Assessing Project Risk Management Practices in Construction Projects: Case Study of Ayat S.C.

BY

Abdulkdus Saad

May 2022

Addis Ababa, Ethiopia

Assessing Project Risk Management Practices in Construction Projects: Case Study of Ayat S.C.

A RSEARCH PROJECT WORK SUBMITED TO OFFICE OF GRADUATE STUDIES OF ST' MARY 'S UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PROJECT MANAGEMENT.

BY

Abdulkdus Saad

May 2022

Addis Ababa, Ethiopia

DECLARATION

I, Abdulkdus Saad, hereby declare that this project entitled - **Assessing Project Risk Management Practices in Construction Projects: Case Study of Ayat S.C.** I carried out by may self and that it is my original work that has never been presented to any other university or institution for any academic award. Where other sources of individuals research work were used, acknowledgement has been duly given.

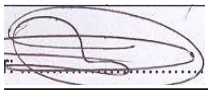
Candidate

Name : Abdulkdus Saad

Signature:

ENDORSEMENT

This thesis has been submitted to St. Mary's University School of Graduate Studies for examination with my approval as a university advisor.

Dejene Mamo, (Ph.D) 

Advisor Signature

St. Mary's University, Addis Ababa, Ethiopia May 2022

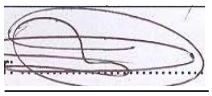
Assessing Project Risk Management Practices in Construction Projects: Case Study of Ayat S.C.

Submitted By

Abdulkdus Saad _____ _____

Name Date Signature

Approved By

Dejene Mamo (Ph. D) 31/05/2022 

Advisor Date Signature

Muluadam Alemu (Ph.D) 19/07/2022 

Internal Examiner Date Signature

Daniel Tadesse Tulu (Ph.D) 19/07/2022 

External Examiner Date Signature

_____ _____ _____

Dean, SGS Date Signature

ACKNOWLEDGMENT

First and foremost, I would like to give glory and praise to the Almighty Allah for his invaluable care and support throughout my life and for helping me from the inception of my education to its completion and enabling me to achieve my career.Next, I would like to extend my special gratitude to my Advisor Dejene Mamo (Ph.D.), for his insightful, constructive advice and comments.

My sincere gratitude goes to the employees and managers of Ayat Real State for their honest responses to my questioners and interview questions. Finally, I am greatly indebted to my families and friends for their encouragement, moral support, and suggestions. A special word of mouth is their credit.

Table of Content

List of Acronym

PMI	Project Management Institute
RMP	Risk Management
GFCF	Gross Fixed Capital Formation
APM	Association for Project Management
SWOT	Strength, Weakens, Opportunity, threat
RBS	Risk Breakdown Structure
BSC	Balance Score Card
EVMS	Earned Value Management System
KPI	Key Performance Indicator

List of figures

List of table

Abstract

In Ethiopia, It is known fact that both foreign and local construction companies are operating on grand projects across the country and one area of this is real estate mainly in the Capital Addis Ababa. Issues related to cost and time overruns are the main factors that affect performance of the projects and risk related to this factors and other unforeseen areas. With this area as a main driver, this study set major objectives of risk assessments and mitigation practice of Ayat Real Estate Company. The Study adopted both quantitative and qualitative research approach as it tries to explore the possible causes and their effect on the overall performance of the project related to risk and its practical use in the project tries to identify any week area that that could be enhanced for best performance and successful project.

CHAPTHER ONE

1.1. BACKGROUND OF THE STUDY

Risk management is a concept that is used in all industries, from IT-related business, automobile or pharmaceutical industry, to the construction sector. Each industry has developed its Risk Management standards, but the general ideas of the concept usually remain the same regardless of the sector. According to the Project Management Institute (PMI) (2004), project risk management is one of the nine most critical parts of project commissioning. This indicates a strong relationship between managing risks and project success.

One concept which is widely used within the field of Risk management is called the risk management process (RMP) and consists of four main steps: identification, assessment, taking action, and monitoring the risks. In each of these steps, there are several methods and techniques which facilitate handling the risks (Pinto, 2022). Many industries have become more proactive and aware of using analyses in projects. Likewise, Risk Management has become a timely issue widely discussed across industries. However, concerning the construction industry, risk management is not commonly used, The common excuse given for not incorporating risk management techniques in projects was lack of awareness about their significance. The methods used to deal with risk in the Ethiopian building construction projects were found to be highly dependent on individual's judgment and past experience. Poor contract management was found to be one of the major causes of risk which has a high probability of occurrence and a high level of impact on project objectives (Abebe Dinku, 2022).

RMP improves project's performance and implementation of risk management methods. Even though there is an awareness of risks and their consequences, some organizations do not approach them with established Risk management methods. The construction industry operates in a very uncertain environment where conditions can change due to the complexity of each project.

More construction companies are starting to become aware of the RMP, but are still not using models and techniques aimed at managing risks. This contradicts the fact that the industry is trying to be more cost and time-efficient as well as have more control over projects. Risk is associated with any project regardless of the industry and thus Risk Management should be of interest to any project manager. The risks differ between projects because every project is unique, especially in the construction industry. However, there are still many practitioners that have not realized the importance of including risk management in the process of delivering the project.

Each organization aims to be successful and Risk management can facilitate it. However, it should be underlined that risk management is not a tool that ensures success but rather a tool that helps to increase the probability of achieving success.

The level of success in carrying out construction project development activities will depend heavily on the quality of the managerial, financial, technical and organizational performance of the respective parties while taking into consideration the associated risk management, the business environment, and economic and

political stability. Risk management is therefore a proactive rather than a reactive concept (Takin, R and Akintoye, 2004). Hence, the purpose of this study is to assess major risk management practices undertaken project Management practices in the organization concerning project management knowledge areas .

1.2. Background of Ayat Real State Share Company

Ayat Real Estate is a shareholder's company that was created in 1997 and is one of the pioneering Ethiopian companies in this sector. They have managed to complete over 5,000 residential units, making them one of the most experienced in this sector. Ayat Real Estate's history and background indeed makes them the largest construction company focused only on residential homes in Ethiopia. They had a bumpy beginning when they were first building and selling the Ayat Real Estate villa houses in the Ayat area, with rumors of low quality building materials being spread.

Today, the Ayat villas which once sold for about 375,000 ETB are now being sold in excess of 20,000,000 ETB. Furthermore, in order to pass on the savings to its clients, Ayat Real Estate has bought and built factories for the purpose of producing the building materials they need, such as terrazzo tiles, concrete hollow blocks, marbles, prefabricated slabs, septic tanks, metal doors/windows, wooden doors/cabinets, and more.

At the moment, one of their largest projects is in the Ayat area of Addis Ababa with numerous apartment buildings being built and sold. Their prices are also considered relatively fair.

1.3. Statement of the Problem

Construction can be considered as a dynamic industry that is constantly facing uncertainties. Besides these uncertainties, the involvement of many stakeholders makes the management of cost and time difficult which consequently causes time and cost deviation. Therefore, cost and time overruns are considered one of the most critical issues during the execution of construction projects. In Ethiopia, the present state of the construction industry falls short of meeting domestic and international quality standards and the performance demand expected from the sector. Construction projects have problems with construction techniques and management as well as limitations of funds and time. The critical problems are the inability to complete the projects on schedule, low-quality work, and cost overrun In general, most (if not all), construction projects experience time overrun and cost overruns during their execution phase (Habtemariam, 2019).

In this situation, there is a problem in project planning and execution management. some companies performed slow construction of houses. Some companies stopped the construction of houses after devoting huge amounts of money and time, up to certain progress.

There is no evidence of previous research studies which show Ethiopian building construction Infrastructures development project practices are effective, Rather a several pieces of evidence from ongoing projects and review of documents cast doubt on the effectiveness of project risk management practice in Ethiopia. There has been an extended delay in some of the projects and there were some unattended goals of the project. These problems are believed to be among other factors due to lack of efficient project risk management practices and certain barriers to doing that (Alliance Experts 2021).

Previous works of literature regarding building Infrastructure development do not cover all aspects of challenges of project risk management practices in one study. Most of them focus on single aspect projects management issues such as Stakeholder management, Risk management, design and planning, and Monitoring and evaluation. But a challenging factor in one area will have a significant ripple effect on all other related areas. Thus the comprehensive view of all project risk management practices is necessary to effectively manage projects being implemented. In line with this, the study intends to assess the risk management practice of Ayat real state for all project management practice areas (Mesfin, 2014, Nega, 2008, Habtemariam, 2019) .

1.4. Research Questions

The basic problem of any company is to complete the project with the specified time, cost, scope, and quality or with the initial agreement to satisfy the customers by completing the building project successfully. Now the basic questions are:

1) What is the risk awareness of the employees of project?
2) How risk management plan helps (benefits of risk management)?
3) How risk management practice adds value to project performance .
4) How does the organization deal with risk?
5) What are the major challenges of project risk management practice in construction companies?

1.5. Research Objectives

1.5.1. General Objective

The general objective of the study is to assess the risk management practice of construction Projects at Ayat Real Estate

1.5.2. Specific Objective

The specific objectives of the study are

- Asses the risk awareness of employees at Ayat.
- Investigate the benefits of risk management practices in the construction industry at Ayat.
- Evaluate the main challenges of project risk management practice in Construction at Ayat for further improvement.
- Assess the practice of project risk management in construction at Ayat related to Project Management knowledge areas.
- Identify problems caused by poor Risk Management practices in construction projects at Ayat.

1.6. Significance of the Study

This research project paper will particularly help to look into challenges encountered while implementing project risk management practice in the case of Ayat real state. This study is significant to professionals, decision-makers, policy designers, and practitioners to look for the best policies, methods, and processes of doing and managing projects and this study aims to point out these difficulties and thus improve the project risk management practice to benefit from the findings.

Project managers and project teams who are involved in the planning, designing, implementation, and control of building projects could make use of the obtained information from this study. Finally, it will also contribute to project management knowledge in that the research paper follows a different approach in categorizing the challenges with project management knowledge areas that can be used as a baseline for further study. It is assumed that this research output contributes to identifying risk management practices of Ayat real state.

Since project management is an area with a growing body of knowledge, this research can contribute to adding some concepts to the existing body of knowledge with a particular emphasis on building construction Company's practices being currently implemented. Even though the research focuses on building projects, the findings and the outcome could be relevant to practitioners in other types of projects

1.7. Scope of the Study

This study is conducted on project risk management practice only on building construction development project of Ayat real state site located in Addis Ababa Around CMC MEKILE

1.8. limitations

Some of the limiting factors that might affect the study are, The span of the study as this paper only focuses on a single company, The Availability of information on the topic as the record-keeping practices in our country might not be modernized and well Organized, Willingness of the company to provide information related to the project, The respondent willingness to provide relevant information and their knowledge on the area and The duration of the study as it is short and the construction projects could span longer period as a result might miss key information the might help for the study.

1.9. Organization of the Study

The research is organized in to five parts. The first chapter includes background of the study, statement of the problem, specific and general objective, significance of the study, scope of the study, limitation of the study and organization of the study. The second chapter presents theoretical and empirical review with general descriptions by different researchers on construction risk management practices.The third chapter discusses about research design and methodology.The forth chapter includes data analysis and discussion of the research findings. The final chapter includes conclusion and recommendation for further research based on result found from the research.

CHAPTER TWO

LITRATURE REVIEW

2.1. Theoretical Review

Many definitions had been given to the project by different authors, due to the fact that project is a multidisciplinary word that has a different meaning from different perspectives and orientations. Engineers, Architects, Managers, and so on, have their definitions coined out from their experiences as far as their professions are concerned. Their definition depends on their areas of study and the point of view that each scholar used. But to have a comprehensive understanding of a project, it is better to refer to different definitions. Project as an initiative to bring about change in order to achieve specific objectives, within a timescale, in a given context with an allocated budget.

