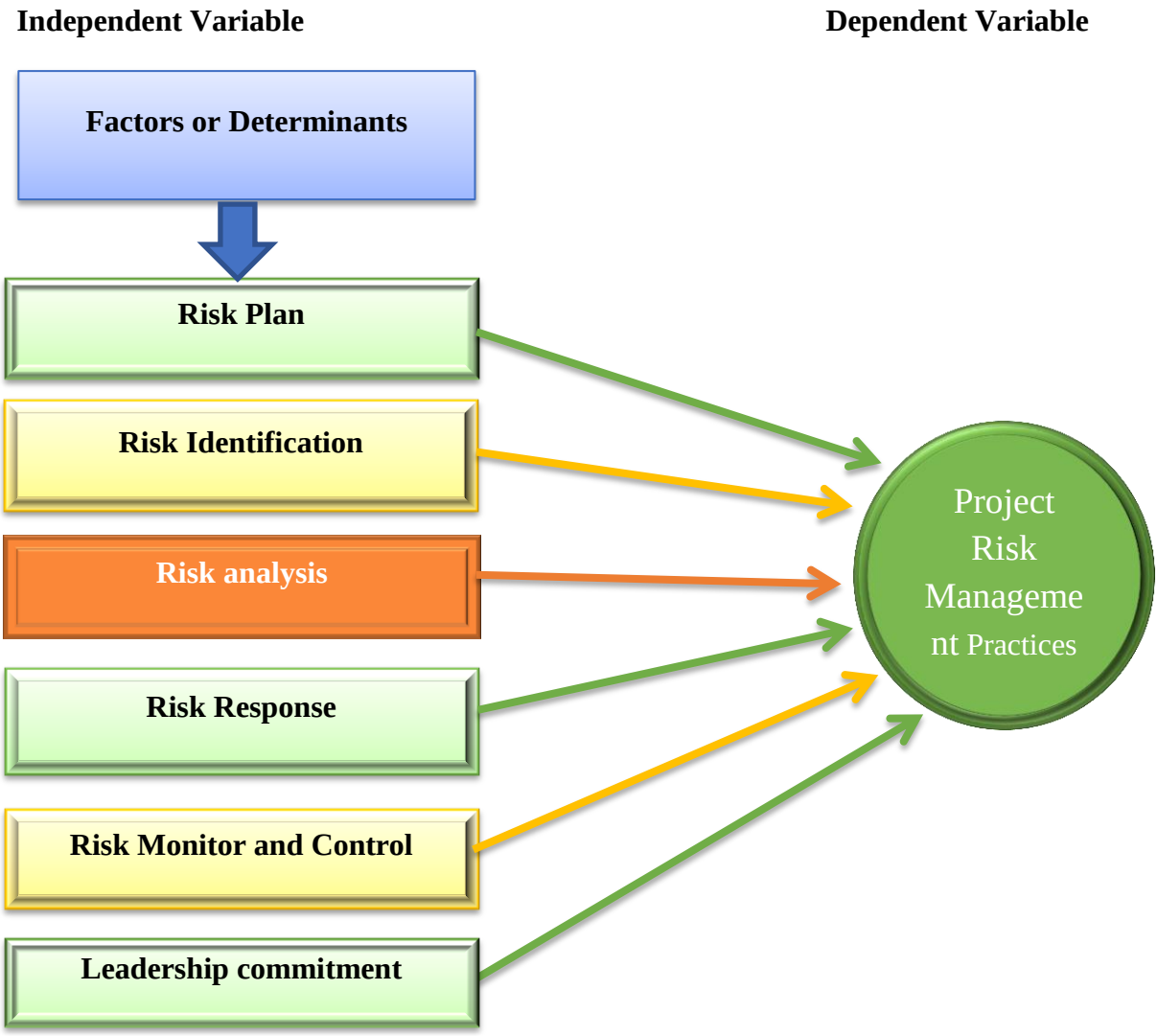

Figure 2 The conceptual framework of this study

Source: (PMI, 2013)

CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

3.1. Introduction

This chapter outlines the methodologies that were used in the study. It describes the research approach, research design, population and sampling, instruments and data collection technique, reliability, and validity of instruments, research ethics, and methods of data analysis and interpretation. According to(**Dawson, 2009**), research methodology refers to the underlying philosophy or general principles that guide research

3.2. Research Approach

A well-starting research study means the study is half completed(**Burney, 2018**). Thus, the researchers need to focus on the best approach to resolving any problems. According to **Creswell and Creswell (2017)** divided into three broad categories of research approach, they are quantitative, qualitative, and mixed approach. To effectively understand this approach it's important to select the final research approach related to the study objective.

The researcher used a mixed research approach with both quantitative and qualitative methods to gain a complete understanding of the factors affecting the effectiveness of project risk management practice in the case of the Debre Berhan University construction project. The quantitative research involved collecting and analyzing numerical data related to the effectiveness of project risk management practice. On the other hand, the qualitative aspect of the research was used to gather non-numerical data through interviews. This included conducting interviews with contractors, clients, and consultants on the various factors affecting project risk management practice. The reason for using the mixed method is an approach to inquiry involving collecting both qualitative and quantitative data would be integrated into forms. A mixed research approach is a suitable approach that yielded positive benefits, and this approach has the potential to provide a greater depth and breadth of information which is not possible by utilizing singular approaches in isolation(**Creswell & Creswell, 2018**).

3.3 Research Design

Research design is a map that is developed to guide the research. Investigation plans to confirm to obtain answers to research questions or problems. Research could be broadly divided into descriptive, exploratory, and explanatory(**Pandey & Chawla, 2016**).

Descriptive research studies are those studies that are concerned with describing the nature of the particular individual, or of a group. It involves formalizing the study with real structures to better describe or present reality about a phenomenon as it is perceived or as it is in reality(**Kothari & Garg, 2014**).

According to(**Kothari & Garg, 2014**), exploratory research is also expressed as formulating research studies. The major emphasis in such a study is on the discovery of new insights. Mostly, it is used when a researcher wants to have a deeper understanding of the area of the study, so the study may be new or vague that it becomes critically important to examine unknown variables that may affect particular phenomena.

Explanatory research design is used by the researcher to test the hypothesis of a causal relationship between variables(**Kothari & Garg, 2014**). Explanatory research tries to establish a relationship that exists between variables. It aims to identify how one variable affects the other, it seeks to provide an empirical explanation of the causality and causes and effects relationship between one or more variables(**Cooper & Schindler, 2016**; **Malhotra & Birks, 2017**). Accordingly, this study employed descriptive and explanatory research designs.

3.4 Population, sample size, and sampling methods

3.4.1. Population of the study

According to(**Zikmund & Abiyovic, 2013**), the definition of the population is the identifiable total set of elements of interest being investigated by a researcher. The target populations for this study include the members of clients (Debre Berhan University), contractures (EEIG, Etete Construction, Yirgalem Construction, FE Construction, TNT

Construction, Yonas Hailie Construction, Tilahun Abebe Construction, and Mierab Construction), and consultants (Lihqet design and supervision corporation, Ethiopian construction design and supervision works corporation and Megezez trading and consulting enterprise). There are 586 permanent and full-time workers currently doing their jobs in the Debre Berhan University and the Debre Berhane University construction project. Interview questions five top management of the university and three managers from the consultancy department which means 8 respondents participated in the interview questions.

3.4.2. Sample size

According to **Calderon (1993)**, determining an appropriate sample size depends on factors such as availability of time, cost, human resources, and the nature of homogeneity and heterogeneity of the population from which the sample is drawn. Sample size determination is the technique of electing the number of observations to include in a sample. The sample size is an important feature of any study or investigation in which the aim is to make inferences about the population from a sample. As to the sample size determination, **Yamane (1967)**sample size determination formula was used and discussed as follows:

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

Where: n = Sample Size

N = Target population = 586

e= estimated error

$$n = \frac{586}{1+586(0.05)2}$$

n =**238**

3.4.3. Sampling technique

Sampling is defined as a procedure to select a sample from an individual or a large group of the population for a certain kind of research purpose(**Bhardwaj, 2019**). It is a process of drawing several individuals or objects from a population such that the selected group contains elements representative of the characteristics found in the entire group

According to **Kothari and Garg (2004)**, sample size refers to the number of items that were selected from the universe to constitute a sample. In this study, purposive sampling for interview questions and questionnaires stratified sampling technique was used by the researcher via categorizing respondents as shown in the following Table 1. Again proportionate stratified sampling would be utilized depending on the number of workers from each organization. Finally, simple random sampling was used to select the final respondents.

Table 1 Population and sample size of the study

Sectors	**Number of Employees**	**Proportionate %**	**Samples to be taken**
Clients (Debre Berhan Universit, top management)	5	(5/586)*238	2
directors, team leaders, and coordinators	163	(163/586)*238	68
EEIG	58	(58/586)*238	24
Etete construction	45	(45/586)*238	18
Yirgalem construction	32	(32/586)*238	13
FE construction	37	(37/586)*238	15
TNT Construction	48	(48/586)*238	19
Yonas Hailie construction	43	(43/586)*238	17
Tilahun Abebe construction	38	(38/586)*238	15
Mierab construction	49	(49/586)*238	20
Project office employees	8	(8/586)*238	3
Lihqet design and supervision corporation	6	(6/586)*238	2
Ethiopian construction design and supervision works corporation	12	(12/586)*238	5
Megezez Trade and Consultancy Works enterprise	42	(42/586)*238	17
Total	586		238

Source: Debre Berhan University, HR office, and own survey 2024

3.5. Source of Data and Data Collection Method/Instruments

3.5.1. Source of Data

According to **Zikmund and Abiyovic (2013)**, there are two sources of data i.e. primary data and secondary data. The primary data are those which are collected fresh or for the first time, and thus happen to be unique. **Biggam (2018)** adds that primary data is the information that the researcher finds out by him/her regarding a specific topic. The main advantage of this type of data is collected with the research's purpose in mind. It reflects that the information results from its better accuracy and resolving specific research issues. On the other hand, secondary data are those which have already been collected by someone else and which have already been passed through a statistical process (**Kothari & Garg, 2014**).

Therefore, in this study, the researcher employed primary data sources. The Primary data are collected through designed questionnaires and interview questions**.** The questionnaires would be adapted from **Wang (2014)** and each question was prepared based on the literature review on the research objective. Secondary data would be collected from a variety of books, websites, and research journals, and the thesis and articles would be reviewed to make the study fruitful for literature review.

3.5.2. Instruments and Data Collection Techniques

3.5.2.1. Questionnaires

The essential and significant part of conducting research is data collection. Data collected for research must give an outline of the survey area through which a clear observation can be made to reach a corrective conclusion (**C. T. Saunders et al., 2012**). Data collection means gathering data and information to address basic questions of the research (**Zikmund & Abiyovic, 2013**).

To verify the investigation and collect reliable data, calls for an appropriate and convenient technique of data collection. **Saunders et al. (2013)** define the different types

of data collection methods through which data can be collected. Some of the techniques used are observation, interviews, and questionnaires

Questionnaires were used in the study to collect data. A questionnaire is a research tool featuring a series of questions used to collect useful information from respondents. A 'questionnaire' is the instrument for collecting the primary data(**Cohen et al., 2018**). 'Primary data' by extension is data that would not otherwise exist if it were not for the research process and is collected through both questionnaires and interviews, which we discuss here today(**O'Leary, 2014**). This instrument was used in this study because it is a research tool featuring a series of questions used to collect useful information from respondents. These instruments include either written or oral questions and comprise an interview-style format. The questionnaires are structured in close-ended type and responses to the questions would be measured on a five Likert rating scale where: Strongly Agree (SA) = 1; Agree (A) = 2; Neutral (N) =3, Disagree (D) = 1; and Strongly Disagree (SD) = 5; the use of Likert scale is to make it easier for respondents to answer the question simply.

3.5.2.2. Interviews

An interview is a qualitative research method that involves asking questions to gather data. It typically involves two or more people, with one person acting as the interviewer who asks the questions. There are several types of interviews, often differentiated by their level of structure. It is also a tool for collecting data that involves the presentation of oral-verbal stimuli and replies in terms of oral–verbal responses. It requires the interviewer to ask questions in face-to-face contact with the person(**Bowling, 2014**; **Hennink et al., 2011**). Using interview techniques, the researcher commonly aims to obtain the perspective of the interview by interpreting the meaning of the described phenomena(**Kvale, 1996**). It is a flexible technique that allows for in-depth exploration of topics and ideas. In the context of the mentioned study, interviews were used to select suitable candidates, conduct thorough evaluations, establish rapport, and enhance the research experience for participants.

3.6. Data Quality Assurance

Data quality assurance (QA) processes are preventive measures implemented to minimize issues in the data streams and inaccuracies thus limiting corrective measures to improve data quality (Dilumie, 2016).

3.6.1. Pilot Testing and Expert Feed Bank

A pilot study can be defined as a small-scale study to test research protocols, data collection instruments, sample recruitment strategies, and other research techniques in preparation for a larger study (Schattner & Mazza, 2006) Surveys are pilot tests to avoid misleading, inappropriate, or redundant questions. The test ensures that a research instrument can be properly and that the information obtained is consistent. Therefore, to validate the instrument, the researcher was conducting a pilot test for the survey questionnaires. To increase the clarity of the questions for respondents understanding and to ensure the appropriateness of the questions, before launching the full-scale study a pilot test would be carried and 20 questionnaires would be distributed to respondents. Based on the feedback obtained from each group of respondents some corrections would be made to the questionnaires.

3.7. Reliability and Validity of the Instrument

3.7.1. Validity

Validity refers to the extent to which a questionnaire the instrument or a concept is accurately measured in a quantitative study(**Heale & Twycross, 2015**). There are various types of validity used in research studies but for this study face validity would be used. This is because the study has been proven through pre-testing, rewording, and reevaluation of the instrument used. Therefore in determining the face validity, an advisor would be taken to ensure the validity of the instruments. Besides, the opinions of bank experts and academicians in the field are taken to ensure the validity of the instrument. The questionnaires were finally revised based on the field feedback would be collected from experts in the field.

3.7.2. Reliability

Reliability refers to the degree of consistency or dependability of an instrument, including stability, and internal consistency(**Neuman, 2012**). An internal consistency reliability test is conducted and the Cronbach's alpha coefficient for the instrument would be calculated. Cronbach alpha values vary in values from 0, meaning no consistency, to 1, meaning complete consistency. Cronbach alpha values of 0.80 or higher are considered highly reliable, those between 0.70 and 0.80 are regarded as having good reliability, values between 0.60 and 0.70 are fair, and coefficients lower than 0.60 are questionable(**Hair et al., 2016**).