According to PMI (2013), a project is defined as a temporary endeavor undertaken to create a unique product, service, or result. The temporary nature of projects indicates that a project has a definite beginning and end. Temporary does not necessarily mean the duration of the project is short. It refers to the project's engagement and its longevity. Temporarily does not typically apply to the product, service, or result created by the project; most projects are undertaken to create a lasting outcome.

Every project creates a unique product, service, or result. Although repetitive elements may be present in some project deliverable s, and activities, this repetition does not change the fundamental, unique characteristics of the project work. Because of the unique nature of projects, there may be uncertainties or differences in the products, services, or results that the project creates.

Many other scholars and books prefer to define and explain projects by describing the common characteristics of projects instead of giving a direct definition so that anyone can define a project by integrating these features of projects. Different scholars provide the unique features of projects.

2.1.1. Characteristics of a project

Regardless of specific features of particular projects, below are some common characteristics for all projects:

A project can be considered to be any series of activities and tasks that:

- Have a specific objective to be completed within certain specifications
- Have defined start and end dates
- Have funding limits, if applicable
- Consume human and nonhuman resources, such as money, people, equipment
- Are multifunctional meaning cuts across several functional lines

A project is organized work toward a predefined goal or objective that requires resources and effort, a unique (and therefore risky) venture having a budget and schedule (Pinto, 2019).

2.1.2.common types of projects

- Civil Engineering and Construction
- Manufacturing Projects
- IT Projects and Projects Associated With Management Change
- Projects for Pure Scientific Research

2.1.3.Challenges of Project Management Practice

Pieces of literature have revealed various challenges in project management the researcher identified the major challenges that are applicable in the context of Ethiopian constriction building Development projects.

- Knowledge areas of Project Management
- Project Integration Management Challenges
- Scope Management Challenges
- Time Management Challenges
- Cost Management Challenges
- Human Resource Management Challenges
- Communication Management Challenges

2.1.4.Project Risk Management

A project is a temporary, unique and time-limited piece of work, in which multiple activities typically must be carried out in order to achieve specified objectives (PMI, 2018). To carry out those activities, multiple stakeholders from different organizations and based in different locations typically work together. Every project, whether it is simple or complex, small or large, faces different uncertainties throughout its course. This uncertainty is so crucial in determining a project's likelihood of success or failure, and is referred to as project risk.

Risk is mainly related to negative events that occur during a project, whereas the Association for Project Management (APM) and the Project Management Institute (PMI) describe risk as sometimes having positive and sometimes negative impacts on a project.

Project risk can be defined as an uncertain event or condition that, if it occurs, has a positive or a negative effect on at least one project objective, such as time, cost, scope, or quality (PMI 2016).

Project risk is an uncertain event or set of circumstances which, should it occur, will have an effect on achievement of one or more objectives (APM 2012).

From these two definitions, we can say that project risk is an uncertain phenomena that can influence the outcome of a project. Thus, in order to ensure that project risk induces minimal negative outcomes, project risk management is essential, especially for large or complex projects. Many previous publications concur that project failure is closely associated with ineffectual risk management in failing projects.

Risk Management has enormous impact on project success and failure. Without a proper Risk Management plan in place, there is a high probability for any project, especially large and complex projects to encounter many uncertainties and ultimately failure. The main goal of project Risk Management is to identify any associated risks and take preventative and corrective measures in order to prevent or minimize negative impacts. Project risk can evolve in many different forms, according to the specific sector.

2.1.5.Brief History of Risk Management

Risk management studies began emerging after World War II, particularly from 1955 onwards. According to various literature, modern Risk Management strategies were developed between 1955–1964. At that time, no academic had been performed on Risk Management and also there were no published books on this subject (Snider, 1956). In 1963 and 1964, two books were published on Risk Management by Mehr and Hedges and Williams and Heins, who focused purely on Risk Management, failing to take into account the most important financial risks.

According to Harrington and Niehaus (2003), market insurance, which is supposed to protect personnel and companies from different losses relating to accidents, is one of the most important sectors that is associated with Risk Management policies. Though there were no financial risk concepts at that time, a different version of pure Risk Management evolved during mid 1950s as a substitute option for market insurance, when insurance policies became very expensive and complex.

Many business sectors were very expensive and complex to insure at the time. Thus, in the 1960s a new contingent planning activity strategy evolved along with different preventive actions and self-insurance instruments, which were very useful in terms of insuring against certain business losses. Though Risk Management in the financial sector did not gain much importance until 1960s, by the 1970s, this scenario had changed. A revolution in financial sector Risk Management occurred in the 1970s, in which many companies experienced price fluctuations due to varying interest rates, stock market returns, exchange rates, prices of raw materials, etc... (Dionne, 2013).

Dionne noted that During the 1980s, companies started to contemplate financial management and it came to replace pure Risk Management when financial companies, such as banks and insurance organizations started to give serious consideration to managing market and credit, operational and liquidity Risk Management activities. At that time, financial organizations also started to internally develop different Risk Management models and investment capital calculation formulas, in order to prevent themselves from different unforeseen risks. During that time, Risk Management

governance, integrated Risk Management and job positions such as “Chief Risk Officer” were introduced into the market.

Dionne noted that, Later, in 2002, the Sarbanes-Oxley Act was brought into action in the United States, due to many incidents evolving from poor Risk Management.

Stock Exchanges also formulated Risk Management governance rules for financial organizations. Though all the rules and regulations of Risk Management were formulated based on various practical research, their application and enforcement remained inefficient. This was a major contributor to the global financial crisis of 2007. Thus, risk management has gradually evolved, with more sophisticated techniques developing, from pure Risk Management to Risk Management that also incorporates financial perspectives (Oxelheim et al., 2020).

2.1.6.Definition of Risk Management

Risk Management, which is sometimes referred to as “Uncertainty Management”, can be generally defined as being a systematic process that a company follows in order to reduce the likelihood of unexpected events occurring, in order to maximize profit. Many authors defined risk management as uncertainty management in the literature as risk itself an uncertain thing. The most two popular definitions of Risk Management are published by PMI and APM:

The systematic process of identifying, analyzing, and responding to project risk. It includes maximizing the probability and consequences of positive events and minimizing the probability and consequences of adverse events to project objectives (PMI, 2016).

A process whereby decisions are made to accept known or assessed risks and/or the implementation of actions to reduce the consequences or probability of occurrence (APM, 2012).

Although both organizations similarly define Risk Management, the major difference between these definitions concerns PMI’s consideration of risk as sometimes being positive. Positive “risk” may also be referred to as “opportunity” in a Risk Management plan. Though many authors have previously described risk only being negative, in which where different measures are initiated in Risk Management plans in order to reduce the probability and impact of negative events, some see certain types of risk as potential opportunities. Positive risks, although causing uncertainty, can also maximize success or profit, and should therefore be considered in Risk Management strategies, alongside negative risk.

Others define Risk Management as the minimizing of negative occurrence of risk which causes loss to the organization. Risk management described in terms of identification, evaluation and control of exposure to each risk that hinders project success. To ensure success the organization has to minimization of negative impacts of risk

recognition, evaluation and economic control of risks that hinder business success and profit; determination of the most relevant way to tackle major and minor risks to a company’s profit; and a procedure for adapting to the impacts of progress.

Risk is a fundamental aspect of Risk Management, the main aim of which is to minimize or maintain risk at a level that is acceptable for an enterprise. Risk Management may be compared to drawing a map of hazards and the probable harm they may cause; the map can then be used to solve the challenges caused by risks. Risk management is very important for any business, but that it does not necessarily ensure the ultimate success of a project.

Risk Management in terms of two dependent variables: risk identification and risk analysis. In risk identification, all potential risks should be determined within the organization's boundaries, whereas in risk analysis, probable impact, cause and control over those risks should be determined. To utilize the available resources and reduce time consumption in the Risk Management process, it is very crucial to have clear knowledge of the risks that a business face. Almost every business faces different types of risk, according to the corresponding sector(s) of the enterprise.Regarding that, each enterprise should focus on identifying the specific risks it faces and take action according to a proper risk response strategy.

Risk Management is a process with the main objective of identifying both the risks and opportunities that the project or business faces in its early stages, and take action according to the necessary response strategy, in order to mitigate or utilize risks for the success of the business. As both risk and opportunity is uncertain, Risk Management can also be called uncertainty management.

2.1.7.Categorization of Risk

A project may face different challenges and uncertainties in the planning, buildup and even post-completion phases. According to the literature, most of the risk that a project faces, arises from uncertainty. Ward and Chapman (2003) identified five types of risk sources that cause uncertainty Thus are variability associated with estimates; uncertainty about the basis of estimates; uncertainty about design and logistics; uncertainty about objectives and priorities; and uncertainty about fundamental relations between project parties.

Different scholars describe project risk types in different ways, according to their sources and nature. The most common calcification are:

- Pure Risk: Unfavorable events such as, fire or other accidents, which cannot be predicted in advance. Although there is a low probability of pure risk occurring, it can cause significant damage to a project. The liability of such types of events lies with the insurance company, thus it is also known as insurable risk.

- Financial Risk: Risk relating to a project's financial activities, including funding of the project. This might also have a major impact on the project's success, as it includes exposure to currency fluctuation, liquidity and operative cash flow.

- Area-Specific Risk: These risks occur due to specific geographical, cultural, political, national and environmental issues. Sudden natural calamities or political instability of that specific location can have major impacts on the project.

- Business Risk: Business risks include all other risks aside from those mentioned above. They can arise from small activities that may superficially

seem negligible, but may end up affecting the activities of the whole project. Business risks may occur at any time during the project and influence its outcome.

2.1.8.Risk Management Process

There are many process models of Risk Management described in the literature and there is a strong consensus regarding Risk Management approach. Among them, the most commonly used and accepted process model is given by Project Management Body of Knowledge (PMBOK).

PMI (2016) divided Risk Management steps into Risk Management planning, risk identification, risk qualitative analysis, risk quantitative analysis, risk response development and risk monitoring and control. During the Risk Management planning steps, a detail plan is produced by the project team on how to approach Risk Management activities during the entirety of the project. This planning step is very crucial for project success and if planning is done extensively and covers the relevant areas, there is less chance of project failure. These steps must be started when project planning is finalized and be completed before project initiation.

In risk identifying steps, all possible risk that the project may face during the whole period is predicted and categorized, according to their characteristics. By identifying risks, all information about risk can be identified and collected through brainstorming, Delphi technique, interviewing, root cause analysis, SWOT analysis and use of previous records and be output to a risk register.

In risk qualitative analysis steps, risks are ranked according to their probability of occurrence and their probable impacts on the project. A probability and impact matrix or Risk Breakdown Structure (RBS) is used extensively to perform qualitative analysis, which builds a foundation for quantitative and risk response strategies. Later, in quantitative risk analysis, risks are analyzed numerically and prioritized based on their probable impacts. In most cases, the risks which are prioritized in qualitative risk analysis are then again analyzed quantitatively in order to more accurately establish the probability of their impacts on the projects. Probability distributions, sensitivity analysis, expected monetary value analysis, modelling and simulation techniques are used to perform quantitative analysis.

In plan risk response steps, different actions are taken in order to minimize the probable impacts of negative events and also to enhance the probabilities of opportunities. In this step, different resources are applied to the project plan to reduce risk. When any negative events or risks occur, four typical strategies are likely to applied in response: avoid, transfer, mitigate and accept.

2.1.9.Risk Management Framework

Chapman and Ward (2003) expressed a generic Risk Management model named the “SHAMPU” framework which contains nine steps: define, focus, identify, structure, ownership, estimate, evaluate, plan and manage.

In the “SHAMPU” framework, Ward and Chapman (2003) define the first two steps define and focus as the basis of analysis, with the next three steps identify, structure and ownership forming the basis of qualitative analysis and estimate and evaluate as

quantitative analysis. Thus, this model can also be defined compared to the five step Risk Management model, which includes basis of analysis, qualitative analysis, quantitative analysis, harness the plan and manage implementation.