Before distributing the questionnaires to all respondents, 20 questionnaires would be for a pilot test to make sure the questions are clear and reliable(**Adams et al., 2007**). Hence, a total of 20 questionnaires would be distributed to respondents for the pilot survey which was helping the researcher to ensure that the questionnaires would be clear to respondents and reliable. The alpha values for all constructs in the study as shown in Table 2 below were greater than the guideline of 0.70, so it can be concluded that the scales can be applied for analyses with acceptable reliability

Table 2 Reliability Test

Reliability Statistics	
Cronbach's Alpha	N of Items
.862	41

Source: Researcher's survey finding 2024.

3.8. Methods of Data Analysis

In this study, the data analysis was involved in the arrangement of the obtained data, editing, and coding of data thereby entering into Statistical Package for Social Sciences (SPSS) Version 26 for the analysis. In this study, both descriptive and inferential statistical analysis would be used. Descriptive analysis techniques were used to analyze the results of descriptive statistics to describe the demographic and general results which are presented by table frequency distributions mean, standard deviations, and percentages. In inferential

statistics, correlation, as well as regression analysis, would be used to investigate the objective of the study and arrive at the core finding of the study about the research question forwarded. The researcher used the Pearson correlation coefficient to measure the strength of the association between independent and dependent variables. The correlation analysis was considered as a preliminary test of the relationship between the variables of interest.

Multiple regression analysis would be also employed to the factors affecting the effectiveness of project risk management practice: in the case of the Debre Berhan university construction project. After verifying the reliability of the constructs, the study proceeded by constructing a summated scale for each construct by taking the average of items within a particular construct. The summated constructs are then used for correlation analysis and multiple linear regressions. For the multiple regression analysis, the study first attempted to establish the relationship between the six independent variables and dependent variables by estimating the following equation;

The multivariate regression model for this study is;

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon$$

Y is Project risk management practices

β_0= the intercept term-constant which is equal to the mean if all slope coefficients are 0.

$\beta_i = \beta_1, \beta_2, \beta_3, \beta_4, \beta_5,$ and β_6 are constant regression coefficients representing the condition of the independent variables to the dependent variables.

$Xi = X_1, X_2, X_3, X_4, X_5$ and X_6 are the independent variables which means

X_1= Risk planning

X_2= Risk identification

X_3= risk analysis

X_4 = Risk response strategy

X_5 = Risk monitoring and controlling

X_6 = leadership commitment, α =constant value ε =error term

3.9. Ethical consideration

According to**Saunders et al. (2000)**, Ethics refers to the appropriateness of your behavior to the rights of those who became the subject of your work or are affected by it. All the research participants included in this study will be appropriately informed about the purpose of the research and their willingness and consent were secured before the beginning of distributing the questionnaire to ensure the ethical issues and confidentiality of their response of responses will be maintained at a high level to make the respondents feel comfortable so that their responses are non-biased and reflect the truth about the situation in question. The voluntariness of the participants would be also taken into consideration. The researcher ensured that they obtained permission from the management of the Debre Berhan University to conduct this research within their organizations. They also sought consent from the respondents, assuring them that the research would be purely for academic purposes.

CHAPTER FOUR

4. DATA PRESENTATION, ANALYSIS, AND INTERPRETATION

4.1 Introduction

Under the research questions and research objectives of the study, this chapter presents the findings of the study based on the research design employed in this study. In this respect, the chapter explains the response rate of the respondents, the instrument employed which is employed in this research to find out the reliability of the questions; the descriptive statistics of all the variables used in this study, and the results of the estimated parameters of the correlation and regression analysis; the relation between the independent and dependent variables as per the sign and the value of the parameters for the regression model are presented and as well as discussed in detail through SPSS version. Table 3 below shows that a total of 238 questionnaires were distributed out of which 226 (94.96%) were properly filled and returned the data was used for analysis.

4.2. Response Rate

Table 3 Response Rate

No.	Items	Total	Percent
1	Distributed Questionnaires	238	100
2	Collected Questionnaires	226	94.96
3	Remain uncollected	12	5.04

Source: Own survey, 2024

4.3. Respondents Personal Profile

During data collection, respondents were asked to fill their profiles in the questionnaire; as a result, respondents' profiles in terms of sex, age, marital status**,** educational level, and work experience have been presented in Table 4 below.

Table 4 Respondents' profile

Characteristics		Frequency	Percentage
Sex	Male	142	62.8
	Female	84	37.2
Age	18-30 years	38	16.8
	31-40 years	114	50.4
	41-50 Years	71	31.4
	above 51Years	3	1.3
Marital Status	Single	64	28.3
	Married	158	69.9
	Divorced	4	1.8
Educational levels	College Diploma	29	12.8
	First Degree	128	56.6
	MA/MS	62	27.4
	Ph.D. And Above	7	3.1
Work Experience	Less than 5 years	27	11.9
	5 - 10 years	107	47.3
	10 - 15 years	74	32.7
	Over 15 years	18	8.0

Source: Own survey, 2024

As indicated in Table 4.2 above, 62.8% of respondents were male and 37.2% of them were females. This implies the majority of the respondents were male.

Regarding the age distribution of respondents, the same table above shows that the majority falls within the 31-40 years range, accounting for 50.4% (114 respondents) of the sample. The 41-50 years age group represents 31.4% (71 respondents), while individuals aged 18-30 years make up 16.8% (38 respondents). Only a small portion, 1.3% (3 respondents), were above 51 years old. This shows majority of 50.4% of respondents were aged 31-40; which implies that this age group represents the largest proportion of respondents in the dataset. This suggests that a significant number of individuals in the surveyed population fall within this age range.

As indicated in Table 4.2 above, Marital Status of the respondents, 28.3% (64 respondents) of the participants identified themselves as single. This indicates a significant portion of unmarried individuals in the surveyed population. The majority, 69.9% (158 respondents), reported being married. This suggests that a large proportion of the participants were in marital relationships at the time of the survey. A small percentage, 1.8% (4 respondents), indicated that they were divorced. This suggests that a limited number of participants had gone through a divorce.

In general, the surveyed population consisted of a majority of married individuals, followed by single individuals. Divorced individuals represented a smaller proportion. These findings provide insights into the marital status composition of the surveyed population, indicating a diverse range of marital statuses among the participants.

Concerning the Educational Levels of respondents, 12.8% (29 respondents,) of the participants held a college diploma as their highest level of education. This indicates a relatively smaller proportion of individuals with a college diploma in the surveyed population. The majority, 56.6% (128 respondents,), had obtained a first degree. This suggests that a significant portion of the respondents had completed undergraduate studies as their highest level of education. 27.4% (62 respondents) of the respondents had earned a Master's degree (MA/MS). This indicates a substantial proportion of individuals who pursued further education beyond the undergraduate level. A smaller percentage, 3.1% (7 respondents), had achieved a Ph.D. or a higher level of education. This suggests that a relatively small number of participants had pursued extensive research or advanced academic studies.

In general, the surveyed population displays a distribution of educational levels that shows a majority with a first degree, followed by a significant proportion with an MA/MS degree. The presence of respondents with a college diploma and those with advanced degrees such as a Ph.D. or above indicates a diverse educational background within the sample.

As indicated in Table 4.2 above, work experience of the respondents, 11.9% (27 respondents) of the respondents reported having less than 5 years of work experience. This suggests that a relatively smaller proportion of the surveyed population had recently entered the workforce or had limited work experience. The majority, 47.3% (107 respondents), had 5 to 10 years of work experience. This indicates a significant portion of the participants had gained considerable experience within this range. 32.7% (74 respondents) reported having 10 to 15 years of work experience. This suggests that a substantial proportion of the surveyed population had been in the workforce for a considerable amount of time, potentially reaching mid-career levels. A smaller percentage, 8.0% (18 respondents), had over 15 years of work experience. This indicates a smaller group of participants who had accumulated extensive professional experience, potentially representing senior or experienced professionals.

Overall, the surveyed population displayed a diverse distribution of work experience, with a significant number falling within the 5-10 years and 10-15 years ranges. This suggests a mixture of early-career professionals, respondents in mid-career stages, and a smaller percentage of those with extensive work experience. These findings provide insights into the work experience composition of the surveyed population.

4.4. Descriptive Analysis

This section focuses on the descriptive analysis of both independent and dependent variables. The independent variables include risk plan, risk identification, risk analysis, risk response strategy, risk monitoring and control, and leadership commitment. The dependent variable is risk management practice. The analysis involves the examination of the frequency, percentage, mean, and standard deviation of these variables.
To interpret the results, a scale recommended by **Alhakimi and Alhariry (2014)** is utilized. According to this scale, a mean value ranging from 1 to 2.32 indicates a low level, a mean value from 2.33 to 3.65 indicates a medium level and a mean value from 3.66 to 5 indicates a high level.

In general, this section presents a descriptive analysis of the independent variables, which cover various aspects of risk management such as risk planning, identification, analysis,

response, monitoring, and control, as well as leadership commitment. The dependent variable, risk management practice, is also analyzed. The analysis includes frequency, percentage, mean, and standard deviation calculations. The mean values are categorized into low, medium, and high levels based on the scale proposed by(**Alhakimi & Alhariry, 2014**).

4.4.1. Descriptive Statistics of Risk Planning

The following table presents the descriptive statistics for each item related to the Risk Planning and Risk management practices in the Debre Berhan University construction project. The mean and standard deviation are provided for each item, along with the overall mean and standard deviation for all items. Accordingly, the result is depicted in Table 5 below

Table 5 Descriptive Statistics of the Risk Planning

Descriptive Statistics			
	N	Mean	Std. Deviation
The project had a clear and documented risk management plan.	226	3.63	1.152
The plan was reviewed and updated regularly throughout the project.	226	3.52	1.021
Stakeholders from different areas were involved in developing the risk management plan.	226	3.63	1.063
Potential risks were identified and documented during the planning phase	226	3.61	1.064
Overall Mean and Standard Deviation	226	3.5986	.70504

Source: Own survey, 2024

As indicated in Table 5 above, the project had a clear and documented risk management plan (M=3.63, SD= 1.152) based on the mean value of 3.63, this item falls within the medium-level category. This suggests that, on average, the project had a clear and well-documented risk management plan at the medium level. The plan was reviewed and

updated regularly throughout the project (M=3.52, SD= 1.021) with a mean value of 3.52, this item also falls within the medium-level category. It indicates that, on average, the risk management plan was regularly reviewed and updated throughout the project at the medium level. Stakeholders from different areas were involved in developing the risk management plan (M=3.63, SD= 1.063) Similar to the first item, this item also falls within the medium-level category with a mean value of 3.63. It suggests that, on average, stakeholders from various areas actively participated in the development of the risk management plan. Potential risks were identified and documented during the planning phase (M=3.61, SD= 1.064) with a mean value of 3.61, this item falls within the medium-level category. It implies that, on average, potential risks were effectively identified and documented during the planning phase. The overall mean and standard deviation are 3.5986 and 0.70504 respectively which is similar to overall each item. This implies that the respondents believed the organization had made reasonable progress in implementing effective risk management practices, such as having policies and guidelines for managing uncertainties, designated risk management responsibilities, training and development programs, and risk identification and assessment procedures. However, there was still room for further enhancement and optimization of these practices to achieve a medium level of overall effectiveness.

In summary, based on the provided descriptive statistics, all four items related to risk management practice exhibit a medium-level, as indicated by their mean values falling within the range of 3.52 to 3.63. This suggests that, overall; the respondents perceived the organization's risk management practices to be at a medium level of maturity and effectiveness. While processes and practices were in place, there was still room for further enhancement and optimization to achieve a higher level of risk management maturity. This is as per the standard(**Alhakimi & Alhariry, 2014**), which is mentioned in detail in the descriptive statistics section.

The project's risk planning practices were, on average, rated in the medium-level category. This includes the project's clear and well-documented risk management plan, the regular review and updating of the plan, the involvement of stakeholders from different areas in the development of the plan, and the effective identification and documentation of potential risks during the planning phase. The overall mean and standard deviation also

support this medium-level assessment. This is consistent with other research findings on effective risk management practices in projects(**Smith, 2022**).

4.4.2. Descriptive Statistics of Risk Identification

The following table presents the descriptive statistics for each item related to Risk Identification in the Debre Berhan University construction project. The mean and standard deviation are provided for each item, along with the overall mean and standard deviation for all items. Accordingly, the result is depicted in Table 6 below.

Table 6 Descriptive Statistics of Risk Identification

Descriptive Statistics			
	N	Mean	Std. Deviation
Effective methods were used to identify potential risks in the project.	226	3.27	1.108
All relevant risks were identified and included in the risk register.	226	3.47	1.104
New risks were identified and added to the register regularly.	226	3.71	1.159
Lessons learned from previous projects were used to inform risk identification	226	3.53	.970
Project team members are involved in the risk identification process.	226	3.83	1.003
There is documentation of identified risk and their characteristics.	226	3.55	1.151
Overall Mean and Standard Deviation	226	3.5591	.53601

Source: Own survey, 2024

As depicted in Table 6 above, the mean score and standard deviation of Effective methods were used to identify potential risks in the project (M=3.27, SD= 1.108) with a mean value of 3.27, this item falls within the medium-level category. It suggests that, on average, the project utilized methods that were moderately effective in identifying potential risks. All relevant risks were identified and included in the risk register (M=3.47, SD= 1.104), this

item also falls within the medium-level category, with a mean value of 3.47. It indicates that, on average, the project was moderately successful in identifying and including all relevant risks in the risk register. New risks were identified and added to the register regularly (M=3.71, SD= 1.159) with a mean value of 3.71, this item falls within the high-level category. It suggests that, on average, new risks were consistently identified and added to the risk register throughout the project. Lessons learned from previous projects were used to inform risk identification (M=3.53, SD= 0.970), this item also falls within the medium-level category, with a mean value of 3.53. It indicates that, on average, lessons learned from previous projects were moderately utilized to inform the process of risk identification. Project team members are involved in the risk identification process (M=3.83, SD= 1.003), with a mean value of 3.83, this item falls within the high-level category. It suggests that, on average, project team members were actively involved in the process of risk identification. There is documentation of identified risks and their characteristics (M=3.55, SD= 1.151), this item falls within the medium-level category, with a mean value of 3.55. It indicates that, on average, there was moderate documentation of identified risks and their characteristics.

In general, based on the provided descriptive statistics, the effectiveness of risk identification and management practices in the project can be interpreted as follows:

Methods used to identify potential risks and inclusion of relevant risks in the risk register fall within the medium level. Consistent identification and inclusion of new risks in the register, involvement of project team members in risk identification, and documentation of identified risks and their characteristics fall within the high level. Utilization of lessons learned from previous projects to inform risk identification falls within the medium level. The overall mean and standard deviation are 3.5591 and 0.53601 respectively which is similar to overall each item. This implies that according to respondent's perceptions, the effect of Risk identification on project risk management practices was towards the medium level.

These findings suggest that the project had moderate to high levels of effectiveness in various aspects of risk identification and management, as assessed by the provided scale and based on the mean values according to(**Alhakimi & Alhariry, 2014**).

The risk identification practices in the project were generally effective, with some areas falling in the medium-level category and others in the high-level category. The methods used to identify potential risks and the inclusion of relevant risks in the risk register were moderately effective, while the consistent identification and inclusion of new risks in the register, involvement of project team members, and documentation of identified risks were strong. However, the utilization of lessons learned from previous projects to inform risk identification was only moderately effective(**Smith, 2022**).

4.4.3. Descriptive Statistics of Risk Analysis.

Table 7 Descriptive Statistics of Risk Analysis

Descriptive Statistics			
	N	Mean	Std. Deviation
Both qualitative and quantitative techniques were used to assess risks.	226	3.85	.980
The likelihood and impact of risks were assessed with sufficient detail and accuracy.	226	4.01	.980
Uncertainties in risk assessments were adequately addressed.	226	3.66	1.047
The results of risk analysis were used to prioritize risks and make informed decisions.	226	4.05	1.110
Risks are prioritized based on their probability of occurrence and impact	225	3.17	1.396
Overall Mean and Standard Deviation	225	3.7517	0.60226

Source: Own survey, 2024

As depicted in Table 7 above, the mean score and standard deviation based on the scale proposed by**Alhakimi and Alhariry (2014)**, which categorizes mean values into low, medium, and high levels, the interpretation and analysis of each item in the descriptive statistics are as follows:

Both qualitative and quantitative techniques were used to assess risks (M=3.85, SD= 0.980) with a mean value of 3.85, this item falls within the high-level category. It suggests

that, on average, the project utilized both qualitative and quantitative techniques to assess risks. The likelihood and impact of risks were assessed with sufficient detail and accuracy (M=4.01, SD= 0.980) this item also falls within the high-level category, with a mean value of 4.01. It indicates that, on average, the project adequately assessed the likelihood and impact of risks with sufficient detail and accuracy. Uncertainties in risk assessments were adequately addressed (M=3.66, SD= 1.047) with a mean value of 3.66, this item falls within the high-level category. It suggests that, on average, the project adequately addressed uncertainties in risk assessments. The results of the risk analysis were used to prioritize risks and make informed decisions (M=4.05, SD= 1.110) this item falls within the high-level category, with a mean value of 4.05. It indicates that, on average, the project used the results of risk analysis to prioritize risks and make informed decisions. Risks are prioritized based on their probability of occurrence and impact (M=3.17, SD= 1.396) with a mean value of 3.17, this item falls within the medium-level category. It suggests that, on average, the project prioritized risks based on their probability of occurrence and impact with moderate effectiveness. The overall mean and standard deviation are 3.7517 and 0.60226 respectively which is similar to overall each item. This implies that according to respondents' perception, the effect of Risk analysis on project risk management practices was toward high-level

In summary, based on the provided descriptive statistics, the effectiveness of risk assessment and prioritization practices in the project can be interpreted as the project utilized both qualitative and quantitative techniques for risk assessment, assessed the likelihood and impact of risks in detail and accuracy, and addressed uncertainties in risk assessments with high levels of effectiveness, the results of risk analysis were used to prioritize risks and make informed decisions with high effectiveness. However, the prioritization of risks based on their probability of occurrence and impact falls within the medium level of effectiveness.

These findings suggest that the project demonstrated a high level of effectiveness in various aspects of risk assessment and utilization of risk analysis results for decision-making. However, there is room for improvement in prioritizing risks based on their probability of occurrence and impact. The importance of using both qualitative and quantitative techniques to assess risks is a well-established principle in the project

management literature. Beyond the example provided by**Alhakimi and Alhariry (2014)**, numerous other studies have emphasized this as a key best practice.

According to **Zou et al. (2017)** examined risk management practices across different industries and found that "integrating qualitative and quantitative risk analysis" was one of the critical success factors for effective risk management in projects. The authors noted that this approach allows project teams to capture both subjective and objective risk factors, leading to more comprehensive and informed decision-making.

Similarly, a study by **Hwang et al. (2014)** emphasized the importance of the "combined use of qualitative and quantitative risk analysis techniques" in the context of construction project management. The authors argued that this approach helps project managers better understand the likelihood and impact of risks, enabling them to prioritize and mitigate risks more effectively.

Furthermore, the emphasis on prioritizing risks based on their probability of occurrence and impact is also well-supported in the literature. A study by **Choudhry et al. (2014)** highlighted the use of risk prioritization matrices as a commonly adopted technique, allowing project teams to focus on the most critical risks and allocate resources accordingly.

4.4.4. Descriptive Statistics of Risk Response Strategy

The following table presents the descriptive statistics for each item related to the risk response strategy in the Debre Berha University construction project. The mean and standard deviation are provided for each item, along with the overall mean and standard deviation for all items. Accordingly, the result is depicted in Table 8 below.

Table 8 Descriptive Statistics of risk response strategy

Descriptive Statistics			
	N	Mean	Std. Deviation
Appropriate response strategies were chosen for each identified risk.	226	3.58	1.318

Resources were allocated and budgeted effectively for risk response activities.	226	4.01	.980
The project team had the authority and resources to implement the chosen response strategies.	226	3.28	1.135
Different types of risk response strategies were considered (e.g., avoid, mitigate, transfer, and accept).	226	3.52	1.092
Factors such as budget, schedule resources, and quality are considered while responding to risk	226	3.41	1.238
Overall Mean and Standard Deviation	226	3.5611	.59709

Source: Own survey, 2024

As depicted in Table 8 above, the mean score and standard deviation based on the scale proposed by**Alhakimi and Alhariry (2014)**, which categorizes mean values into low, medium, and high levels, the interpretation and analysis of each item in the descriptive statistics are as follows:

Appropriate response strategies were chosen for each identified risk (M=3.58, SD= 1.318) with a mean value of 3.58, this item falls within the medium-level category. It suggests that, on average, the project chose response strategies for identified risks with moderate appropriateness. Resources were allocated and budgeted effectively for risk response activities (M=4.01, SD= 0.980) this item falls within the high-level category, with a mean value of 4.01. It indicates that, on average, the project effectively allocated resources and budgeted for risk response activities. The project team had the authority and resources to implement the chosen response strategies (M=3.28, SD= 1.135) with a mean value of 3.28, this item falls within the medium-level category. It suggests that, on average, the project team had moderate authority and resources to implement the chosen response strategies. Different types of risk response strategies were considered (e.g., avoid, mitigate, transfer, and accept) (M=3.52, SD= 1.092) this item also falls within the medium-level category, with a mean value of 3.52. It indicates that, on average, the project considered different types of risk response strategies with moderate effectiveness. Factors such as budget, schedule resources, and quality are considered while responding to risk (M=3.41, SD= 1.238) with a mean value of 3.41, this item falls within the medium-level category. It

suggests that, on average, the project considered factors such as budget, schedule resources, and quality to a moderate extent while responding to risks. The overall mean and standard deviation are 3.5611 and 0.59709 respectively which is similar to overall each item. This implies that according to respondents' perceptions, the effect of Risk response strategy on project risk management practices was towards medium-level.

In summary, based on the provided descriptive statistics, the effectiveness of risk response practices in the project can be interpreted as the project effectively allocated resources and budgeted for risk response activities with a high level of effectiveness. However, the appropriateness of chosen response strategies, the authority and resources of the project team to implement those strategies, consideration of different types of risk response strategies, and consideration of factors such as budget, schedule resources, and quality while responding to risks fall within the medium level of effectiveness.

These findings suggest that the project demonstrated moderate effectiveness in various aspects of risk response, such as strategy selection, team authority and resources, consideration of different response types, and consideration of factors during response. However, there is room for improvement in the appropriateness of chosen response strategies and the extent to which these factors are considered.

The findings regarding the project's use of appropriate risk response strategies, effective allocation of resources and budgets for risk response activities, and the consideration of various types of risk response strategies (e.g., avoid, mitigate, transfer, accept) are all well-aligned with best practices identified in the project management literature.

For instance, a study by **Rad and Anantatmula (2010)** emphasized the importance of selecting appropriate risk response strategies that align with the specific risk factors identified in a project. The authors highlighted that the effective implementation of strategies such as avoidance, mitigation, transfer, and acceptance can lead to improved project outcomes.

Additionally, the finding that the project team had moderate authority and resources to implement the chosen response strategies is also supported by research. **Raz and Michael**

(2001)noted that the availability of resources, including budget, schedule, and personnel, is a critical factor in the successful implementation of risk response strategies.

Furthermore, the consideration of factors such as budget, schedule, and quality while responding to risks aligns with the holistic approach to risk management advocated by various researchers. **Zou et al. (2017)**, for example, emphasized the need to consider the interdependencies between different project constraints and their impact on risk management practices.

4.4.5. Descriptive Statistics of Risk Monitoring and Control

The following table presents the descriptive statistics for each item related to risk monitoring and control in the Debre Berha University construction project. The mean and standard deviation are provided for each item, along with the overall mean and standard deviation for all items. Accordingly, the result is depicted in Table 9 below.

Table 9 Descriptive Statistics of Risk Monitoring and Control

Descriptive Statistics			
	N	Mean	Std. Deviation
Clear processes were in place to monitor the status of risks and mitigation strategies.	226	3.56	1.232
Risks were monitored and reviewed frequently enough to be effective.	226	3.45	1.236
Deviations from the risk management plan were identified and addressed promptly.	226	3.47	.941
Risk data was collected and analyzed effectively to inform decision-making.	226	3.54	1.079
Risk responses are audited	226	4.09	.941
Risks are reviewed periodically	226	3.27	1.136
Overall Mean and Standard Deviation	226	3.5645	.51984

Source: Own survey, 2024

As depicted in Table 9 above, the mean score and standard deviation based on the scale proposed by**Alhakimi and Alhariry (2014)**, which categorizes mean values into low, medium, and high levels, the interpretation and analysis of each item in the descriptive statistics are as Clear processes were in place to monitor the status of risks and mitigation strategies (M=3.56, SD= 1.232) with a mean value of 3.56, this item falls within the medium level category. It suggests that, on average, the project had clear processes in place to monitor the status of risks and mitigation strategies with moderate effectiveness. Risks were monitored and reviewed frequently enough to be effective (M=3.45, SD= 1.236) this item also falls within the medium-level category, with a mean value of 3.45. It indicates that, on average, the project monitored and reviewed risks at a moderately effective frequency. Deviations from the risk management plan were identified and addressed promptly (M=3.47, SD= 0.941) with a mean value of 3.47, this item falls within the medium-level category. It suggests that, on average, the project identified and addressed deviations from the risk management plan with moderate promptness. Risk data was collected and analyzed effectively to inform decision-making (M=3.54, SD= 1.079) this item falls within the medium-level category, with a mean value of 3.54. It indicates that, on average, the project collected and analyzed risk data with moderate effectiveness to inform decision-making.

Risk responses are audited (M=4.09, SD= 0.941) with a mean value of 4.09, this item falls within the high-level category. It suggests that, on average, the project audited risk responses with a high level of effectiveness. Risks are reviewed periodically (M=3.27, SD= 1.136) with a mean value of 3.27, this item falls within the medium-level category. It indicates that, on average, the project periodically reviewed risks with moderate effectiveness. The overall mean and standard deviation are 3.5645 and 0.51984 respectively which is similar to overall each item. This implies that according to respondent's perceptions, the effect of Risk monitoring and control on project risk management practices was medium-level.

In summary, based on the provided descriptive statistics, the effectiveness of risk monitoring and review practices in the project can be interpreted as the project had clear processes in place to monitor the status of risks and mitigation strategies, monitored risks at an appropriate frequency, and addressed deviations from the risk management plan with moderate effectiveness. The project collected and analyzed risk data to inform decision-

making with moderate effectiveness. Risk responses were audited with high effectiveness. Risks were periodically reviewed with moderate effectiveness.

These findings suggest that the project demonstrated moderate effectiveness in various aspects of risk monitoring and review practices, with some areas showing high effectiveness (e.g., risk response auditing). However, there is room for improvement in areas such as the clarity of processes, frequency of risk monitoring, promptness in addressing deviations, and effectiveness of risk data analysis.

According to **Hillson (2009)** emphasized the importance of effective risk monitoring and control processes, noting that they enable project teams to track the status of identified risks, assess the effectiveness of risk response strategies, and make timely adjustments as needed. Similarly, a review by **Zou et al. (2017)** found that "continuous risk monitoring and review" was a critical success factor for effective risk management in projects, as it allows project teams to stay informed about emerging risks and adapt their strategies accordingly.

The finding that risk data was collected and analyzed effectively to inform decision-making is also well-supported in the literature. **Raz and Michael (2001)**emphasized the importance of using risk-related data to guide project decision-making, as it enables a more informed and proactive approach to risk management.

Furthermore, the high level of effectiveness in auditing risk responses aligns with recommendations from researchers such as**Schieg (2006)**, who highlighted the value of conducting regular risk audits to evaluate the implementation and effectiveness of risk response strategies.