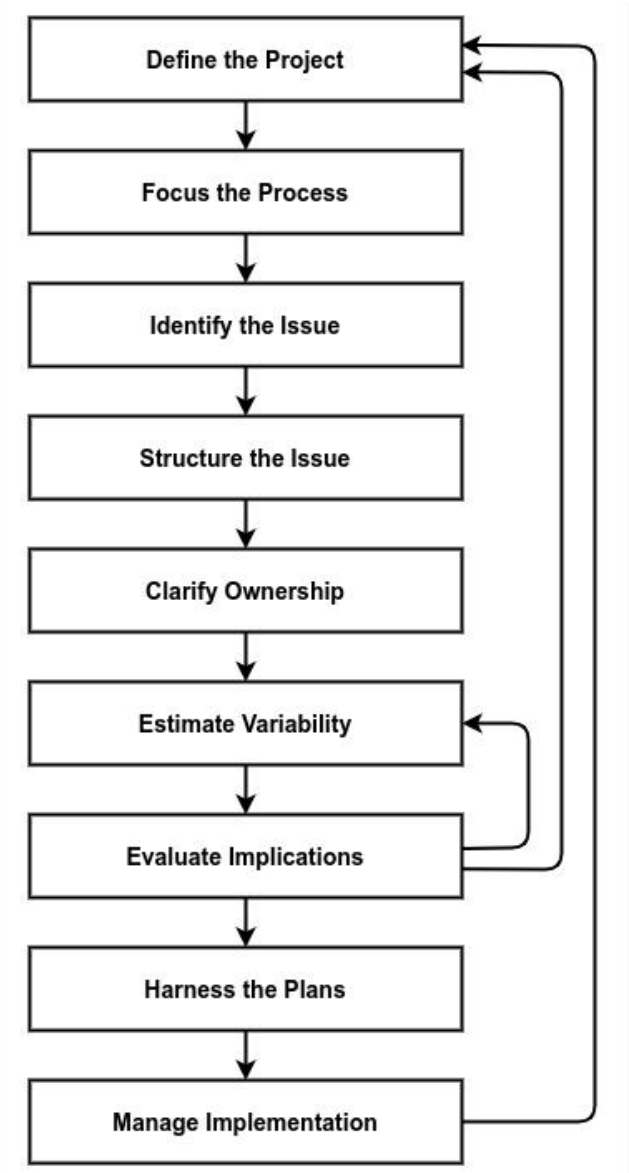


Figure 2.1 : SHAMPU framework (Ward and Chapman, 2003)

D.van Well-Stam et al (2004) also described the Risk Management process in a similar way by splitting the Risk Management process into nine steps. The main characteristic of this model is that it focuses greatly on continuous risk assessment. D. Van emphasizes that, after performing risk analysis, the following evaluation and control phase should continue on a regular basis, as both the evaluation and control phases depend on one other.

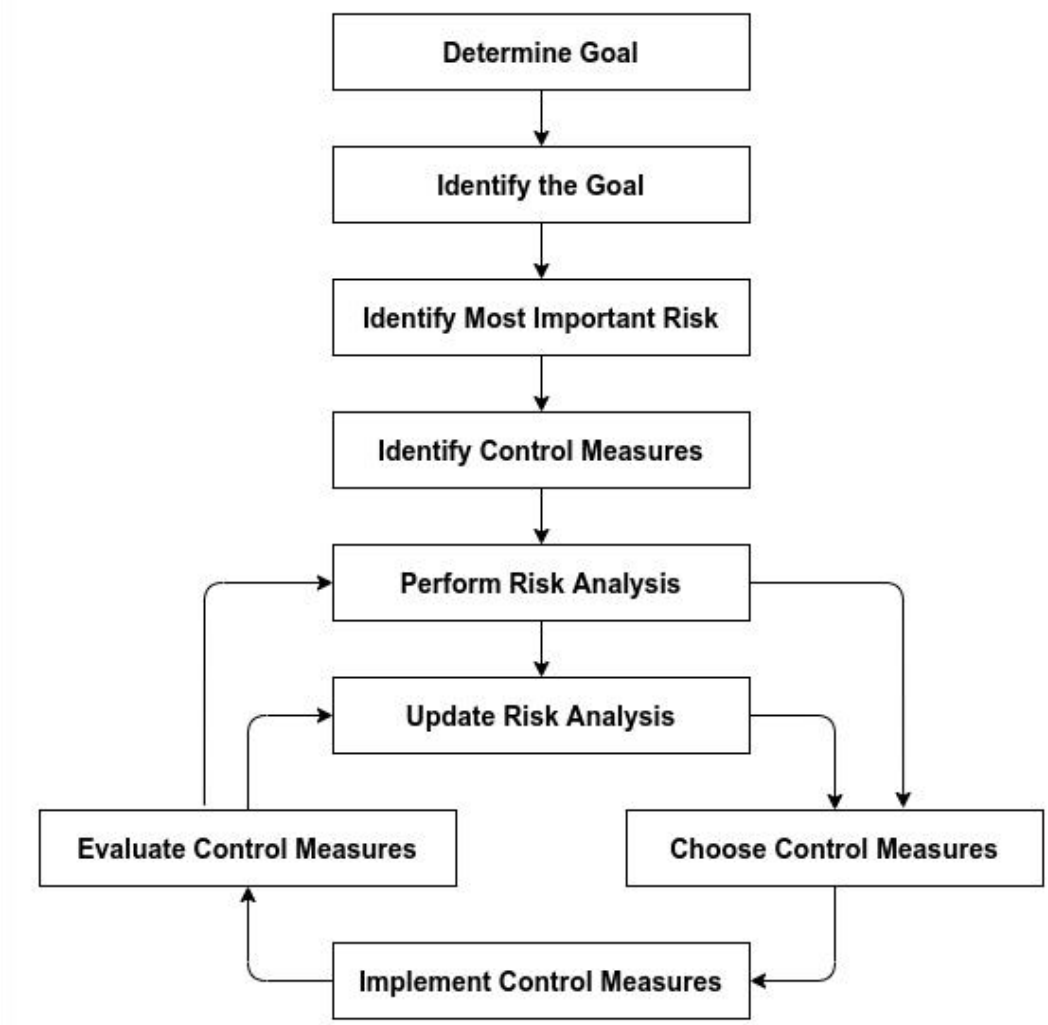


Figure 2.2 : Risk management steps (D. van Well-Stam et al, 2004)

2.1.10. Risk Management Performance Measurement

Performance measurement is an important approach for any project or business, by which an organization's or project's success percentage is evaluated. Nowadays, many organizations face extensive problems regarding establishment of performance management criteria which are cost effective and measure performance meaningfully. In performance measurement, a project's outcome is compared with the project's original goals, along with the performance of individuals, in some cases, in order to make a quantifiable factor upon which a project's or business' ongoing performance can be measured (Neely et al., 2003). For project-oriented organizations, a proper risk management system acts as an efficient and effective tool for ensuring project success. Thus, to ensure RM system accuracy and efficiency, a performance measurement criterion must be developed (Rahman & Adnan, 2020).

2.1.11. Performance Measurement Methodologies

Performance management basically has four main components: duty, strategy goal, performance goal and performance index (Kim, 2010). Strategy goal refers to the organization's policies, which represents the organization's values as a whole, and in which performance goal is part of the strategy goal. This includes specific performance objectives of a particular project in a specific year. Performance index is the criteria of successful evaluation of the project goal where quantitative measures are developed for each project. In the literature, there are very few methodologies regarding the Risk Management performance measurement for projects. Among them, the four most used and popular Risk Management performance measurement methods for large projects are:

- Balanced Score Card (BSC)
- Earned Value Management System (EVMS)
- Key Performance Indicators (KPI)
- Risk Management Index

2.1.12. Empirical Review

The construction industry is the backbone of economic development. The industry is involving an increasing number of small companies and a few big construction companies. The construction process is labor-intensive and also requires a good management style because of difficult site conditions and bulky materials use. In spite of all the best practices, the predictability of project outcomes is still an issue of concern. Failure to achieve targeted time, budgeted cost, and specified quality result in various unexpected negative effects on the projects.

The Ethiopian construction industry is characterized by a large number of micro-entrepreneurs, the majority of whom operate in the country's informal economy. Ethiopia's formal construction sector comprises indigenous and indigence firms, as well as numerous major foreign civil engineering and construction companies. Although all contractors are required to be registered with the Ethiopian Ministry of Urban Development and Construction, corruption, as well as health and safety issues, remain a matter of concern.

During the past decade robust public and private expenditure on infrastructure and other construction works have served as a catalyst for Ethiopia's rapid economic development. The country has consistently invested more than 30% of GDP into Gross Fixed Capital Formation (GFCF) expenditure since 2010 and as a result, Ethiopia has emerged as one of the fastest-growing economies in the world. The market value of the construction sector is currently estimated at more than US$7bn. According to the 2017 edition of African Economic Outlook, construction activities in Ethiopia accounted for 15.9% of GDP at current prices during the 2015/16 fiscal year.

Professionals and experts have stated that project risk management is a crucial strategic view.

2.1.13. Research gap analysis

Review of previous study made on the subject reveal that most of the study focus on Risk Management Plans of the Organization and Processes that they follow and make Assessment of the Risk awareness level of the employees but don't give much emphasis to the Professional assistance that the organization provides to the employees in order to raise the risk awareness level of it's employees and Risk Registration System practice of the organization and how they learn and create an Improved Risk management Plan that incorporate the data registered from past projects to help feature project.

2.2. Conceptual framework

The research mainly focus on the concepts of project risk and risk management practices of Ayat real state.Thus the focus area that the research tries to assess are the risk awareness of Ayat Real State Employees, the benefit of the risk management plan, identification of major risks involved in real estate constriction projects, problems caused by poor risk management practice, and project risk management practice applied by Ayat real state in its projects.

A profound explanation about project risk management process and its steps by Dale, Stephen, Geoffrey and Phil (2005) and explanation about major components of risk awareness by Jen(2000) will serve to conceptually frame this research. According to Dale et al. (2005) project risk management is a five step process and in each step a project organization should ask certain questions to help it guide and fulfill the process effectively. Communicating, consulting,monitoring and reviewing of project risks through each steps of the process are also main activities to be performed in a characteristic project risk management process.Steps of a typical project risk management process and the major questions a project organization should ask at each stage of the project risk management steps are discussed as follows:

- **Establish the context**- What are we trying to achieve?

This step includes actions in relation to defining project objectives, criteria, key elements and key project stakeholders.

- **Identify the risks**- What might happen? What can happen? How can it happen?

This step is aimed at determining what might happen that could affect the objectives of the project, and how those things might happen.

- **Analyze the risks**- What might that mean for the project's key criteria?

Analyzing is a step done through the systematic use of available information to determine how often specified events may occur and the magnitude of their consequences. Likelihood, consequence and level of risk are major items to be analyzed.

- **Evaluate the risks**- What are the most important things?

It is the process of comparing the estimated risk against given risk criteria to determine the significance of the risk. Converting the consequence and likelihood

ratings to an initial priority for the risk and developing agreed risk priorities and inherent risk levels are major activities here.

- **Treat the risks**- What are we going to do about them?

Identifying options, selecting the best response mechanism, developing risk treatment plans and finally implementing the plan are key procedures under this stage.

- **Monitor and review**- How do we keep them under control?

This step will ensure that new risks are detected and managed, and risk treatment action plans are implemented and progressed effectively.

- **Communicate and consult**- Who should be involved in the process?