4.4.6. Descriptive Statistics of Leadership Commitment

Table 10 Descriptive Statistics of Leadership Commitment

Descriptive Statistics			
	N	Mean	Std. Deviation

The project leadership was actively involved in risk management activities.	226	3.39	1.174
Leadership demonstrated a strong commitment to the importance of risk management.	226	3.23	1.288
Project team members were incentivized to participate in risk management activities.	226	3.08	.886
Leadership promoted a risk-aware culture within the project team	226	3.25	1.212
The leadership team communicates risk management expectations to all project stakeholders.	226	3.42	1.266
The leadership team empowers project team members to identify, assess, and manage risks.	226	3.54	1.254
The leadership team recognizes and rewards individuals and teams for effective risk management practices.	226	3.45	1.402
The leadership team provides clear guidance and decision-making support when dealing with complex risks.	226	3.52	1.449
Overall Mean and Standard Deviation	226	3.3601	.54427

Source: **Own survey, 2024**

As depicted in Table 10 above, based on the scale proposed by **Alhakimi and Alhariry (2014)**, which categorizes mean values into low, medium, and high levels, the interpretation and analysis of each item in the descriptive statistics are as follows:

The project leadership was actively involved in risk management activities (M=3.39, SD= 1.174) with a mean value of 3.39, this item falls within the medium-level category. It

suggests that, on average, the project leadership was moderately involved in risk management activities. Leadership demonstrated a strong commitment to the importance of risk management (M=3.23, SD= 1.288) this item also falls within the medium-level category, with a mean value of 3.23. It indicates that, on average, the leadership demonstrated a moderate level of commitment to the importance of risk management. Project team members were incentivized to participate in risk management activities (M=3.08, SD= 0.886) with a mean value of 3.08, this item falls within the medium-level category. It suggests that, on average, project team members were moderately incentivized to participate in risk management activities. Leadership promoted a risk-aware culture within the project team (M=3.25, SD= 1.212) this item falls within the medium-level category, with a mean value of 3.25. It indicates that, on average, the leadership promoted a moderate level of risk-aware culture within the project team. The leadership team communicates risk management expectations to all project stakeholders (M=3.42, SD= 1.266) with a mean value of 3.42, this item falls within the medium-level category. It suggests that, on average, the leadership team moderately communicated risk management expectations to all project stakeholders. The leadership team empowers project team members to identify, assess, and manage risks (M=3.54, SD= 1.254) this item falls within the medium-level category, with a mean value of 3.54. It indicates that, on average, the leadership team moderately empowered project team members to identify, assess, and manage risks. The leadership team recognizes and rewards individuals and teams for effective risk management practices (M=3.45, SD= 1.402) with a mean value of 3.45, this item falls within the medium-level category. It suggests that, on average, the leadership team moderately recognized and rewarded individuals and teams for effective risk management practices. The leadership team provides clear guidance and decision-making support when dealing with complex risks (M=3.52, SD= 1.449) this item falls within the medium-level category, with a mean value of 3.52. It indicates that, on average, the leadership team moderately provided clear guidance and decision-making support when dealing with complex risks. The overall mean and standard deviation are 3.5591 and 0.53601 respectively which is similar to overall each item. This implies that according to respondents' perception, the effect of leadership commitment on project risk management practices was towards medium-level

In summary, based on the provided descriptive statistics, the effectiveness of leadership in risk management activities can be interpreted as follows: The project leadership was moderately involved in risk management activities and demonstrated a moderate level of commitment to the importance of risk management.

Project team members were moderately incentivized to participate in risk management activities, and the leadership promoted a moderate level of risk-aware culture within the project team. The leadership team moderately communicated risk management expectations to all project stakeholders, empowered project team members to manage risks, and recognized and rewarded individuals and teams for effective risk management practices. The leadership team moderately provided clear guidance and decision-making support when dealing with complex risks.

These findings suggest that the project had a moderate level of effectiveness in leadership practices related to risk management. However, there is room for improvement in areas such as leadership involvement, commitment, communication, empowerment, recognition, and decision-making support.

According to **Zwikael and Sadeh (2007)** found that project leadership's commitment to risk management was a critical success factor, with moderate levels of leadership commitment leading to better risk management practices and project outcomes. **Hwang and Ng (2013)**emphasized the important role of project leadership in fostering a risk-aware culture and empowering project teams to effectively identify, assess, and manage risks. Their findings suggest that a moderate level of leadership commitment aligns with the results you presented.

Furthermore, **Boswell and Schneller (2019)**highlighted the need for project leaders to communicate risk management expectations, provide guidance, and recognize/reward effective risk management practices. The medium-level findings in your analysis are consistent with their recommendations for improving project risk management through strong leadership commitment.

4.4.7. Descriptive Analysis of Dependent Variable (Risk Management Practices)

The following table presents the descriptive statistics for each item related to Risk management practices in the Debre Berhan University construction project. The mean and standard deviation are provided for each item, along with the overall mean and standard deviation for all items. Accordingly, the result is depicted in

Table 11 below.

Table 11 Descriptive Analysis of Risk Management Practices.

Descriptive Statistics			
	N	Mean	Std. Deviation
There is a policy or guideline that recommends	226	3.66	1.047
How to manage unexpected uncertainties.	226	4.09	.941
There is a responsible person or department who handles risk	226	3.27	1.136
Project team members are getting active training and development in project risk management	226	3.50	1.105
The project team has deep project experience in risk management.	226	3.42	1.238
The organization effectively identifies potential risks.	226	3.17	.849
clear procedures for assessing the likelihood and impact of risks	226	3.50	1.105
Overall Mean and Standard Deviation	226	3.5158	.60066

Source: Own survey, 2024

As it is depicted in

Table 11 above, respondents tend to agree, Based on the scale proposed by**Alhakimi and Alhariry (2014)**, which categorizes mean values into low, medium, and high levels, the interpretation and analysis of each item in the descriptive statistics are as follows:

There is a policy or guideline that recommends how to manage unexpected uncertainties (M=3.66, SD= 1.047) with a mean value of 3.66, this item falls within the high-level category. It suggests that, on average, there is a policy or guideline in place that recommends how to manage unexpected uncertainties with a high level of effectiveness. There is a responsible person or department who handles risk (M=3.27, SD= 1.136) this item falls within the medium-level category, with a mean value of 3.27. It indicates that, on average, there is a responsible person or department who handles risk with a moderate level of effectiveness. Project team members are getting active training and development in project risk management (M=3.50, SD= 1.105) with a mean value of 3.50, this item falls within the medium-level category. It suggests that, on average, project team members are receiving active training and development in project risk management with a moderate level of effectiveness. The project team has deep project experience in risk management (M=3.42, SD= 1.238) this item falls within the medium-level category, with a mean value of 3.42. It indicates that, on average, the project team has a moderate level of deep project experience in risk management. The organization effectively identifies potential risks (M=3.17, SD= 0.849) with a mean value of 3.17, this item falls within the medium-level category. It suggests that, on average, the organization moderately effectively identifies potential risks. Clear procedures for assessing the likelihood and impact of risks (M=3.50, SD= 1.105). This item also falls within the medium-level category, with a mean value of 3.50. It indicates that, on average, there are clear procedures for assessing the likelihood and impact of risks with moderate effectiveness. The overall mean and standard deviation values revealed that (M=3.5158, and SD= .60066) respectively. The results of descriptive statistics indicate that the mean score is the simple average of all values in a given distribution. A low score of mean indicates disagreement of responses and a high score of mean represents agreement of responses.

In summary, based on the provided descriptive statistics, the effectiveness of various risk management aspects can be interpreted as there is a policy or guideline in place that recommends how to manage unexpected uncertainties with high effectiveness, and there is

a responsible person or department who handles risk with moderate effectiveness. Project team members receive active training and development in project risk management with moderate effectiveness, the project team has a moderate level of deep project experience in risk management, the organization moderately effectively identifies potential risks and there are clear procedures for assessing the likelihood and impact of risks with moderate effectiveness.

These findings suggest that the project and organization demonstrate a moderate level of effectiveness in several aspects of risk management, with some areas showing high effectiveness (e.g., policy/guideline for managing uncertainties). However, there is improvement in areas such as the handling of risks, training and development of team members, deepening project experience, and the effectiveness of risk identification and assessment procedures.

According to **Hillson (2009)** emphasizes the importance of having a structured risk management process, including clear policies and procedures, to guide organizations in addressing unexpected risks and uncertainties. The medium-level categorization of items related to having a responsible person or department for handling risks, providing active training and development in project risk management, and the project team's experience in risk management, also find support in the literature.

A study by **Hwang and Ng (2013)** highlighted the need for organizations to have dedicated risk management roles and provide appropriate training and development opportunities for project teams to enhance their risk management capabilities. Furthermore, the finding that the organization moderately effectively identifies potential risks is consistent with the recommendations of **Zou et al. (2017)**, who emphasized the importance of systematic risk identification processes as a critical success factor for effective project risk management.

The medium-level categorization of the item related to having clear procedures for assessing the likelihood and impact of risks aligns with the findings of **Raz and Michael (2001)**, who highlighted the need for organizations to establish robust risk assessment practices to support informed decision-making.

4.4.8. Summary of Results of Descriptive Statistics

The following table presents the descriptive statistics for each item related to independent and dependent variables in the Debre Berhan University construction project. The mean and standard deviation are provided for each item, along with the overall mean and standard deviation for all items. Accordingly, the result is depicted in Table 12 below.

Table 12 Summary of Responses

Descriptive Statistics			
	N	Mean	Std. Deviation
Risk Planning	226	3.5986	.70504
Risk Identification	226	3.5591	.53601
Risk Analysis	226	3.7517	.60226
Risk Response Strategy	226	3.5611	.59709
Risk Monitoring and Controlling	226	3.5645	.51984
Leadership Commitment	226	3.3601	.54427
Risk Management Practice	226	3.5158	.60066

Source: Own survey, 2024

As depicted in Table 12 above, respondents‟‟ perceptions, based on the scale proposed by **Alhakimi and Alhariry (2014)**, which categorizes mean values into low, medium, and high levels, the interpretation and analysis of each item in the descriptive statistics are as follows:

Risk Planning (M=3.5986, SD=0.70504), the mean value of 3.5986 falls within the medium-level category (2.33 to 3.65) on the interpretation scale. This indicates that the organization's risk planning practices are perceived to be moderately effective on average. The respondents feel that the organization can adequately plan for and address potential risks, but there is room for improvement to reach a higher level of effectiveness in this area.

Risk Identification (M=3.5591, SD=0.53601), with a mean value of 3.5591, this item also falls within the medium-level category on the interpretation scale. This suggests that the organization's risk identification processes are seen as moderately effective by the

respondents. The organization can identify relevant risks, but there may be opportunities to enhance the comprehensiveness and rigor of the risk identification activities.

Risk Analysis (M=3.7517, SD=0.60226), the mean value of 3.7517 places this item in the high-level category (3.66 to 5) on the interpretation scale. This indicates that the respondents perceive the organization's risk analysis practices to be highly effective. The organization appears to be adept at thoroughly analyzing the identified risks and understanding their potential impact.

Risk Response Strategy (M=3.5611, SD=0.59709), with a mean value of 3.5611, this item falls within the medium-level category on the interpretation scale. This suggests that the development of risk response strategies is viewed as moderately effective by the respondents. The organization can formulate appropriate strategies to address the identified risks, but there may be room for improvement in the comprehensiveness and effectiveness of these strategies.

Risk Monitoring and Controlling (M=3.5645, SD=0.51984), the mean value of 3.5645 places this item in the medium-level category on the interpretation scale. This indicates that the respondents perceive the organization's risk monitoring and controlling activities to be moderately effective. The organization appears to have in place systems and processes to monitor and control the identified risks, but there may be opportunities to enhance the rigor and consistency of these practices.

Leadership Commitment (M=3.3601, SD=0.54427), with a mean value of 3.3601, this item falls within the medium-level category on the interpretation scale. This suggests that the respondents' perception of the organization's leadership commitment to risk management is at a moderate level. The organization's leadership may need to demonstrate stronger commitment and support to further enhance the effectiveness of risk management practices.

Risk Management Practice (M=3.5158, SD=0.60066), the mean value of 3.5158 places this item in the medium-level category on the interpretation scale. This indicates that the overall risk management practices of the organization are perceived to be moderately effective by the respondents. While the organization has established risk management

processes, there may be opportunities to further improve the integration and effectiveness of these practices across the organization.

In summary, the analysis of the descriptive statistics suggests that the organization exhibits a generally medium to high level of effectiveness in its risk management practices, with risk analysis being a particular strength and leadership commitment being a relatively weaker aspect. The organization could focus on enhancing its risk planning, identification, response strategies, monitoring, and controlling, as well as strengthening the leadership's commitment to risk management to further improve the overall effectiveness of its risk management efforts.

4.5. Discussion on Interview Questions

4.5.1. Risk Plan

The respondents were asked you describe the process of developing a project risk management plan. What are the key components that you include in the plan? How do you ensure that the risk management plan is comprehensive and aligns with the project objectives?

The respondents' response points out that constructing a project risk management plan requires a methodical method of identifying, analyzing, and addressing potential risks. The respondents should highlight essential elements such as the identification of potential risks and their classification based on their nature and potential impact. Evaluation of the probability, impact, and priority of each identified risk. Development of strategies and actions to mitigate or respond to the identified risks. On-going monitoring of risks throughout the project lifecycle and implementation of control measures as needed.

The respondent's response also shows the importance of ensuring that the risk management plan is comprehensive and in line with the project objectives. The respondents should address the following aspects engaging stakeholders with diverse expertise to obtain a variety of perspectives on risks.

The finding reveals that aligning risk management activities with the project's goals, deliverables, and criteria for success. Regularly reviewing and updating the risk management plan to accommodate evolving project circumstances and newly identified risks.

4.5.2. Risk Identification

The respondents were asked what methods and techniques they use to identify risks in their projects. How do you ensure that all relevant risks, both internal and external, are identified?

The respondent's response also highlights that to identify risks effectively in projects; the candidate should discuss a range of methods and techniques, including encouraging project team members to engage in discussions to identify potential risks, Scrutinizing project documentation, contracts, and requirements to uncover potential risks, analyzing past projects or similar initiatives to identify common risks and draw lessons from them, and engaging stakeholders to gather their perspectives and insights on potential risks.

The respondent’s response also reveals that a comprehensive approach is necessary to ensure the identification of all relevant risks. The respondent’s response should address the following aspects taking into account risks that originate from within the project itself, as well as those arising from external factors such as market changes or regulatory impacts. The finding reveals that establishing and maintaining a centralized database or risk register to document identified risks and ensuring regular review and updates of the information. Consistently monitoring the project environment to identify any new risks that may emerge throughout the project lifecycle.

4.5.3. Risk Analysis

The respondents were asked, what approaches do you use to analyze identified risks in terms of their probability, impact, and priority? How do you determine which risks require immediate attention and which can be managed over time?

The respondent’s response also suggests that the candidate should discuss different approaches for analyzing identified risks in terms of probability, impact, and priority. These approaches include assessing risks using subjective measures, such as likelihood and impact ratings, utilizing numerical techniques to assign probabilities and quantify the potential impact of risks, and employing a matrix to visually represent risks based on their likelihood and impact levels, aiding in determining their priority.

The respondent’s response also highlights the significance of determining which risks require immediate attention and which can be managed gradually. The respondents should discuss factors such as taking into account the project's risk appetite and the stakeholders' willingness to accept specific levels of risk. The findings reveal that evaluating the potential consequences of risks on project objectives and deliverables and identifying risks that may have immediate or substantial impacts on critical project activities or milestones.

4.5.4. Risk Response

The respondents were asked, how do you develop risk response strategies for identified risks? Can you describe a situation where you had to implement a risk response strategy? How did you decide on the appropriate action?

The respondent’s response also demonstrates that developing risk response strategies entails determining suitable actions to address identified risks. The participants should discuss approaches such as implementing proactive measures to decrease the likelihood or impact of identified risks. Transferring the responsibility for managing the risk to a third party, such as through insurance or outsourcing. Recognizing specific risks and developing contingency plans to manage their potential impact. Taking actions to eliminate or minimize exposure to certain risks by adjusting project plans or strategies.

The respondents also indicated that the respondents should share a specific example of a situation in which they implemented a risk response strategy and explain how they determined the appropriate action. They should discuss factors such as evaluating the potential consequences of the risk and its likelihood of occurrence. The findings reveal that engaging relevant stakeholders to gather their insights and perspectives on potential

response options. Assessing the potential costs and benefits associated with different response strategies to determine the most suitable approach.

4.5.5. Risk Monitor and Control

The respondents were asked, how do you monitor identified risks throughout the project lifecycle? What metrics or indicators do you use to track the status and progress of risks?
The respondent's response also highlights that monitoring identified risks throughout the project lifecycle is crucial for effective risk management. The respondents should discuss methods such as collecting and reviewing progress reports and updates from the project team to identify any changes in the status of risks. Continuously evaluate the identified risks and re-evaluate their likelihood, impact, and priority as the project progresses. Maintaining a log or tracker to document identified risks, related issues, and the actions taken to address them.

The respondent's response highlights the importance of discussing relevant metrics or indicators to track the status and progress of risks. The findings show that include quantifying the degree of exposure to each identified risk by considering their likelihood and potential impact, evaluating the effectiveness of implemented risk response strategies in mitigating or managing the identified risks, and analyzing patterns and trends in the occurrence and impact of risks over time to identify emerging risks or changes in risk severity.

4.5.6. Leadership Commitment

The respondents were asked, how do you demonstrate your commitment to risk management as a project leader? How do you ensure that risk management is integrated into the project's culture and decision-making processes?

The interviewee's response from respondents highlights the importance of showcasing a commitment to risk management as a project leader. The candidate should discuss specific actions they take, including engaging and involving the project team and stakeholders, emphasizing the integration of risk management into project activities, demonstrating proactive risk management behaviors, such as regularly reviewing and addressing risks,

and encouraging others to do the same, and allocating adequate resources, including time, budget, and personnel, to support effective risk management activities.

The respondent's response highlights the importance of implementing strategies to integrate risk management into the project's culture and decision-making processes. The candidate should discuss approaches such as organizing training sessions and workshops to educate the project team and stakeholders about risk management principles and practices. The finding reveals that incorporating risk assessment activities into project planning, decision-making, and progress reviews, Promoting open communication channels to share risk-related information, and fostering collaboration among team members to collectively address risks.

4.6. Inferential Analysis

Regarding the objective the study was to investigate and analyze the factors affecting the effectiveness of project risk management practices in Debre Berhan University construction projects which deals with 'the factors affecting the effectiveness of project risk management practices' Inferential analysis, particularly correlation and regression has been done as elaborated below.

4.6.1. Correlation Analysis

In establishing the weight and direction of relationships between multiple variables correlation analysis statistical technique is used(**Pallant, 2013**). This is established using correlation coefficients to determine both the positive and negative. Moreover, in determining the weight of the relationship (r), the value of the Pearson Correlation Coefficient (r) was used. **Hair et al. (2011)**recommend that several assumptions must be considered in using the r to investigate the correlations between the variables of the study. The assumptions include, the data must be in an interval or ratio data. This assumption is met in this study as the data collected is in intervals using the Likert-type scale. Secondly, the relationship under examination should be linear. This assumption is also met, as this study aims to examine the direct relationship between independent variables on dependent variables.

Correlation analysis is primarily concerned with finding out whether a significant relationship exists between two variables(**Field, 2005**). It is used to describe the strength and direction of the linear relationship between two variables. The Bivariate Correlations procedure computes the pair-wise associations for a set of variables and displays the results in a matrix. It is useful for determining the strength and direction of the association between two scale and ordinal Bivariate Correlations. As noted above, a Pearson correlation matrix indicates the direction, strength, and significance of the bivariate relationships of all the variables in the study(**M. Saunders et al., 2012**).

According to **Field (2015)**, the correlation coefficient is a very useful means to summarize the relationship between two variables with a single number that falls between -1 and +1. The general symbol for the correlation coefficient is "r". So, a perfect positive relationship (r=+1.00) indicates a direct relationship and an "r" of -1.00 indicates a perfect negative relationship.

Hence, in this study, Bivariate Pearson Coefficient (r) was used to show the relationship between the six determinant factors & risk management practices by using a two-tailed test of statistical significance at the level of 95% significance, P< 0.05. Interpretation of correlation coefficient (r) size is as follows: if the correlation coefficient falls between 0.1 to 0.20, it is a slight correlation or small; if it is between 0.20 to 0.40 is a low correlation or weak relationship, if it lies between 0.40 to 0.70 moderate; if it falls along 0.70 to 0.90 high correlation or substantial relationship and if it is within 0.90 to 1.00 it is very high correlation or very strong correlation between variables (Burns, 2018). Accordingly, Table 12 below shows the correlation coefficient of each independent variable/factor (Risk planning, risk identification, risk analysis, risk response strategy, risk monitoring, and controlling, and Leadership commitment) with the dependent variable (risk management practices).

Table 13 Correlation coefficient

Correlations								
		RP	RI	RA	RRS	RMC	L C	RMP
RP	Pearson	1						

	Correlation							
	Sig.(2-tailed)							
	N	226						
RI	Pearson Correlation	.641**	1					
	Sig.(2-tailed)	.000						
	N	226	226					
RA	Pearson Correlation	.165*	.148*	1				
	Sig.(2-tailed)	.013	.026					
	N	226	226	226				
RRS	Pearson Correlation	.511**	.464**	.423**	1			
	Sig.(2-tailed)	.000	.000	.000				
	N	226	226	226	226			
RMC	Pearson Correlation	.628**	.533**	.356**	.732**	1		
	Sig.(2-tailed)	.000	.000	.000	.000			
	N	226	226	226	226	226		
L C	Pearson Correlation	.403**	.357**	.310**	.633**	.554**	1	
	Sig.(2-tailed)	.000	.000	.000	.000	.000		
	N	226	226	226	226	226	226	
RMP	Pearson Correlation	.593**	.591**	.422**	.713**	.693**	.655**	1
	Sig.(2-tailed)	.000	.000	.000	.000	.000	.000	
	N	226	226	226	226	226	226	226
**. Correlation is significant at the 0.01 level (2-tailed).								
*. Correlation is significant at the 0.05 level (2-tailed).								

Source: Own survey, 2024

From the above Table 13, Based on the correlation coefficients Risk Identification, Risk Analysis, Risk Response Strategy, Risk Monitoring and Controlling, and Leadership Commitment) and the dependent variable(Risk Management Practice) as follows:

As indicated in the study above Table 13, shows that there was a strong positive correlation ($r = 0.593^{**}$, $p<.001$) between Risk Planning and Risk Management Practice. This indicates that medium levels of Risk Planning are associated with medium levels of effective Risk Management Practices.

As indicated in the study above Table 13, shows that there is a strong positive correlation ($r = 0.591^{**}$, $p<.001$) between Risk Identification and Risk Management Practice. This suggests that medium levels of Risk Identification are associated with medium levels of effective Risk Management Practices.

In the study in Table 13 above, there is a moderate positive correlation ($r = 0.422^{**}$) between Risk Analysis and Risk Management Practice. This implies that moderate levels of Risk Analysis are associated with moderate levels of effective Risk Management Practices.

As depicted in Table 4.11 above, there is a strong positive correlation ($r = 0.713^{**}$, $p<.001$) between Risk Response Strategy and Risk Management Practice. This suggests that higher levels of Risk Response Strategy are associated with higher levels of effective Risk Management Practices.

As depicted in Table 13 above, there is a medium positive correlation ($r = 0.693^{**}$, $p<.001$) between risk monitoring and controlling and risk management practice. This implies that medium levels of risk monitoring and controlling are associated with medium levels of effective Risk Management Practices.

As depicted in Table 13 above showed that there is a strong positive correlation ($r = 0.655^{**}$, $p<.001$) between Leadership Commitment and Risk Management Practice. This suggests that moderate levels of Leadership Commitment are associated with moderate levels of effective Risk Management Practices.

Overall, the correlations indicate that all the independent variables have positive relationships with the dependent variable. The moderate levels of most independent variables are associated with moderate levels of effective risk management practices. This suggests that focusing on and improving risk planning, risk identification, risk analysis, risk response strategy, risk monitoring and controlling, and leadership commitment can contribute to overall better risk management practices.

4.7. Regression Analysis

Regression analysis is a statistical method employed to examine and understand the connection between a dependent variable and one or multiple independent variables. Its purpose is to provide a meaningful understanding of variable dynamics, allowing us to forecast outcomes and make informed deductions from the available data.

4.7. 1. Regression Assumption Test

The test is necessary because if the data fails to meet the assumptions of the classical assumption test, the outcomes obtained after processing the data could potentially be misleading or biased(**Lind, 2012**). This examination, referred to as the fundamental assumption test, encompasses five primary tests: linearity, normality, multicollinearity, autocorrelation, and homoscedasticity tests(**Lind, 2012**). The purpose of conducting these tests is to ensure that the data satisfies certain criteria before drawing any conclusions or making predictions. Failing to meet these assumptions could compromise the validity and reliability of the results.

4.7.1.1. Linearity Test

Linearity refers to the concept that the dependent variable can be expressed as a linear function of the predictor (independent) variables(**Junhui et al., 2021**). According to **Aduma (2018)**, the model needs to exhibit linearity in its parameters, regardless of whether the explanatory and dependent variables themselves are linear or not. This requirement arises from the challenges associated with estimating parameters when they are non-linear and their values are not known based solely on the available data of both

dependent and independent variables. To assess linearity and equality of variances, it is recommended to plot the standardized residuals against the standardized predicted values. The absence of any discernible pattern or trend in the resulting diagram suggests linearity between the dependent and independent variables, indicating that their relationship can be adequately captured by a linear model.

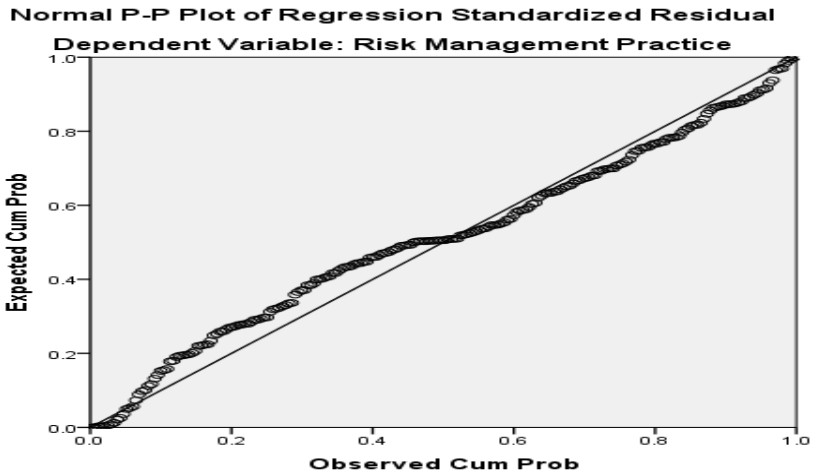

Figure 3 Linearity Test

Source: Own survey, 2024

4.7.1.2. Normality Test

In multiple regression analysis, it is necessary for the data used in the models to adhere to a normal distribution. To examine the normality of the residuals, a histogram was employed. The histogram, depicted in Figure 4, demonstrates that the majority of the data aligns closely with the normal curve, and there are no significant outliers present. As a result, it can be concluded that the data collected for this research exhibits a normal distribution.

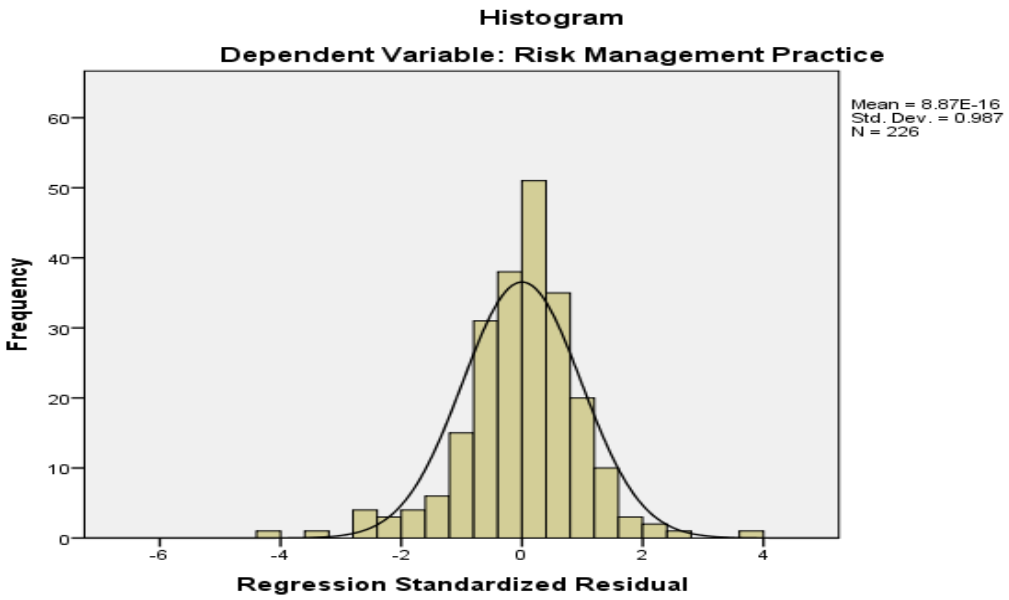

Figure 4 Normality Test

Source: Own survey, 2024

4.7.1.3. Multicollinearity Test

One of the assumptions in multiple linear regressions is that the independent variables should not exhibit a high degree of association or correlation. When there is a strong correlation among the independent variables, it poses a problem known as multicollinearity. **Gujarati and Porter (2010)**explain that multicollinearity can be identified by examining the values of tolerance and Variance Inflation Factors (VIF). A tolerance value of less than 0.10 and/or a VIF value exceeding 10 indicate the presence of multicollinearity.