This step is highly linked to the concept of risk awareness. To project owners, clients and end users this step will help to understand the risks and trade-offs that can be made in the project undertaking. This ensures all parties are fully informed, and thus avoids unpleasant surprises. Within the project management team, this will help to maintain the consistency and 'reasonableness' of risk assessments and their underlying assumptions

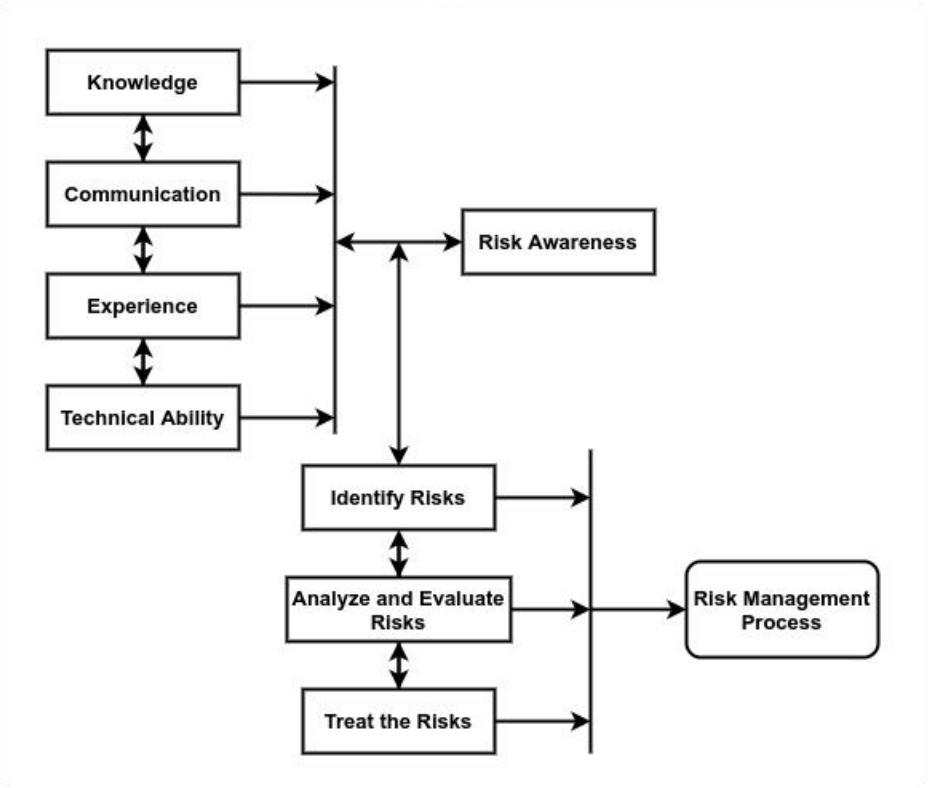


Figure 2.3 : Conceptual Framework

CHAPTER THREE

Research Design and Methodology

3.1. Introduction

This chapter discuss the research design, the study participants, sample size and sampling technique, data source and data collection instruments, data collection procedures, and method of data analysis. The methodology describes the practical way in which the whole research project has been organized.

A plan of action is developed to shows how the problem was investigated, what information was collected using which methods, and how this information was analyzed in order to arrive at conclusions and develop recommendations. The main factors in considering the methodology used is based on the objectives of the research.

3.2. Description of the Study Area

Hence the study assesses risk management practice on building a residence in the case of Ayat real state. The problem of risk management practice has been seen all over Ethiopia but the study focused only on Ayat Real State construction site located at CMC MIKAEL in Addis Ababa. Addis Ababa lies at an elevation of 2,300 meters (7,500 ft.) and is a grassland biome, located at 9°1′48″N 38°44′24″E. The city has a complex mix of highland climate zones, with temperature differences of up to 10 °C (18 °F), depending on elevation and prevailing wind patterns.

3.3. Research design

The main objective of the study is to assess risk management practice on building residential apartments in the case of Ayat real state. Research design is the plan and structure of investigation conceived so as to obtain answers to research questions or test the research hypothesis. The plan represents the overall strategy used in collecting and analyzing data in order to test the research hypothesis.

This study was conducted based on a mixed approach research design. Qualitative and quantitative data are partially mixed in sequential dominant status qualitative designs. For quantitative data, a descriptive survey method was employed to analyze the collected data and the study has collect qualitative data through interviews with project management staff members. It was a triangulation of research techniques, which refers to a combination of mainly qualitative and quantitative methods of data collection and analysis. Quantitative and qualitative phases has occured one after the other, with the qualitative phase being given higher priority and mixing occurring at the data interpretation.

This method is more appropriate to gather a variety of data related to the study and to analyze the data in a mixed type of quantitative and qualitative approach. The main reason why the mixed research method has been used for this study is that the mixed-

method enables the researcher to look at the research problem using different techniques to gain an adequate understanding of the problem.

3.4. Target population

Population defines statistically as the total of all subjects having a certain common characteristic that is being studied. It is the collection of all units or elements under investigation, which consists of a specified type of a person or subject over a given space and time.

The population of the study comprises the stakeholders involved in construction projects and contractors who were involved in construction projects during study time considered. The target population of the study is Construction management office engineers & related program managers and contractors has been taken based on data available in the construction management unit and on getting contractors involved.

Ayat is a fully Ethiopian owned and managed company, has made tens of hundreds of Ethiopians and Ethiopian diasporas, at home and abroad, proud homeowners in their native country. Envisages to put roof over the heads of thousands more in the years ahead. In the previous years, Ayat has handed over more than 7,000 residential homes, 1,000 commercial outlets and created job opportunities for more than 15,000 Ethiopians. Our study focus on the CMC Michael branch which has 470 employees.

3.5. Research Methods

3.5.1. Samp size and sampling technique

Sampling is the process of selecting a sample from a bigger group the sampling population to become the basis for estimating or predicting a fact, situation, or overcome regarding the bigger group. Sample should be free from bias. Otherwise, the type of selected sample will greatly affect the reliability of subsequent generalization. To conduct the research; the researcher has used two sampling techniques. These are purposive and simple random sampling (SRS) techniques. This sampling technique was selected because it gives an equal and independent chance for all clubs in the defined population of being selected as a sample.

3.5.2. Sample Size Determination

There are several approaches to determining the sample size. These include using a census for small populations, imitating a sample size of similar studies, using published tables, and using the published table to determine the sample size of a total population size of 470, with the desired sample size of 82 with a 90% of precision level as depicted in the table that follows.

Size of Population	Sample Size (n) for Precision (e) of:		
	±5%	±7%	±10%
100	81	67	51
125	96	78	56
150	110	86	61
175	122	94	64
200	134	101	67
225	144	107	70
250	154	112	72
275	163	117	74
300	172	121	76
325	180	125	77
350	187	129	78
375	194	132	80
400	201	135	81
425	207	138	82
450	212	140	82

Table 3.1 : Sample size for ±5%, ±7% and ±10% Precision Levels Where Confidence Level is 95% and P=.5 (Israel, G.D. 2013)

In the case of the research population, it does not mean that all members of stakeholders are possible respondents to the questionnaire. Rather the questionnaire was distributed to engineers & other professionals who know the concerned construction projects during the specified time.

3.6. Source of Data Collection

In order to get the essential data and information, the researcher used both primary and secondary data.The primary data used in this study are collected through a questionnaire survey. A questionnaire is designed from a literature review of various factors affecting the success of construction projects and Secondary data is gathered from sources like relevant literature, internet sources, journal articles, published materials, which have relevance with managerial factors that affect construction risk management practices in the study area.

3.6.1. Data Collection Instrument

The researcher uses both primary and secondary sources of data. To get reliable information from the research participant's questionnaire and interview (Semi-structured interview) types of data collection instruments have identified as pertinent tools of this study.

3.6.2. Questionnaire

A questionnaire is a series of questions asked to individuals to obtain statistically useful information about a given topic. When properly constructed and responsibly administered, questionnaires become a vital instrument by which statements can be made about specific groups of people or entire populations. In designing the

questionnaire, the objectives of the study were first established. This was done to help in determining what questions to ask and how to ask them.

The questionnaire consists of a formal and written set of closed-ended and a few open-ended questions that are used to collect effective data from different respondents in the study area. In this regard, the questionnaire which constitutes closed-ended and open-ended questions was be prepared by the researcher to gather data from respondents and to assess risk management practice on building a residence in the case of Ayat real state.

3.6.3. Interview

In-depth interviews was employed with intention of getting better information about risk management practice on building a residence in the case of Ayat real state. this will provide much more detailed information than other data collection methods.

3.6.4. Procedure

All participants wear informed about the study and was asked for volunteers to participate in the study. A semi-structured questioner and interview was used to collect the data for this study. This combined strategy offers the flexibility of probing and exploring certain subjects in greater depth. The standard approach was used in this study consisting of a series of pre-planned open-ended questions organized into a number of interrelating sections. According to Patton (2002), demographic or background questions can often make people comfortable and they have a tendency to require only short-answer responses; therefore, demographic questions was asked at the beginning of the interview. The collected data was analyzed by using tables and descriptions.

Moreover, the researcher made the objective of the study clear to all respondents at the beginning of the questionnaire administration, in order to avoid confusion and facilitate ease of administration. A close follow-up was issued to immediately correct problems that arose during the filling of the questionnaire.

3.7. Data Analysis

In this study, both Descriptive and inferential statistical method was used to analyze the data by using statistical software SPSS. Descriptive statistics includes among many a process of data collection, organization, presentation, and summery of the data into a meaningful form by using frequency distribution, graphs, table and diagrams to describe the pattern and structure of the data and also helps us to clear some anomalies in the data.

3.8. Ethical consideration

An ethical concern is one of the most important things in research. It is related mostly to confidentiality as well as with efforts to guarantee and to reduce possible risks and dangers for the participants in the time of fieldwork research to the respondents. All the study participants was informed about the purpose of the study and finally, their permission was obtained before the actual data collection process started.

3.9. Validity and Reliability of Research Instruments

3.9.1. Validity

Expert opinions, literature search, and pre-testing of close and open-ended questions helped to establish content validity. The researcher prepared the instruments in close consultation with the advisor to ensure that the items in the questionnaire covered all the areas under investigation.

3.9.2. Reliability

Reliability is the consistency of a certain measurement or the degree to which an instrument measures the same way each time it is used under the same condition with the same subjects. In short, it is the repeatability of a certain measurement. Reliability is not measured, it is estimated. Reliability as the degree to which a measurement technique can be depended upon to secure consistent results upon repeated application.

Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of sample items are as a group. It is considered to be a measure of scale reliability. A "high" value for alpha does not imply that the measure is one-dimensional. Technically speaking, Cronbach's alpha is a coefficient of reliability (or consistency). According to Hair (as cited by Mengstie, 2019), if α is greater than 0.7, it means that it has high reliability, 0.5 is sufficient, and if α is smaller than 0.3, then it implies that there is low reliability.

Table 3.2. Reliability test results

Reliability Statistics			
Variables		No. Of items	Cronbach's alpha
Information about risk management plan		6	0.965
Risk Management Practice	Identification	8	0.973
	analysis and evaluation	7	0.973
	response strategies	13	0.984
management tool and techniques		4	0.971
management challenges		3	0.899
Valid		41	0.96

Source: Filed survey, (2022)

Table 3.2. revealed that the Cronbach's alpha results for all dimensions and constructs are more than the threshold value of 0.7. Therefore, each dimension Cronbach's alpha result is higher than the minimum required (a = .70). In addition, the overall Cronbach's alpha result of the 41 items was found to be 0.96 which is higher than the min acceptable value. It can be concluded the scale has good internal consistency.

CHAPTER FOUR

DATA ANALYSIS AND DESCRIPTION

4.1. Introduction

The results and discussion below is devised in three parts in line with the objectives of this research and also the sections of the questionnaire. These divisions can help tackle one objective at a time. The first part tries to present the findings of the questions asked to test the level of awareness, and general information about risk management practices of Ayat Real State, and discuss about the findings of the researcher.