In the present study, the regression analysis results, as shown in Table 14, indicate that the VIF values range from 1.246 to 2.769, while the tolerance values range from 0.361 to 0.803. These values suggest that there is no issue of multicollinearity in the regression model used for this study. This conclusion is supported by the fact that all the VIF values and tolerance values fall within the acceptable range (VIF = 1 - 10, or tolerance = 0.1 – 1.0).

Table 14 Multicollinearity Test

Coefficients

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Risk Planning	.470	2.129
	Risk Identification	.554	1.805
	Risk Analysis	.803	1.246
	Risk Response Strategy	.365	2.736
	Risk Monitoring and Controlling	.361	2.769
	Leadership Commitment	.578	1.731
a. Dependent Variable: Risk Management Practice			

Source: Own survey, 2024

4.7.1.4. Autocorrelation Test

Regression analysis is based on uncorrelated error/residual terms of any two or more observations(**Kothari & Garg, 2004**). This assumption is tested for each regression procedure with the Durbin-Watson test, which tests for correlation between variables residuals. The test statistic can vary between 0 and 4 with a value of 2 meaning that the residuals are uncorrelated(**Field, 2009**). A value greater than 2 indicates a negative correlation between adjacent residuals, whereas a value below 2 indicates a positive correlation. As a general rule, the residuals are independent (not correlated) if the Durbin-Watson statistic is approximately 2, and an acceptable range is 1.50 - 2.50(**Muluadam, 2015**). In this study Table 15 below the Durbin-Watson value is 2.143, which was more than 2, therefore it can be confirmed that the assumption of independent error has almost certainly been met.

Table 15 Autocorrelation Test

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.831[a]	.690	.682	.33883	2.143
a. Predictors: (Constant), Leadership Commitment, Risk Analysis, Risk Identification, Risk Planning, Risk Response Strategy, Risk Monitoring and Controlling					

b. Dependent Variable: Risk Management Practice

Source: Own survey, 2024

4.7.1.5. Homoscedasticity Test

According to **Tabachnick et al. (2013)**, the assumption of homoscedasticity states that the variance should remain constant for all observations. Specifically, for each value of the predictors, the variance of the error term should be consistent. However, there are instances where this assumption may not hold. To assess the linearity and equality of variances, it is recommended to plot the standardized residuals against the standardized predicted values. For instance, the variance of the error term may exhibit an increase or decrease.

Based on the graph depicted below, it can be concluded that there is no issue of heteroscedasticity. The points are distributed randomly, without any noticeable patterns of increase or decrease. In conducting a basic analysis, we initially plot the *ZRESID (Y-axis) against *ZPRED (X-axis) on SPSS, as this plot is valuable in determining whether the Assumptions of random errors and homoscedasticity have been met(**Field, 2009**).

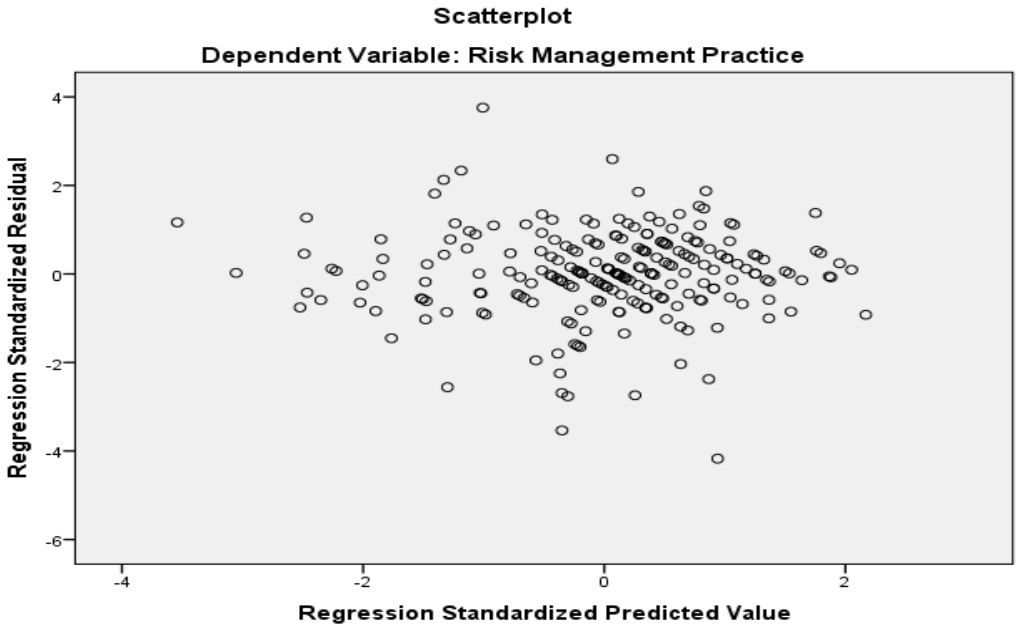

Figure 5 Scatter Plot

Source: Own survey, 2024

4.8. Regression Results

The results of the regression analysis demonstrate that the independent variables effectively explain the dependent variable and a regression analysis was conducted to examine this relationship. Specifically, the regression analysis investigated the relationship between the six dimensions of risk effectiveness (leadership commitment, risk analysis, risk identification, risk planning, risk response strategy, risk monitoring, and controlling) and risk management practice. The purpose of the regression analysis was twofold: first, to determine the overall explanatory power of the independent variables on the dependent variable, and second, to assess the individual contributions of each independent variable in explaining Risk Management Practice.

The regression model provided insights into the extent to which the variance in the measure of risk management practice was accounted for by the independent variables. These analyses were summarized in the Model Summary table, which presented metrics such as R, R2, adjusted R2, and the standard error of the estimate. These metrics were utilized to evaluate how well the regression model fits the data. The multiple correlation coefficient (R) served as a measure of the quality of prediction for the dependent variable, while the R2 value (coefficient of determination) represented the proportion of variance in the dependent variable explained by the independent variables. The Model Summary provides information about the overall fit of the regression model, which includes the independent variables (Leadership Commitment, Risk Analysis, Risk Identification, Risk Planning, Risk Response Strategy, Risk Monitoring, and Controlling) in predicting the dependent variable (Risk Management Practice).

Interpret the Model Summary; the multiple correlation coefficients (R) represent the strength and direction of the linear relationship between the independent variables as a whole and the dependent variable. In this case, the R-value is 0.831, indicating a relatively strong positive relationship between the independent variables collectively and the dependent variable. The coefficient of determination (R Square) represents the proportion of the variance in the dependent variable that can be explained by the independent variables.

Table 16 presented the data illustrating that all six dimensions of risk effectiveness significantly predicted Risk Management Practice, explaining 68.2% of the variance (Adjusted R^2 = .682). The coefficient of regression analysis (adj. R^2 = .682) indicated that a 68.2% change in Risk Management Practice could be predicted by the combination of the six risk effectiveness dimensions. The remaining 31.8% represented other factors that were not considered in the scope of this study.

In summary, the regression model with the included independent variables explains a substantial portion of the variance in Risk Management Practice (68.2%). The model has a good fit, as indicated by the relatively high R and adjusted R Square values

Table 16 Model summary Table

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.831[a]	.690	.682	.33883	2.143
a. Predictors: (Constant), Leadership Commitment, Risk Analysis, Risk Identification, Risk Planning, Risk Response Strategy, Risk Monitoring and Controlling					
b. Dependent Variable: Risk Management Practice					

Source: Own survey, 2024

Table 17 Regression ANOVA

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	56.036	6	9.339	81.349	.000[b]
	Residual	25.142	219	.115		
	Total	81.178	225			
a. Dependent Variable: Risk Management Practice						
b. Predictors: (Constant), Leadership Commitment, Risk Analysis, Risk Identification, Risk Planning, Risk Response Strategy, Risk Monitoring and Controlling						

Source: Own survey, 2024

Moreover, Table 17 presents the ANOVA table, which assesses the overall significance and acceptability of the multiple regression model from a statistical standpoint. The significance value of the F statistic indicated as .000, was found to be less than $p<0.01$, indicating statistical significance. This suggests that the observed variation explained by the model was unlikely to have occurred by chance alone. The F ratio in the ANOVA table tests whether the overall regression model adequately fits the data. In other words, it examines whether the model, considering the number of variables included, possesses statistically significant predictive capability as a whole.

The F value of 81.349 implies that by fitting the model, there is a potential for a 68.2% improvement in predicting the outcome. Looking at Table 18, it can be observed that the Mean Square of regressions exceeds the Mean Square of residuals, and the significance value (sig) is reported as 0.000. These findings indicate that the regressions in this research were statistically significant at a confidence level of 95%.

Table 18 Regression Coefficients

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.626	.206		-3.034	.003
	Risk Planning	.102	.047	.120	2.183	.030
	Risk Identification	.247	.057	.221	4.367	.000
	Risk Analysis	.144	.042	.145	3.448	.001
	Risk Response Strategy	.214	.063	.213	3.421	.001
	Risk Monitoring and Controlling	.167	.072	.145	2.314	.022
	Leadership Commitment	.296	.055	.268	5.419	.000
a. Dependent Variable: Risk Management Practice						

Source: Own survey, 2024

It is clear that if the Beta value of the predictor variables is positive, it can be concluded that there is a positive relationship between the predictor variables and the dependent variable; while the coefficient is negative, it represents a negative relationship(**Field, 2009**).

This study intends to identify the most contributing, independent variable in the prediction of the dependent variable. Thus, the strength of each predictor (independent variable) influencing the criterion (dependent variable) can be investigated by the Standardized beta coefficient.

The regression coefficient explains the average amount of change in the dependent variable that is caused by a unit change in the independent variable. The larger value of the beta coefficient of an independent variable brings more support to the independent variable as the most important determinant in predicting the dependent variable.

As can be seen in above Table 18, the unstandardized coefficient (B) for risk planning is 0.102, with a standardized coefficient (Beta) of 0.120. The t-value is 2.183, and the p-value is 0.030, which is less than the significance level of 0.05. This indicates that there is a statistically significant positive relationship between risk planning and the effectiveness of project risk management practices. As risk planning increases, the effectiveness of project risk management practices also increases.

The unstandardized coefficient (B) for risk identification is 0.247, with a standardized coefficient (Beta) of 0.221. The t-value is 4.367, and the p-value is 0.000, which is less than the significance level of 0.05. This suggests that there is a statistically significant positive relationship between risk identification and the effectiveness of project risk management practices. Higher levels of risk identification are associated with greater effectiveness in project risk management practices.

The unstandardized coefficient (B) for risk analysis is 0.144, with a standardized coefficient (Beta) of 0.145. The t-value is 3.448, and the p-value is 0.001, which is less than the significance level of 0.05. This indicates that there is a statistically significant

positive relationship between risk analysis and the effectiveness of project risk management practices. Increased emphasis on risk analysis is associated with improved effectiveness in project risk management practices.

The unstandardized coefficient (B) for risk response strategy is 0.214, with a standardized coefficient (Beta) of 0.213. The t-value is 3.421, and the p-value is 0.001, which is less than the significance level of 0.05. This suggests that there is a statistically significant positive relationship between risk response strategy and the effectiveness of project risk management practices. Better risk response strategies are associated with greater effectiveness in project risk management practices.

The unstandardized coefficient (B) for risk monitoring and controlling is 0.167, with a standardized coefficient (Beta) of 0.145. The t-value is 2.314, and the p-value is 0.022, which is less than the significance level of 0.05. This indicates that there is a statistically significant positive relationship between risk monitoring and controlling and the effectiveness of project risk management practices. Effective risk monitoring and controlling processes are associated with improved effectiveness in project risk management practices.

The unstandardized coefficient (B) for leadership commitment is 0.296, with a standardized coefficient (Beta) of 0.268. The t-value is 5.419, and the p-value is 0.000, which is less than the significance level of 0.05. This suggests that there is a statistically significant positive relationship between leadership commitment and the effectiveness of project risk management practices. Higher levels of leadership commitment are associated with greater effectiveness in project risk management practices.

In summary, all the variables related to risk management practices (risk planning, risk identification, risk analysis, risk response strategy, risk monitoring, and controlling, and leadership commitment) have a significant positive relationship with the effectiveness of project risk management practices. The findings support the alternative hypotheses (H1) and indicate that these risk management practices are crucial for improving the effectiveness of project risk management

The multivariate regression model for this study is;

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon$$

Y is Project risk management practices

β0= the intercept term-constant which is equal to the mean if all slope coefficients are 0.

$\beta i = \beta_1, \beta_2, \beta_3, \beta_4, \beta_5,$ and β_6 are constant regression coefficients representing the condition of the independent variables to the dependent variables.

- $X_i = X_1, X_2, X_3, X_4, X_5$ and X_6 are the independent variables which means
- X_1= Risk planning
- X_2= Risk identification
- X_3= risk analysis
- X_4 = Risk response strategy
- X_5 = Risk monitoring and controlling
- X_6 = leadership commitment, α =constant value ε =error term

$$Y = -.626 + .102X_1 + .247X_2 + .144X_3 + .214X_4 + .167X_5 + .296X_6 + \varepsilon$$

4.9. Hypothesis Testing and Discussions

The researcher has articulated five hypotheses to be tested. Based on the result of multiple regression analysis standardized coefficients, the hypotheses have been verified as follows**:**

Table 19 Hypothesis Testing

Hypothesis	**Description**	**Standardized Beta value**	**P-value**	**Decision**
H0	There is no significant relationship between risk planning and the effectiveness of project risk management practices.	.120	.030	Reject
H1	There is a significant relationship between risk planning and the			Accept

	effectiveness of project risk management practices.			
H0	There is no significant relationship between risk identification and the effectiveness of project risk management practices.	.221	.000	Reject
H1	There is a significant relationship between risk identification and the effectiveness of project risk management practices.			Accept
H0	There is no significant relationship between risk analysis and the effectiveness of project risk management practices.	.145	.001	Reject
H1	There is a significant relationship between risk analysis and the effectiveness of project risk management practices.			Accept
H0	There is no significant relationship between risk response strategy and the effectiveness of project risk management practices.	.213	.001	Reject
H1	There is a significant relationship between risk response strategy and the effectiveness of project risk management practices.			Accept
H0	There is no significant relationship between risk monitoring and controlling and the effectiveness of project risk management practices.	.145	.022	Reject
H1	There is a significant relationship between risk monitoring and controlling and the effectiveness of project risk			Accept

	management practices.			
H0:	There is no significant relationship between leadership commitment and the effectiveness of project risk management practices.	.268	.000	Reject
H1:	There is a significant relationship between leadership commitment and the effectiveness of project risk management practices.			Accept

Source: Own survey, 2024

As shown in Table 19 above, the provided coefficients and significance levels, we can analyze the relationships between the variables related to risk management practices and their effectiveness:

H0: There is no significant relationship between risk planning and the effectiveness of project risk management practices.
H1: There is a significant relationship between risk planning and the effectiveness of project risk management practices.

Based on the coefficient for risk planning (B = 0.102, p = 0.030), can reject the null hypothesis (H0) and conclude that there is a significant relationship between risk planning and the effectiveness of project risk management practices. The positive coefficient suggests that an increase in risk planning is associated with improved effectiveness in project risk management practices. The hypothesis that there is a significant relationship between risk planning and the effectiveness of project risk management practices is supported by the following research findings:

Perminova et al. (2008)investigated the role of risk planning in project risk management. Their study found that comprehensive risk planning, which involves identifying, analyzing, and developing risk response strategies, is positively associated with the overall effectiveness of project risk management. (**Zwikael & Ahn, 2011**)examined the impact of

risk planning on project success. Their results indicate that the quality of risk planning, including the development of risk management plans and the identification of appropriate risk response strategies, has a significant positive effect on project risk management effectiveness. **Kutsch and Hall (2010)**explored the relationship between risk planning and project risk management in the information technology (IT) sector. Their findings suggest that organizations with more formalized and structured risk planning processes demonstrate higher levels of project risk management effectiveness. **Raz and Michael (2001)**studied the use of risk management tools and techniques in project-oriented organizations. Their results show that the degree of risk planning, including risk identification, analysis, and response development, is a significant predictor of the effectiveness of project risk management practices. **Mu et al. (2014)**investigated the influence of risk planning on the performance of public-private partnership (PPP) projects. Their study revealed that robust risk planning, which involves the identification, assessment, and mitigation of project risks, is positively associated with the overall effectiveness of project risk management in PPP settings.

These research findings, spanning various industries and project contexts, provide strong empirical support for the hypothesis that there is a significant relationship between risk planning and the effectiveness of project risk management practices. *This supports the acceptance of the hypothesis H1 was accepted and the null hypothesis was rejected.*

H0: There is no significant relationship between risk identification and the effectiveness of project risk management practices.
H1: There is a significant relationship between risk identification and the effectiveness of project risk management practices.

Based on the coefficient for risk identification (B = 0.247, p = 0.000), can reject the null hypothesis (H0) and conclude that there is a significant relationship between risk identification and the effectiveness of project risk management practices. The positive coefficient indicates that higher levels of risk identification are associated with greater effectiveness in project risk management practices.

The finding that risk identification is a significant factor in the risk management practices of both conventional and Islamic banks in Pakistan is consistent with the research conducted by **Mian et al. (2012)**. Their study demonstrated that risk identification was the most important variable influencing risk management in these banking institutions.

Similarly, the empirical results presented by **Mohammed (2017)** also showed that risk identification was a significant risk management factor for Indian microfinance institutions. This further supports the notion that the identification of risks is a crucial component of effective risk management practices across different financial sectors.

However, the current finding appears to contradict the results reported by(**Sania & Shehla, 2012**). Their study on Islamic banks in Pakistan found that risk identification had a positive but insignificant effect on project risk management practices. Nonetheless; the statistical findings of the current study indicate that there is a significant positive relationship between project risk management practices and risk identification.

In summary, the current result aligns with the findings of **Mian et al. (2012)** and **Mohammed (2017)**, highlighting the importance of risk identification in effective risk management. However, it contradicts the conclusions drawn by **Sania and Shehla (2012)**, further emphasizing the need for more research to reconcile these conflicting findings.

This supports the acceptance of hypothesis H1, which posits that there is a positive relationship between project risk management practices and risk identification in the study area but the null hypothesis was rejected.

H0: There is no significant relationship between risk analysis and the effectiveness of project risk management practices.
H1: There is a significant relationship between risk analysis and the effectiveness of project risk management practices.

Based on the coefficient for risk analysis (B = 0.144, p = 0.001), can reject the null hypothesis (H0) and conclude that there is a significant relationship between risk analysis and the effectiveness of project risk management practices. The positive coefficient

suggests that increased emphasis on risk analysis is associated with improved effectiveness in project risk management practices.

The finding that risk analysis has a significant effect on the effectiveness of risk management practices in Bahrain banks, as shown by **Ahmad et al. (2013)**, is not consistent with the results of the current study. This suggests that the relationship between risk analysis and risk management practices may vary across different banking and financial sectors.

In contrast, the current result is different from the previous research conducted by **Sania and Shehla (2012)** and **Mohammed (2017)**. **Sania and Shehla (2012)** found that risk assessment and analysis have an insignificant effect on risk management practices in Islamic banks in Pakistan, while **Mohammed (2017)** reported that risk assessment and analysis have an insignificant effect on risk management practices in Indian microfinance institutions.

However, the statistical findings of the current study indicate that there is a significant positive relationship between project risk management practices and risk analysis.

This suggests that the current study has identified a different relationship between risk analysis and risk management practices compared to the previous research conducted by **Sania and Shehla (2012)** and **Mohammed (2017)**. The discrepancy in findings may be due to differences in the specific contexts, sectors, or methodologies employed in the various studies.

This supports the acceptance of hypothesis H1, which posits that there are positive relationships between project risk management practices and risk analysis in the study area but hypothesis H0 was rejected.

H0: There is no significant relationship between risk response strategy and the effectiveness of project risk management practices.

H1: There is a significant relationship between risk response strategy and the effectiveness of project risk management practices.

Based on the coefficient for risk response strategy (B = 0.214, p = 0.001), can reject the null hypothesis (H0) and conclude that there is a significant relationship between risk response strategy and the effectiveness of project risk management practices. The positive coefficient indicates that better risk response strategies are associated with greater effectiveness in project risk management practices. The finding that risk response strategy has a significant positive effect on risk management practices is supported by the literature on project risk management.

Risk response strategies focus on addressing the identified and quantified project risks. According to **Cervone (2006)**, the main risk response strategies include eliminating the risk by avoiding it, usually by treating the root causes, accepting the risk but having a contingency plan in place, shifting the risk to a third party by transferring it, for example, through insurance and reducing the likelihood of the risk's occurrence by mitigation.

Project Management (2004) emphasizes that the most effective risk response strategy (ies) should be selected for each identified risk. The selection of appropriate risk response strategies is a critical component of comprehensive risk management practices. By implementing effective risk response strategies, organizations can better manage and mitigate the identified project risks, which in turn enhance the overall effectiveness of their risk management practices. This is consistent with the current study's finding that risk response strategy has a significant positive effect on risk management practices.

The alignment of the current finding with the established project risk management principles and guidelines suggests that the selection and implementation of suitable risk response strategies is an essential element of successful risk management in the study context. *This supports the acceptance of the hypothesis H1, and the null hypothesis was rejected.*

H0: There is no significant relationship between risk monitoring and controlling and the effectiveness of project risk management practices.
H1: There is a significant relationship between risk monitoring and controlling and the effectiveness of project risk management practices.

Based on the coefficient for risk monitoring and controlling (B = 0.167, p = 0.022), can reject the null hypothesis (H0) and conclude that there is a significant relationship between risk monitoring and controlling and the effectiveness of project risk management practices. The positive coefficient suggests that effective risk monitoring and controlling processes are associated with improved effectiveness in project risk management practices.

The finding that risk monitoring has a significant positive effect on risk management practices is in line with the empirical findings of previous studies. **Sania and Shehla (2012)**demonstrated this relationship in the context of Islamic banks in Pakistan, while **Ahmad et al. (2013)** found similar results in the banking industry more broadly. The consistency between the current study's findings and the results reported by **Sania and Shehla (2012)** as well as **Ahmad et al. (2013)** suggests that effective risk monitoring and controlling are an important factor contributing to the overall effectiveness of risk management practices across different financial sectors.

However, the current finding appears to be inconsistent with the results presented by **Mohammed (2017)**. In their study on microfinance institutions in India, **Mohammed (2017)**found that risk monitoring had an insignificant positive effect on risk management practices.

The discrepancy in findings may be attributed to the differences in the specific contexts and characteristics of the financial institutions examined. The role and significance of risk monitoring in risk management practices could vary between banks, Islamic banks, and microfinance institutions due to factors such as regulatory environments, organizational structures, and the nature of risk exposures. Despite this inconsistency, the current study's finding aligns with the more prevalent evidence from previous research, indicating that risk monitoring is a crucial component of effective risk management practices in the financial sector.

H0: There is no significant relationship between leadership commitment and the effectiveness of project risk management practices.

H1: There is a significant relationship between leadership commitment and the effectiveness of project risk management practices.

Based on the coefficient for leadership commitment (B = 0.296, p = 0.000), we can reject the null hypothesis (H0) and conclude that there is a significant relationship between leadership commitment and the effectiveness of project risk management practices. The positive coefficient indicates that higher levels of leadership commitment are associated with greater effectiveness in project risk management practices.

The hypothesis that there is a significant relationship between leadership commitment and the effectiveness of project risk management practices is supported by several other research findings: **Jiang et al. (2014)**examined the role of leadership in project risk management and found that leadership commitment is a critical factor that positively influences the effectiveness of risk management practices. Their study, conducted in the construction industry, demonstrated that strong leadership support and involvement are essential for the successful implementation of project risk management. **Lyons and Skitmore (2004)**investigated the relationship between leadership and risk management in construction projects. Their findings suggest that leadership behaviors, such as providing clear direction, effective communication, and active engagement in the risk management process, are significantly associated with improved risk management outcomes. **Salawu and Abdullah (2015)**studied the impact of leadership on risk management practices in the Nigerian construction industry. Their results indicate that leadership commitment, in terms of providing resources, setting risk management objectives, and monitoring risk responses, has a substantial positive influence on the effectiveness of project risk management. Krane et al. (2012) explored the role of project managers' leadership styles in the context of project risk management. Their findings reveal that transformational leadership, which is characterized by a focus on inspiration, intellectual stimulation, and individualized consideration, is positively related to the successful implementation of risk management practices. **Öztaş and Önaçan (2003)** examined the relationship between project management leadership and risk management in the Turkish construction industry. Their study concluded those project managers' leadership qualities, such as decision-making abilities and risk-taking propensity, are significant predictors of the effectiveness of project risk management. These empirical findings from various industries and contexts

provide strong support for the hypothesis that leadership commitment is a significant determinant of the effectiveness of project risk management practices.

In summary, based on the provided coefficients and significance levels, all the alternative hypotheses (H1) are supported. There is a significant positive relationship between risk planning, risk identification, risk analysis, risk response strategy, risk monitoring and controlling, leadership commitment, and the effectiveness of project risk management practices.

CHAPTER FIVE

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter provides a summary, conclusions, and recommendations of the research undertaken in the study. For clarity purposes, the conclusions were made based on the research objectives of the study. The general explanations of the findings were discussed and recommendations were drawn from the conclusions of the research. Finally, the study shows some limitations of the study and provides directions for future research.

5.1. Summary of the main findings

The study was conducted at Debre Berhan University's ongoing construction project. Primary data was collected using interviews and questionnaires distributed to 238 questionnaires, out of which 226 were received. The collected questionnaires were valid for the statistical test that was analyzed using frequency tables, means, correlation, and regression, through Statistical Package for Social Science (SPSS). After analyzing the primary data, the following points are presented as the major findings. This study sought to analyze the factors affecting the effectiveness of project risk management practice: in the case of the Debre Berhan University construction project.

- ☞ The descriptive statistics result showed that the risk Analysis has the highest mean score of 3.7517, indicating that this aspect of risk management is relatively stronger compared to the other dimensions. Leadership Commitment has the lowest mean score of 3.3601, suggesting that this is a relatively weaker area in the organization's risk management practices. The standard deviations range from 0.51984 to 0.70504, indicating a moderate level of variability in the responses for each variable.
- ☞ The result of correlation analysis showed that there was a significant, positive between risk management practice and risk planning value ($r = 0.593$, $p<.001$), between risk management practice and risk identification value ($r = 0.591$, $p<.001$), between risk management practice and risk analysis value ($r = 0.422$, $p<.001$), between risk management practice and risk response strategy value ($r = 0.713$, $p<.001$), between risk management practice and risk monitoring and controlling ($r = 0.693$, $p<.001$) and

between risk management practice and leadership commitment (r = 0.655, p<.001). The result of correlation analysis showed that all six independent variables have a strong positive and significant effect on the dependent variable.

- The results of multiple regressions, as presented, all six dimensions of risk effectiveness (leadership commitment, risk analysis, risk identification, risk planning, risk response strategy, risk monitoring, and controlling) significantly predicted risk management practice. The six risk effectiveness dimensions explained 68.2% of the variance in risk management practice (Adjusted R2 = 0.682).
- The coefficient of regression analysis (adjusted R2 = 0.682) indicated that 68.2% of the change in risk management practice could be predicted by the combination of the six risk effectiveness dimensions. The remaining 31.8% of the variance in Risk Management Practice represented other factors that were not considered in the scope of this study.
- The significance value of the F statistic is 0.000, which is less than p<0.01, indicating the multiple regression models are statistically significant. This suggests the observed variation explained by the model is unlikely to have occurred by chance alone. The F ratio of 81.349 implies that by fitting the model, there is a potential for a 68.2% improvement in predicting the outcome (risk management practice).
- The Mean Square of regressions exceeds the Mean Square of residuals, and the significance value (sig) is 0.000, indicating the regressions in this research were statistically significant at a 95% c All six risk effectiveness dimensions (risk planning, risk identification, risk analysis, risk response strategy, risk monitoring and controlling, and leadership commitment) were statistically significant positive predictors of Risk Management Practice effectiveness.
- The standardized regression coefficients (Beta) indicate the relative importance of each predictor: Leadership Commitment (β = 0.268, t =5.419, p < 0 .005) had the strongest impact, Risk Identification (β = 0.221, t =4.367, p < 0 .005) was the second most important predictor, Risk Response Strategy (β = 0.213, t =3.421, p < 0 .005) was the third most important, Risk Analysis (β = 0.145, t =3.448, p < 0 .005) and Risk Monitoring and Controlling (β = 0.145, t =2.314, p < 0 .005) had equal importance Risk Planning (β = 0.120, t =2.183, p < 0 .005) had the smallest but still significant impact confidence level. The proposed hypothesis was accepted at p<.05 significance

level. Thus, the tentatively developed alternative hypotheses were supported. But all null the proposed hypotheses were rejected.