The second part of the results and discussion contains the findings of the questions directed towards identifying the level of use of different risk management practices and the results are discussed and use likert scale with five points:-

1. Not Applied
2. Applied to some extent
3. Well applied
4. Greatly applied
5. Applied to very great extent

And is focused on risk management tools and techniques used, and present the results of the questions directed towards, and challenges of risk management practice and the findings are discussed.

Finally respondent opinions wear analyzed and discussed. To analyze the final part the researcher used the ideas mentioned frequently as a rank.

4.2. Respondent's personal information and Awareness to concept of risk management

Table 4.1 : Current working position of respondents

Work Position in Company

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Project Manager	8	9.8	9.8	9.8
	Project Engineer	8	9.8	9.8	19.5
	Project implementation team member	58	70.7	70.7	90.2

	Risk officer	4	4.9	4.9	95.1
	Risk auditor	4	4.9	4.9	100.0
	Total	82	100.0	100.0	

Source : Field Survey, (2022)

Table 4.1 shows that the work position of respondents, 70.7% of the respondent's are a member of project implementation team, 9.8% of respondents are project engineer and project manager, 4.9 of them wear risk officer, and risk auditor.

Table 4.2 : Education level of respondent's

Education Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	PHD	2	2.4	2.4	2.4
	MSc	20	24.4	24.4	26.8
	BSc	60	73.2	73.2	100.0
	Total	82	100.0	100.0	

Source : Field Survey, (2022)

Table 4.2 shows that the education level of respondents, of which 73.2% of them are first degree holder, 24.4% of them are second degree holder, and 2.4% of them are PhD level.

Table 4.3 : Working experience of respondents

Working Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 5 years	44	53.7	53.7	53.7
	Between 6 to 10 years	15	18.3	18.3	72.0
	Between 11 to 15 years	12	14.6	14.6	86.6
	Between 16 to 20 years	7	8.5	8.5	95.1
	Above 20 years	4	4.9	4.9	100.0
	Total	82	100.0	100.0	

Source : Field Survey, (2022)

Table 4.3 show that 53.7% of respondents have below five years experience, 18.3% of them have between six to ten years of experience, 14.6% of them have between

eleven to fifteen years of experience, 8.5% of them have between sixty to twenty years of experience, and 4.9% of them have above twenty years of experience.

Risk is defined in different ways by various researchers as shown in the literature review. Most standards used risk in its negative sense and for the purpose of this research this negative term was adapted. Hence risk is an uncertain event or set of circumstances if they occur would have a negative effect on one or more of the project objectives.

Risk management is a very important part of any project which tries to identify, analyze and evaluate risk to minimize the effect it has on projects.

From the questionnaire survey of this research, it was discovered most of the Respondents were aware of the concept of risk management practices.

Table 4.4 Respondents Awareness of risk management.

Are you aware of risk management practices?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	82	100.0	100.0	100.0

Source : Field Survey, (2022)

Table 4.4, shows the responses of the respondents when they were asked if they were aware of the concept of risk management practices. Among the 82 respondents all of them responded yes.

Table 4.5 How do you became aware of risk management.

How do you became aware of risk management?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Study	71	86.6	86.6	86.6
	Training	11	13.4	13.4	100.0
	Total	82	100.0	100.0	

Source : Field Survey, (2022)

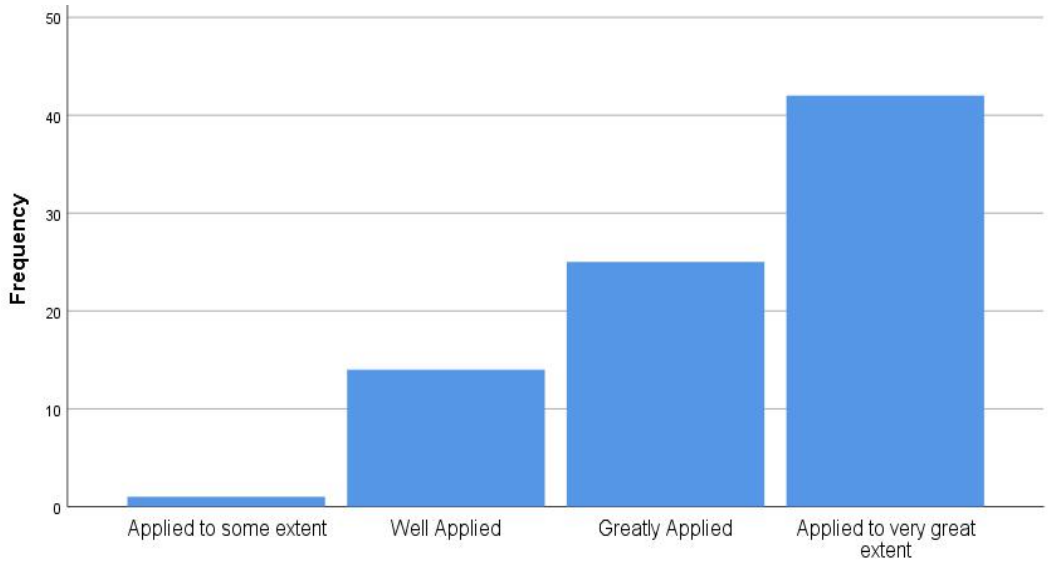
Table 4.5. 86.6% of respondents are became aware of risk management practices through study and 13.4% of them through training.

From the above Tables, it can be summarized that all of the employees who participated in the survey have been evaluated on basis their knowledge of risk management practices and have a high awareness.This shows that all of the respondents may feel confident that their knowledge about the principle of risk management practice is enough to implement applicable risk management in Ayat Real State during construction projects.

4.3. General Information about Risk Management Plan

On this section of the survey, The respondents was asked about Effective and Efficient risk management plan; Including stakeholder on developing risk management plan, use of previous data for risk management; About developing risk breakdown structure; proper cost and resource allocation and risk management activity definition in schedule?

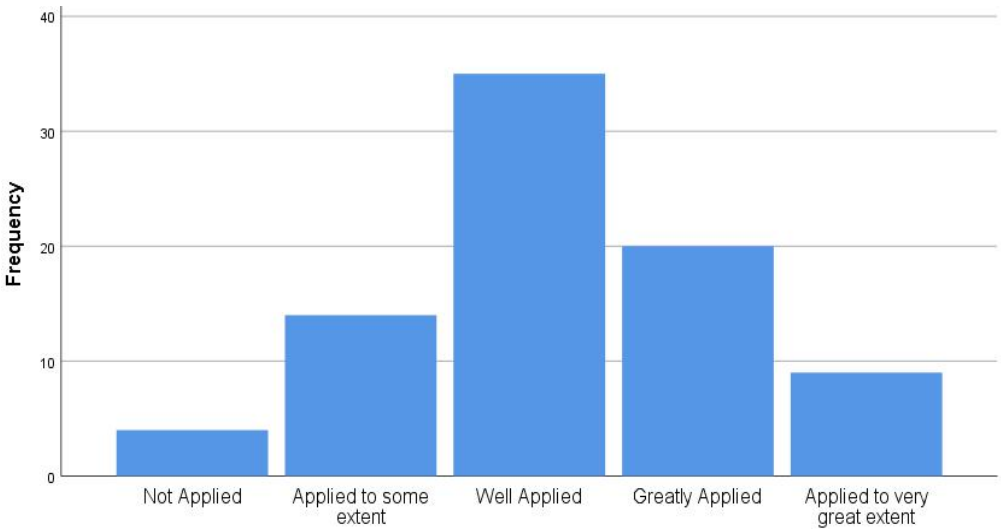
Figure 4.1 Effective and Efficient risk management plan



Source : Field Survey, (2022)

As indicated by the figure above, the information gathered from the respondents that shows 51.2% of the respondents have answered that the company have effective and efficient risk management plan to a very great extent, 30.5% of them wear respond that the company have greatly applied risk management plan, and 17.1% of respondents have answered the company have a well applied risk management plan.

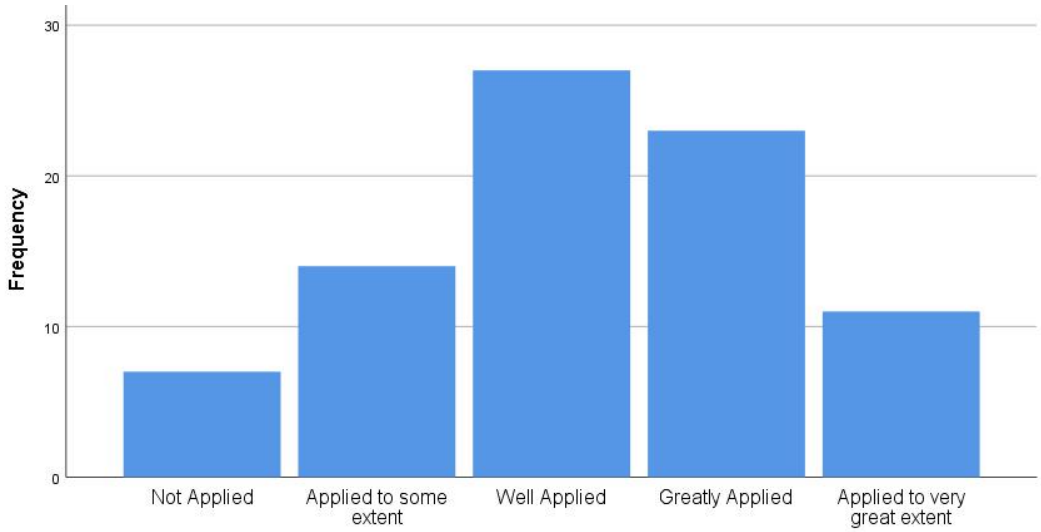
Figure 4.2 : Include key stakeholders in developing risk management plan



Source : Field Survey, (2022)

Figure 4.2, shows 42.7% of the respondents have answered that the company includes key stakeholders on developing risk management plan to well applied level, 24.4% of them wear respond that the company have greatly applied inclusive level of stakeholders, 17.1% of respondents have answered to some extent, 13% of respondents have answered applied to great extent, and 4.9% of respondents have answered not applied.

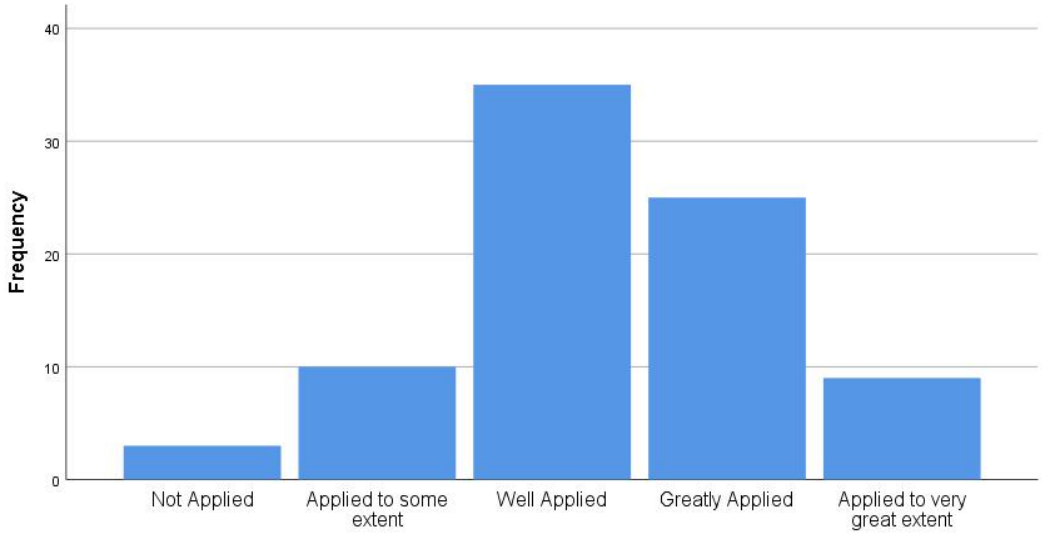
Figure 4.3 : Use previous data for developing risk management plan



Source : Field Survey, (2022)

Figure 4.3 shows that, to the question on the use of previous data for developing risk management plan, 32.9% of respondents have answered the company have well applied risk management plan, 28% of respondents answered greatly applied, 17.1% responded applied to some extent, 13.4% responded applied to very great extent and 8.5% responded Not applied.

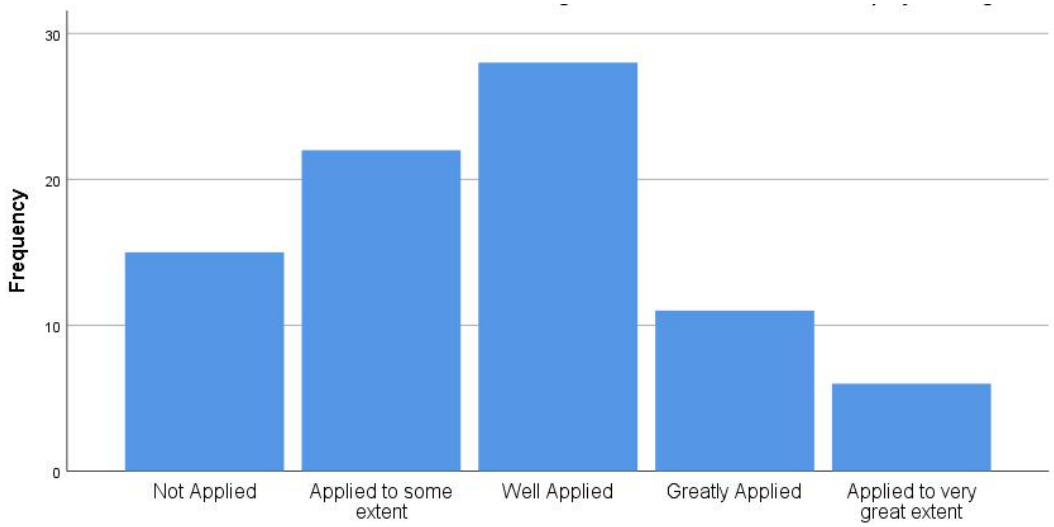
Figure 4.4 Use risk breakdown structure for risk categorization



Source : Field Survey, (2022)

Figure 4.4 shows that to the question on the use of risk breakdown structure to define risk categories, 35% of respondents have answered the company have well applied risk breakdown structure for risk categorization, 30.5% of respondents answered greatly applied, 12.2% responded applied to some extent, 11% responded applied to very great extent and 3.7% responded Not applied.

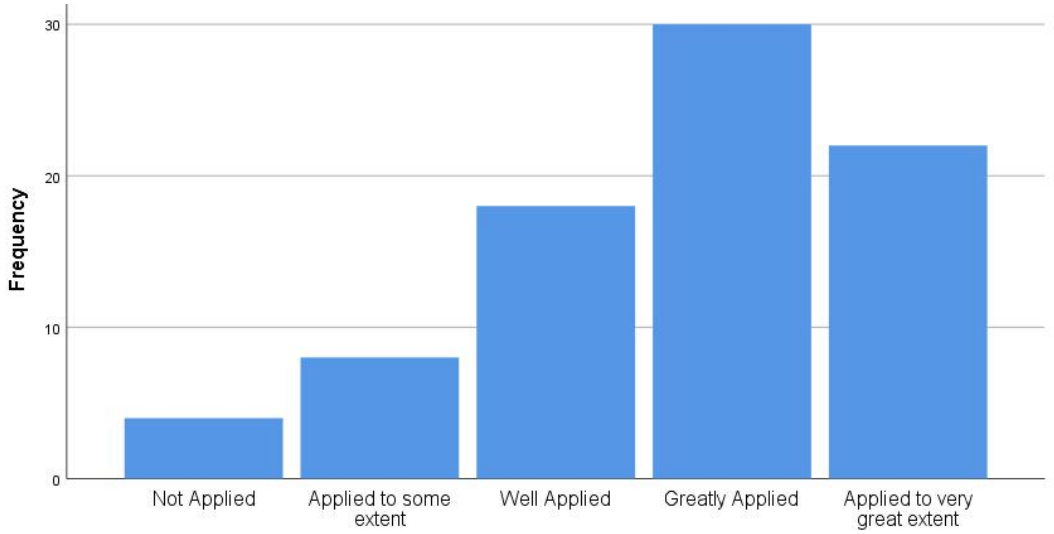
Figure 4.5 : Cost and resource allocation needed for risk management activities



Source : Field Survey, (2022)

Figure 4.5 shows that to the question on the resource and cost allocation needed for risk management activities included in the project budget, 34.1% of respondents have answered the company have well applied cost and resource allocation needed for risk management activities, 26.8% of respondents answered applied to some extent, 18% responded not applied, and 7.3% responded applied to very great extent.

Figure 4.6 : Risk management activities defined and included in schedule



Source : Field Survey, (2022)

Figure 4.6 shows that to the question on the risk management activities are defined and included in the schedule, 36.6% of respondents have answered the company have

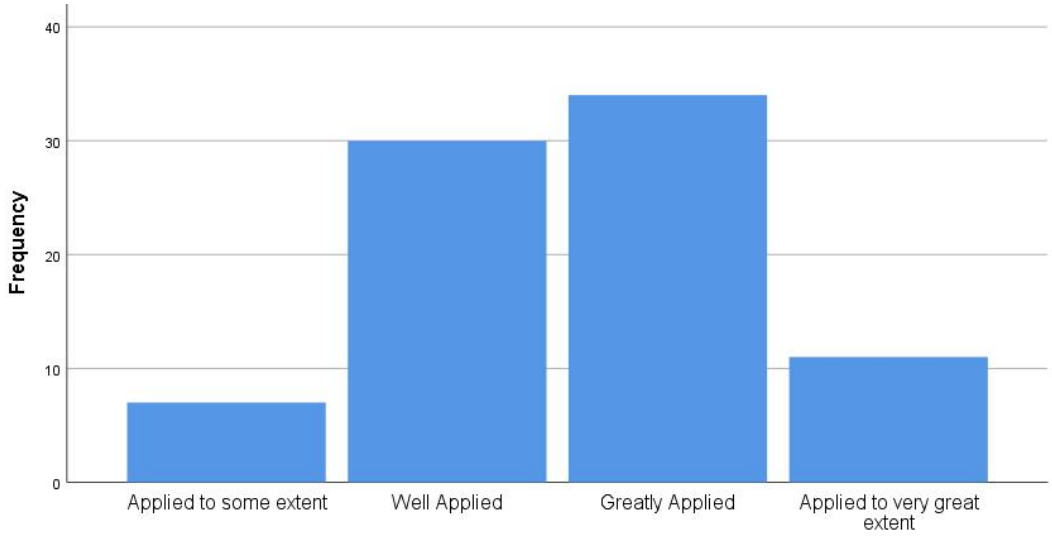
greatly applied risk management activities are defined and included in schedule, 26.8% of respondents answered applied to very great extent, 22% responded well applied, 9.8% responded applied to some extent, and 4.9% responded not applied.

Based on the response of the interviewee's, it can be observed that the company has applied to great extent risk management plan, but inclusiveness of stakeholders in the development risk plan, use of previous data for developing risk management plan, use of risk breakdown structure for risk categorization, and allocation of estimated cost and resource needed for risk management activities drop down to implemented to well accepted level.

4.4. Risk Management Practice

4.4.1. Risk Identification

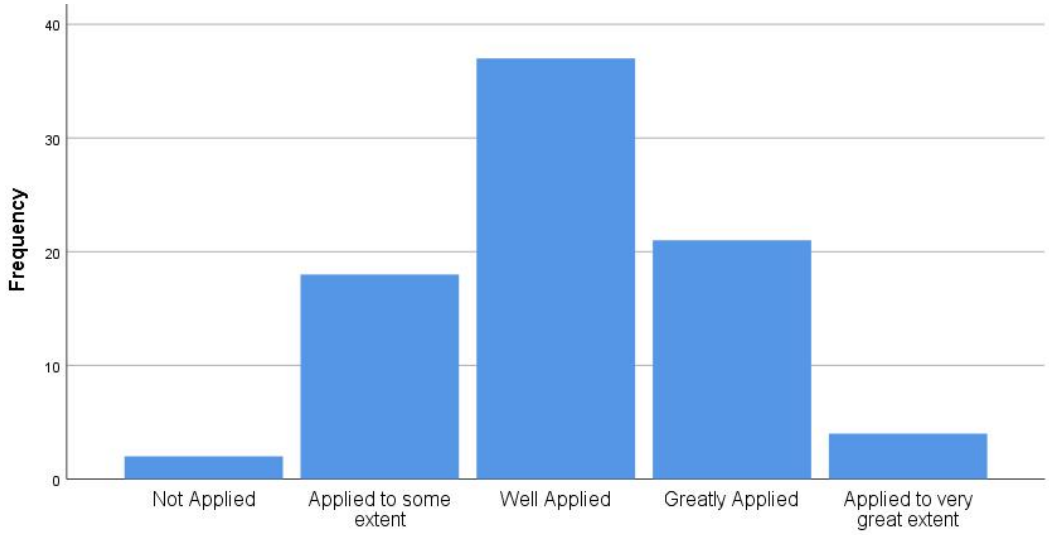
Figure 4.7. Use of process and tools for project risk identification



Source : Field Survey, (2022)

Figure 4.7. shows that on the use of process and tools for project risk identification, 41.5% responded greatly applied, 36.6% responded well applied, 13.4% responded applied to very great extent and 8.5% responded applied to some extent.

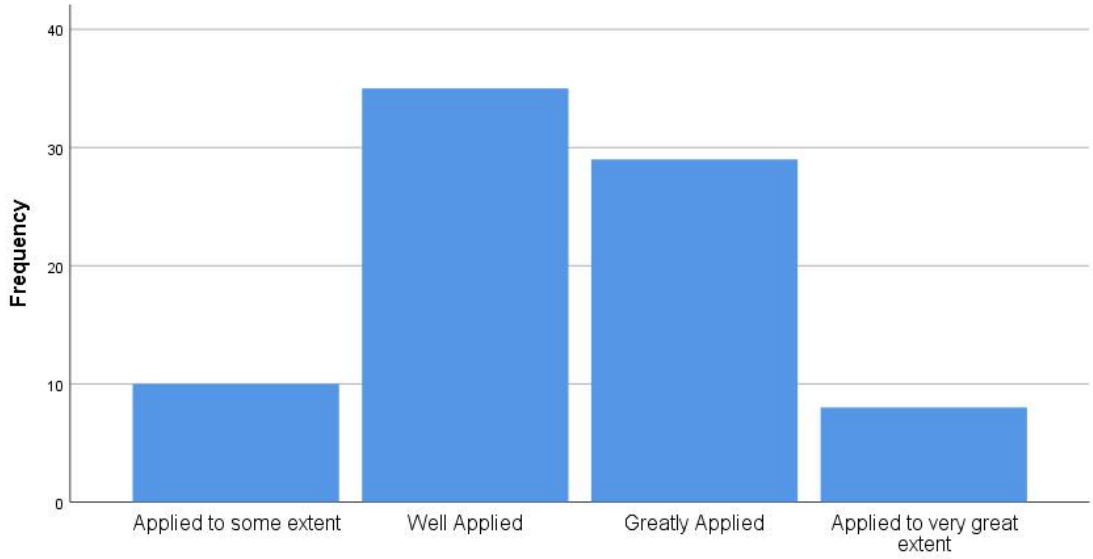
Figure 4.8. Use of brainstorming session for project risk identification



Source : Field Survey, (2022)

Figure 4.8. shows that on the use brainstorming session for risk identification, 45.1% responded well applied, 25.6% responded greatly applied, 22% responded applied to some extent, 4.9% responded applied to very great extent, and 2.4% responded not applied.