5.2. Conclusions

The study is focused on evaluating the efficiency and effectiveness of the project risk management practice of the Debre Birhan University construction project. Questioners were used to obtain data from the institutions' employees and managers. Based on the data obtained and analyzed, the research objectives, research questions, and hypothesis can be summarized and concluded as follows.

- The organization seems to be relatively stronger in the area of risk analysis, which involves the systematic process of identifying, assessing, and prioritizing risks.
- Leadership commitment, which is crucial for the effective implementation and promotion of risk management practices, appears to be a relatively weaker area that requires improvement.
- The moderate level of variability in the risk responses suggests that there may be some inconsistencies or differences in the organization's risk management practices across different departments or teams.
- All the independent variables (risk planning, risk identification, risk analysis, risk response strategy, risk monitoring, controlling, and leadership commitment) have positive relationships with the dependent variable of Risk Management Practice. The medium levels of most independent variables are associated with the medium levels of effective Risk Management Practices.
- The six risk effectiveness dimensions are critical and influential factors in determining effective Risk Management Practices. The model with these six predictors has strong explanatory power, accounting for a large portion (68.2%) of the variance in the dependent variable. However, there are likely additional factors beyond the six predictors that also contribute to Risk Management Practice, which were not captured in this study.
- The multiple regression model, consisting of the six risk effectiveness dimensions, has strong statistical significance and predictive capability. The high statistical significance of the model suggests the relationships between the predictors and the dependent variable are robust and unlikely to be due to chance. Leadership

Commitment appears to be the most important factor driving the effectiveness of risk management practices, followed by risk identification and risk response strategy.

The findings support the hypothesis that these risk management practices are essential for improving the effectiveness of project risk management.

5.3. Recommendations:

Based on the research findings, the following recommendations have been given that the researcher thought to be very critical if considered and implemented by the institution accordingly and properly.

- Debre Berhan University should investigate the factors contributing to the relatively lower scores for Leadership Commitment and develop strategies to enhance management's involvement and support for risk management practices.
- Debre Berhan University should provide targeted training and resources to help strengthen the weaker areas of risk management, such as risk planning, risk monitoring, and risk control.
- Debre Berhan University should Conduct a deeper analysis to understand the relationship between the different risk management practices and identify opportunities for a more integrated and holistic approach.
- Debre Berhan University should implement regular review and update processes for the organization's risk management framework to ensure it remains aligned with evolving business needs and industry best practices.
- Debre Berhan University should encourage open communication and knowledge sharing across the organization to promote a consistent understanding and application of risk management principles.
- Organizations should focus on improving and enhancing risk planning, risk identification, risk analysis, risk response strategy, risk monitoring and controlling, and leadership commitment to contribute to overall better risk management practices.
- Debre Berhan University should adopt a holistic approach to risk management, focusing not only on the six key predictors but also investigating and addressing any other relevant factors that may impact their overall risk management effectiveness.

- ☞ Debre Berhan University should have continuous monitoring and evaluation of the six risk effectiveness dimensions, as well as identification of additional influential factors, which will be essential for organizations to enhance their Risk Management Practices.
- ☞ The University should have confidence in utilizing this model to understand and predict Risk Management Practices, as it has been demonstrated to be a statistically valid and reliable tool.
- ☞ Debre Berhan University should have periodic testing and validation of the model conducted to ensure its continued relevance and accuracy in predicting Risk Management Practices over time.
- ☞ Debre Berhan University should incorporate this validated model into its risk management decision-making processes to enhance its overall risk management effectiveness.
- ☞ Equally important are initiatives to enhance Risk Identification and Risk Response Strategy capabilities.
- ☞ The university should have Continuous improvement efforts should also focus on the other three risk effectiveness dimensions (Risk Analysis, Risk Monitoring and Controlling, and Risk Planning) to optimize the overall effectiveness of project risk management.
- ☞ Debre Berhan University should prioritize strengthening the risk management capabilities across all six dimensions to enhance the overall effectiveness of project risk management practices.
- ☞ Specific focus should be placed on improving risk identification, risk planning, and leadership commitment, as these were found to be the most impactful factors.
- ☞ The university should establish clear policies, processes, and training programs to build organizational competencies in each of the risk management practices.
- ☞ Further research could explore the potential interactions and synergies between the different risk management practices to optimize their combined impact on project risk management effectiveness

5.4. Limitations of the study

Every research study inevitably faces limitations and challenges, and the present study on the effectiveness of project risk management practice in the case of the Debre Berhan

University construction project is no exception. Firstly, it is important to acknowledge that the findings and conclusions of this study may not be readily generalized to other organizations beyond the specific context of the university construction project. Factors influencing project risk management effectiveness can vary across different sectors such as real estate or beer companies, as each industry may have its unique characteristics and risk profiles in construction projects.

The second limitation of this study pertains to the focus on selected dimensions of risk management effectiveness. While risk management effectiveness consists of multiple dimensions, this study only examined a limited number of dimensions, namely Leadership Commitment, Risk Analysis, Risk Identification, Risk Planning, Risk Response Strategy, and Risk Monitoring and Controlling. There may be other dimensions that were not explored in this research. Future researchers could expand the scope by investigating additional dimensions of risk management effectiveness to provide a more comprehensive understanding.

The third limitation stems from the availability of recent literature. The researcher relied on older or less recent sources of literature due to limited access to more up-to-date publications. This may have implications for the currency and relevance of the information and theories used in the study. It would be valuable for future research to incorporate a wider range of recent and relevant literature to ensure the study's findings align with the current state of knowledge in the field.

Lastly, it is important to note that this study was conducted within the constraints of available resources and practical limitations. The scope of the study may have been restricted due to limitations in funding, time, and access to data. These limitations may have influenced the depth and breadth of the research, potentially leaving some aspects unexplored or underrepresented.

In summary, while this study provides insights into the effectiveness of project risk management practice in the context of the Debre Berhan University construction project, it is essential to consider the limitations. Future research endeavors should aim to address these limitations by broadening the scope of investigation, incorporating recent literature,

and considering a wider range of organizational contexts to enhance the generalizability and applicability of findings.

5.5. Further Research Suggestions

Given the promising results that were obtained, coupled with the inherent limitations of the study just discussed above, many potential avenues of further research can be explored. Future studies should focus on investigating the influence of organizational culture, leadership commitment, and stakeholder engagement on the effectiveness of project risk management practices. Identify strategies to promote a risk management culture within the organization and assess the impact of organizational factors on risk management effectiveness. Explore different risk identification techniques and assess their applicability to construction projects. Investigate the effectiveness of techniques such as brainstorming, checklists, expert judgment, historical data analysis, and simulation models in identifying construction project risks. Examine different quantitative and qualitative risk assessment methods and their suitability for construction projects. Compare the effectiveness of methods such as probability-impact matrices, Monte Carlo simulation, and decision tree analysis in assessing construction project risks.

Evaluate the effectiveness of different risk response strategies in construction projects. Investigate the applicability of strategies such as risk avoidance, risk transfer through insurance or contracts, risk mitigation through design changes or contingency plans, and risk acceptance in the context of construction projects. Analyze the impact of effective communication and collaboration among project stakeholders on risk management effectiveness. Identify best practices for facilitating communication, encouraging collaboration, and enhancing stakeholder engagement in construction projects. Explore the role of lessons learned and knowledge management in improving project risk management practices. Investigate how capturing, documenting, and sharing project risk-related experiences, analyzing the role of technology adoption and knowledge can contribute to future risk management effectiveness.

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APPENDIX A

APPENDIX -- I

DEBRE BERHAN UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF MANAGEMENT

Dear valued guest/Participant,

I invite you to participate in a research study entitled: Factors Affecting the Effectiveness of Project Risk Management Practice in the Case of Debre Berhan University construction project. I am currently enrolled in Project management at Debre Birhan University and am in the process of writing my Master's Thesis. The purpose of the research is to emphasize the importance of factors affecting the effectiveness of project risk management practice. The enclosed questionnaire has been designed to collect information on risk management practices and the effectiveness of construction projects at Debre Berhan University. Your participation in this research project is completely voluntary. Your responses will remain confidential and anonymous. Data from this research will be kept secretly and key and reported only as a collective combined total. No one other than the researchers will know your answers to this questionnaire. If you agree to participate in this study, please answer the questions on the questionnaire as best you can. Thank you for your assistance in this important endeavor.

Sincerely yours,

Negash Gebeyehu

Tel: 09 13510067

Instruction: Dear respondents,

1. No need to write your name
2. Please encircle where alternative answers are available and put (√) mark where necessary

Thank you in advance for your utmost cooperation!

Part One: Demographic Information

Instruction.: The following items are about your personal information. Please read each question carefully and put a "√"mark in the box which contains your answer.

1. Sex: Male ☐ Female ☐
2. Age: 18-30 ☐ 31-40 ☐ 41-50 ☐ 51 and above ☐
3. Marital status: Single ☐ Married ☐ Divorced ☐
4. Educational level: College Diploma ☐ First Degree ☐ MA/MS ☐ Ph.D. And Above ☐
5. **Working Experience:**

Less than 5 years ☐ 5 - 10 years ☐

10 - 15 years ☐ over 15 years ☐

Part Two: Project details

Instruction: the following items are factors affecting the project effectiveness of risk management practice to risk planning practice, risk identification, risk analysis, risk response strategy, risk monitoring and controlling, and leadership commitment at Deber Berhan University. Read each statement representing each dimension and indicate the level of your agreement with each statement by putting a "√"mark under the numbers on the table. The numbers on the table represent the following

1. = Strongly disagree
2. = Disagree
3. = Neutral
4. = Agree
5. = Strongly agree

N.o	Items	Scales				
Items Related To Risk Planning		1	2	3	4	5
1.	The project had a clear and documented risk management plan.					
2.	The plan was reviewed and updated regularly throughout the project.					
3.	Stakeholders from different areas were involved in developing the risk management plan.					
4.	Potential risks were identified and documented during the planning phase					
Items Related To Risk Identification		**1**	**2**	**3**	**4**	**5**
1.	Effective methods were used to identify potential risks in the project.					
2.	All relevant risks were identified and included in the risk register.					
3.	New risks were identified and added to the register regularly.					
4.	Lessons learned from previous projects were used to inform risk identification					
5.	Project team members are involved in the risk identification process.					
6.	There is documentation of identified risk and their characteristics.					
Items Related To Risk Analysis		**1**	**2**	**3**	**4**	**5**
1.	Both qualitative and quantitative techniques were used to assess risks.					
2.	The likelihood and impact of risks were assessed with sufficient detail and accuracy.					
3.	Uncertainties in risk assessments were adequately addressed.					
4.	The results of risk analysis were used to prioritize risks and make informed decisions.					
5.	Risks are prioritized based on their probability of occurrence and impact					
Items Related To Risk Response Strategy		**1**	**2**	**3**	**4**	**5**
1.	Appropriate response strategies were chosen for each identified risk.					
2.	Resources were allocated and budgeted effectively for risk response activities.					
3.	The project team had the authority and resources to implement the chosen response strategies.					
4.	Different types of risk response strategies were considered (e.g., avoid, mitigate, transfer, and accept).					
5.	Factors such as budget, schedule resources, and quality are considered while					

	responding to risk					
Items Related to Risk Monitoring and Controlling		**1**	**2**	**3**	**4**	**5**
1.	Clear processes were in place to monitor the status of risks and mitigation strategies.					
2.	Risks were monitored and reviewed frequently enough to be effective.					
3.	Deviations from the risk management plan were identified and addressed promptly.					
4.	Risk data was collected and analyzed effectively to inform decision-making.					
5.	Risk responses are audited					
6.	Risks are reviewed periodically					
Items Related to Leadership Commitment		1	2	3	4	5
1	The project leadership was actively involved in risk management activities.					
2	Leadership demonstrated a strong commitment to the importance of risk management.					
3	Project team members were incentivized to participate in risk management activities.					
4	Leadership promoted a risk-aware culture within the project team					
5	The leadership team communicates risk management expectations to all project stakeholders.					
6	The leadership team empowers project team members to identify, assess, and manage risks.					
7	The leadership team recognizes and rewards individuals and teams for effective risk management practices.					
8	The leadership team provides clear guidance and decision-making support when dealing with complex risks.					

Project Risk Management Practice-Related Questions

Items Related To Risk Management Practice		1	2	3	4	5
1	There is a policy or guideline that recommends					
2	How to manage unexpected uncertainties.					
3	There is a responsible person or department who handles risk					
4	Project team members are getting active training and development in project risk management					

5	The project team has deep project experience in risk management.					
6	The organization effectively identifies potential risks.					
7	clear procedures for assessing the likelihood and impact of risks					

Source: Adapted and Same Modification From Questionnaire (Chapman, C., & Ward, S. (2017) and Turner, R. (2009)).

APPENDIX B

INTERVIEW GUIDE

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF MANAGEMENT

MA PROGRAM IN PROJECT MANAGEMENT

Thesis Title: Factors Affecting the Effectiveness of Project Risk Management Practice In the Case of Debre Berhan University Construction Project

Dear participant, I am Negash Gebeyehu. I am a graduate student in the Department of Management in Project Management here at Debre Berhan University. At this time I am doing research to complete my Thesis. You will be asked the questions that you are going to answer orally. The interview will not take you more than 30 minutes. The whole conversation during the interview will be recorded. Your participation in the interview is voluntary.

Interview guide for clients (Debre Berhan University), Contractors, and Consultants of Debre Berhan University Construction Projects. The interview question would be raising each independent variable as follows:-

Risk Plan

1. Can you describe the process of developing a project risk management plan? What are the key components that you include in the plan?
2. How do you ensure that the risk management plan is comprehensive and aligns with the project objectives?

Risk Identification

1. What methods and techniques do you use to identify risks in your projects?
2. How do you ensure that all relevant risks, both internal and external, are identified?

Risk Analysis

1. What approaches do you use to analyze identified risks in terms of their probability, impact, and priority?
2. How do you determine which risks require immediate attention and which can be managed over time?

Risk Response

1. How do you develop risk response strategies for identified risks?
2. Can you describe a situation where you had to implement a risk response strategy? How did you decide on the appropriate action?

Risk Monitor and Control

1. How do you monitor identified risks throughout the project lifecycle?
2. What metrics or indicators do you use to track the status and progress of risks?

Leadership Commitment

1. How do you demonstrate your commitment to risk management as a project leader?
2. How do you ensure that risk management is integrated into the project's culture and decision-making processes?