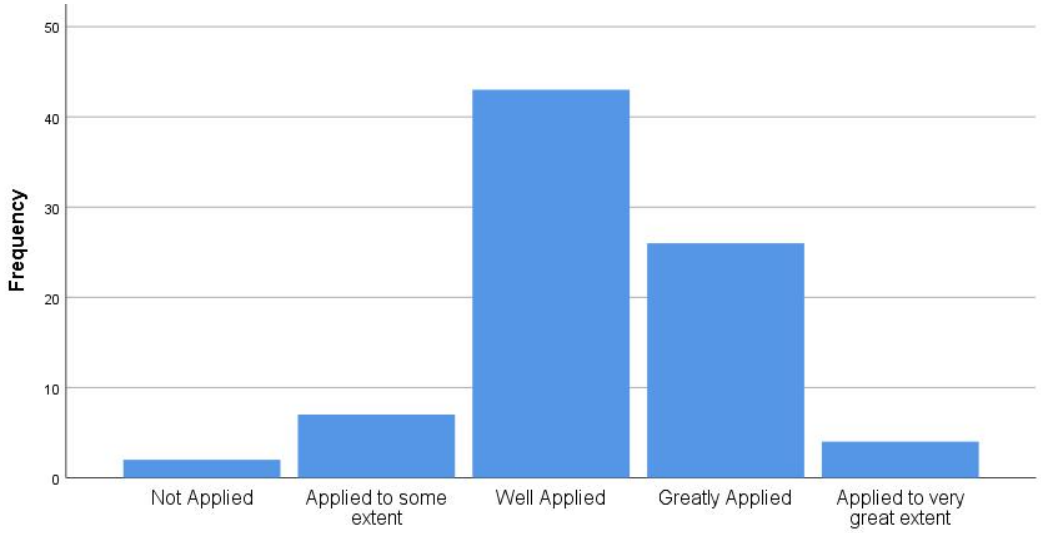
Figure 4.9. Use of checklists for project risk identification



Source : Field Survey, (2022)

The Following Figure summarize the response that for the use of cheek lists for risk identification, 42.7% responded well applied, 35.4% responded greatly applied 12.2% responded applied to some extent, and 9.8% responded applied to very great extent .

Figure 4.10. Use of risk registry for project risk identification

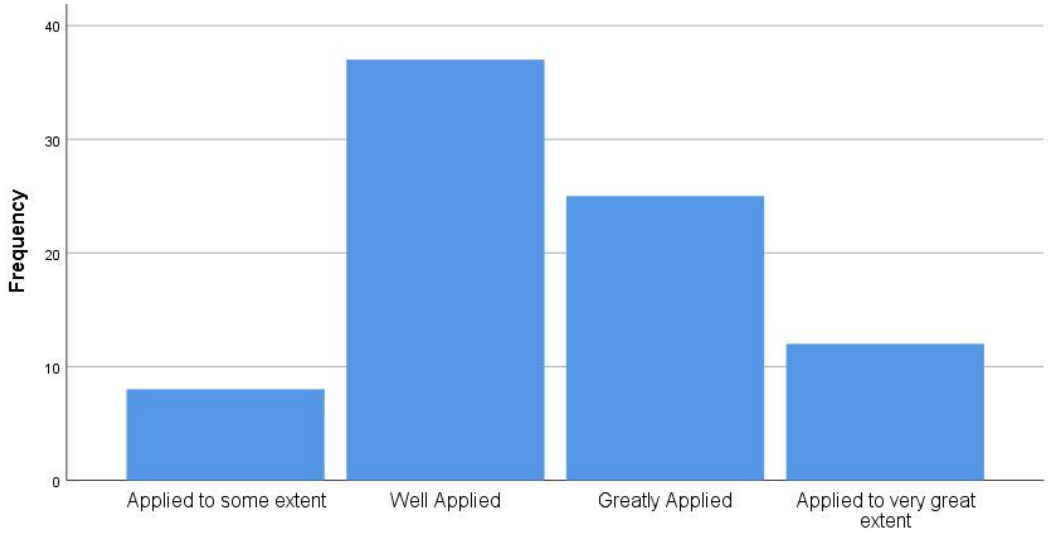


Source : Field Survey, (2022)

Figure 4.10. summarize the response that for the use of risk registry for

risk identification, 52.4% responded well applied, 31.7% responded greatly applied, 8.5% responded applied to some extent, 4.9% responded applied to very great extent, and 2.4% responded not applied.

Figure 4.11. Use of expert judgment for risk identification

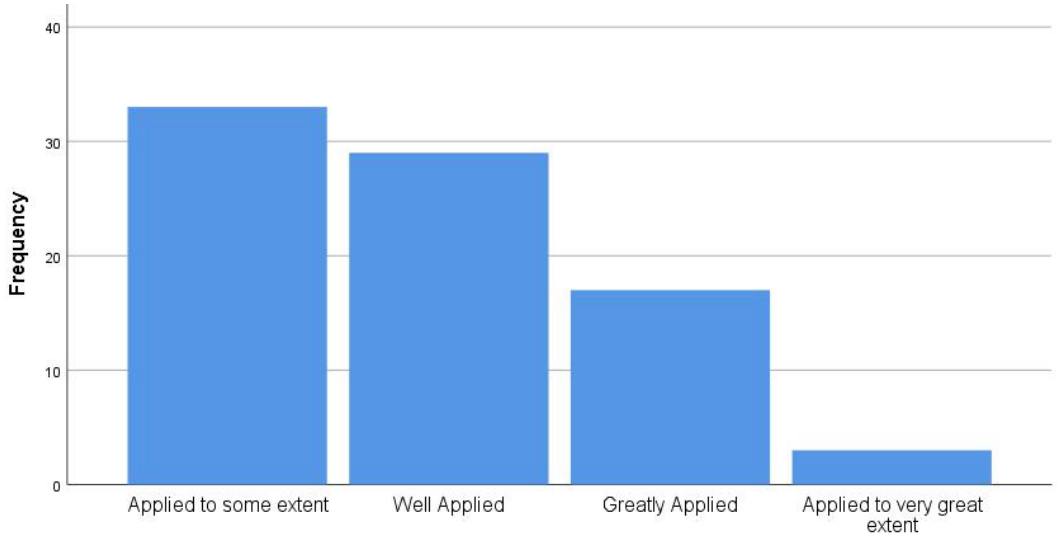


Source : Field Survey, (2022)

Figure 4.11. summarize the response that for the use of expert judgment

for risk identification, 45.1% responded well applied, 30.5% responded greatly applied 14.6% responded applied to very great extent and 9.8% responded applied to some extent.

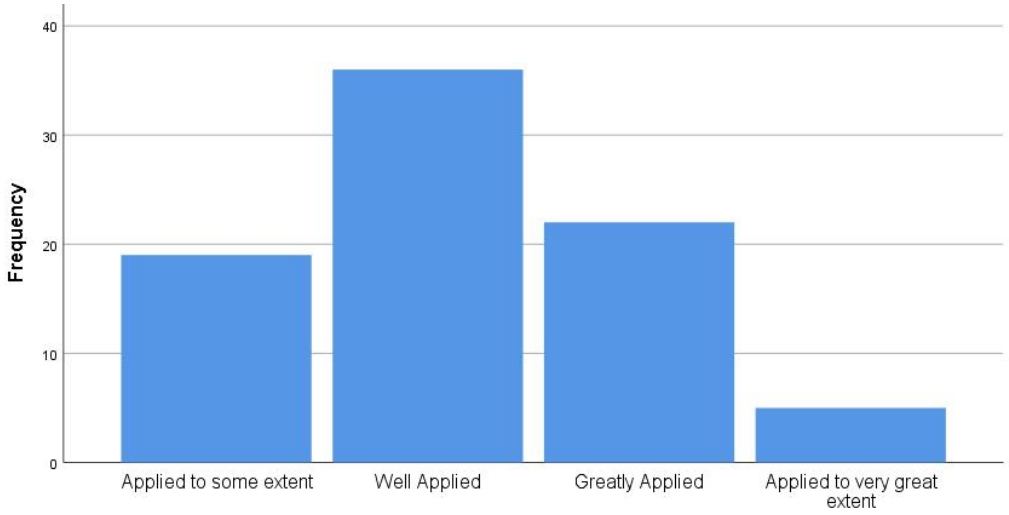
Figure 4.12. Use of past experience and risk document



Source : Field Survey, (2022)

Figure 4.12. summarize the response of using past experience and review of risk documentation, 40.2% responded well applied, 35.4% responded applied to some extent, 20.7% responded greatly applied and 3.7% responded applied to very great extent.

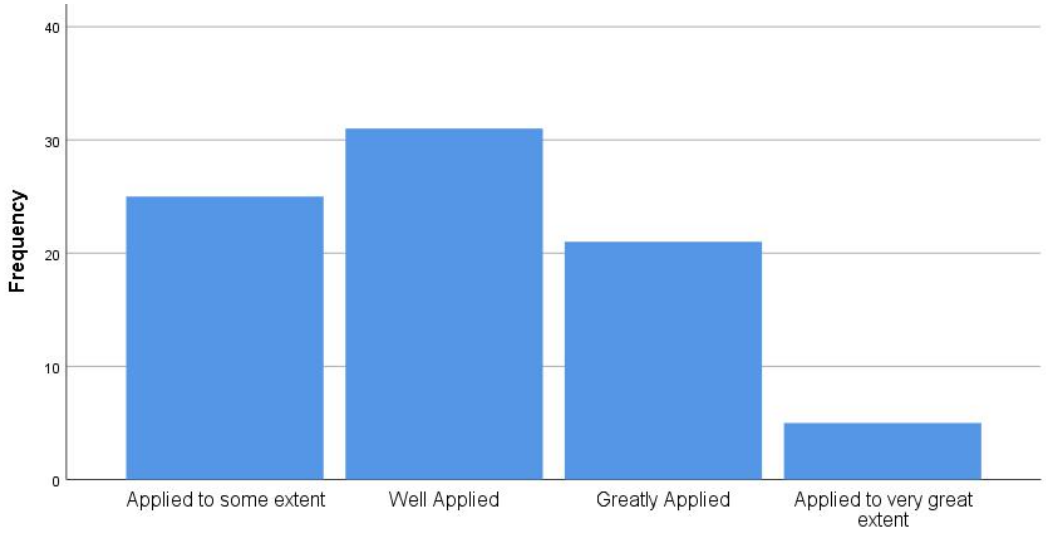
Figure 4.13. Including key project participants for risk identification



Source : Field Survey, (2022)

Figure 4.13. shows that to the question on the inclusion of key project participants for risk identification, 43.9% of respondents have answered the company have well applied inclusiveness of key project participants for risk identification ,26.8% of respondents answered greatly applied, 23.2% of respondents answered applied to some extent, and 6.1% responded applied to very great extent.

Figure 4.14. Categorization of identified risk



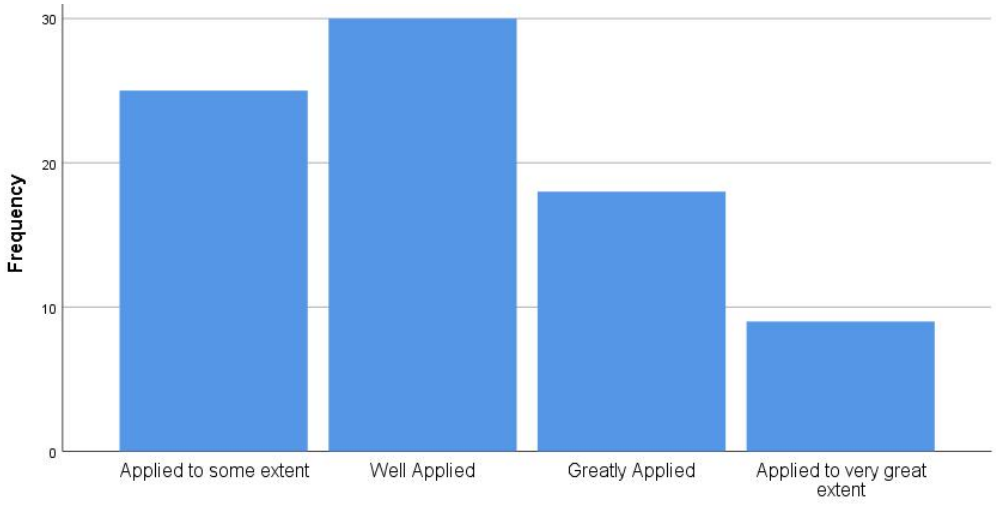
Source : Field Survey, (2022)

Figure 4.14. shows that to the question on the use of categories for identified risks, 37.8% of respondents have answered the company have well applied categories for identified risks, 30.5% of respondents answered applied to some extent, 25.6% of respondents answered greatly applied, and 6.1% responded applied to very great extent.

Based on the response of the interviewee's, it can be observed that the company has applied risk identification, that uses cheek lists, risk registry, brainstorming session and includes key participants of the project for identification. Therefore the company has implemented to well accepted level.

4.4.2. Risk Analysis and Evaluation

Table 4.15 : Have a established qualitative risk analysis method and tools.

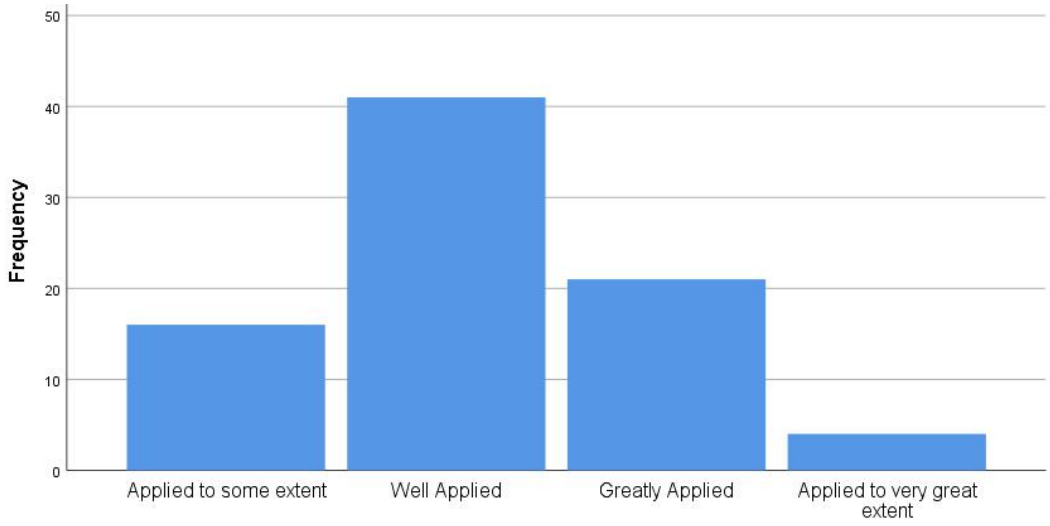


Source : Field Survey, (2022)

Figure 4.15. summarizes response in relation to organization having established qualitative risk analysis methods and tools, 36.6% of them responded well applied,

30.5% responded applied to some extent, 22% responded greatly applied and 11% responded applied to very great extent.

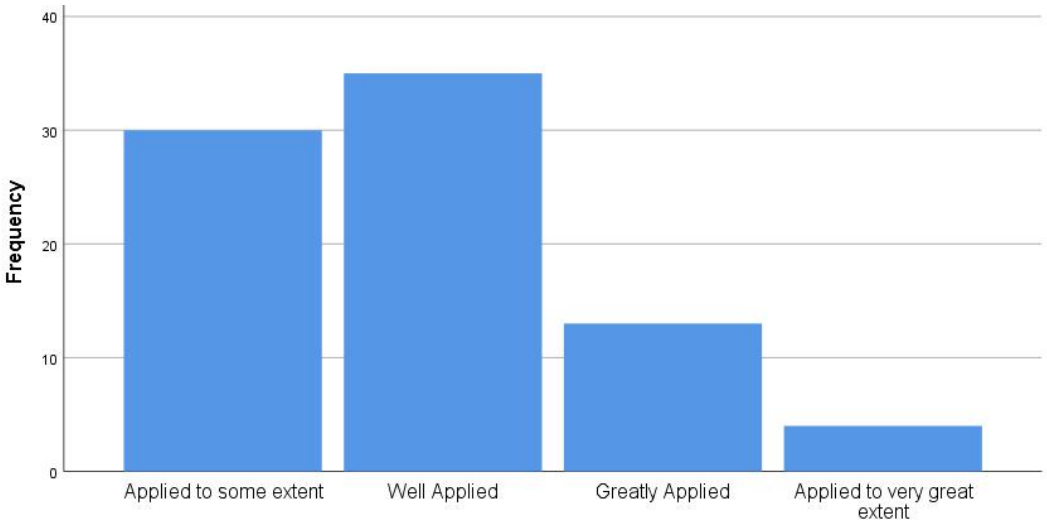
Table 4.16 : Having a process to quantify risks



Source : Field Survey, (2022)

Figure 4.16. summarizes response in relation to organization having a process in place to quantify risks, 50% of them responded well applied, 25.6% responded greatly applied, 19.5% responded applied to some extent and 4.9% responded applied to very great extent.

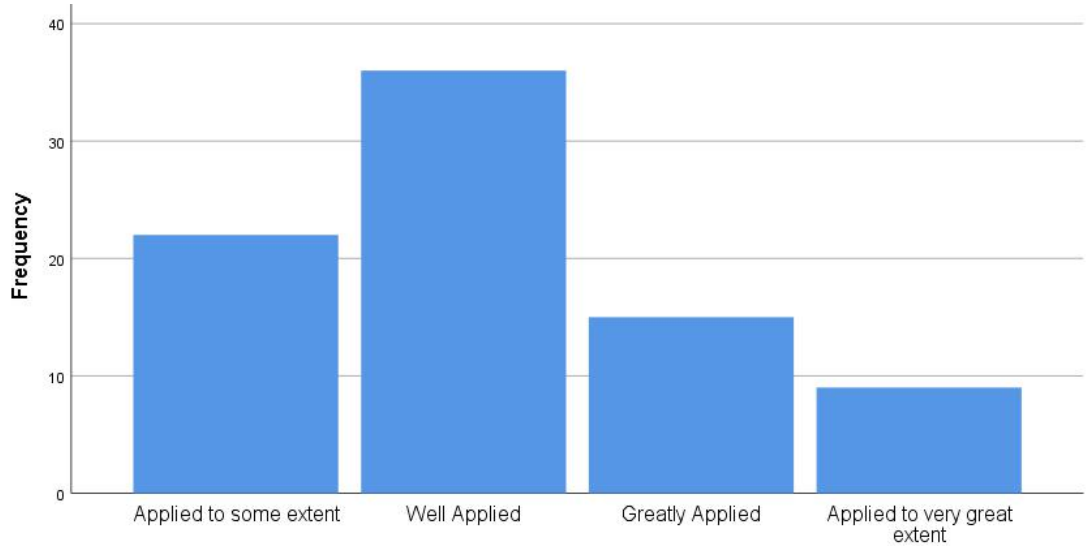
Figure 4.17 : Cause and effect risk analysis



Source : Field Survey, (2022)

Figure 4.17. summarizes response related to cause and effect risk analysis, 42.7% responded well applied, 36.6% responded applied to some extent, 15.9% responded greatly applied and 4.9% responded applied to very great extent.

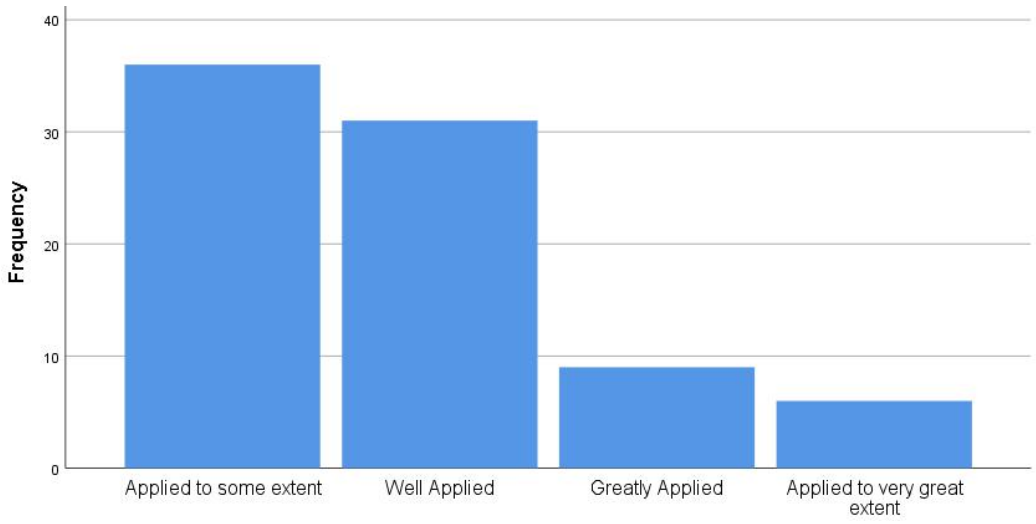
Figure 4.18 : Contingency plan for risk analysis



Source : Field Survey, (2022)

Figure 4.18. summarizes response related to contingency plan for risk analysis, 43.9% responded well applied, 26.8% responded applied to some extent, 18.3% responded greatly applied, and 11% responded applied to very great extent.

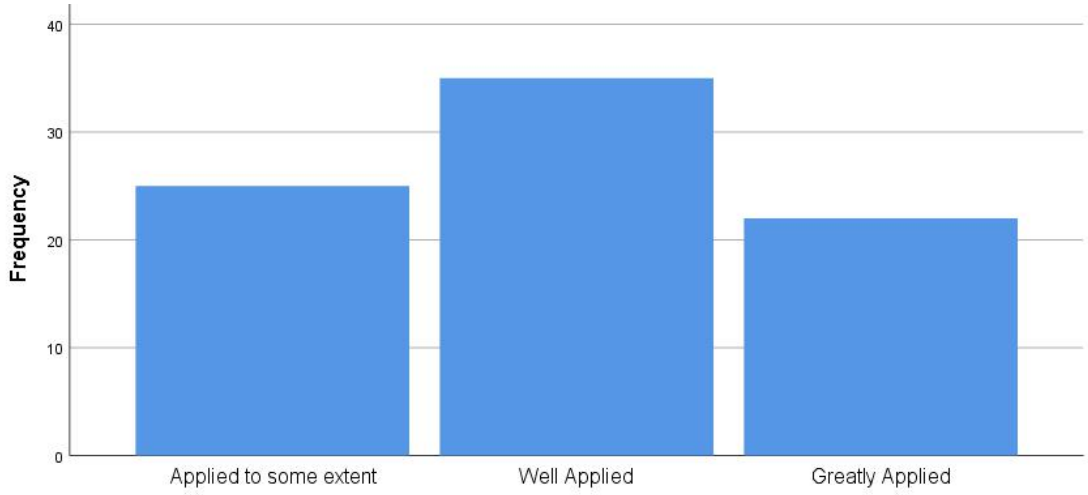
Figure 4.19 : Probability of achieving specific project objective



Source : Field Survey, (2022)

Figure 4.19. summarizes response related to the probability of achieving specific project objective, 43.9% responded applied to some extent, 37.8% responded well applied, 11% responded greatly applied, and 7.3% responded applied to very great extent.

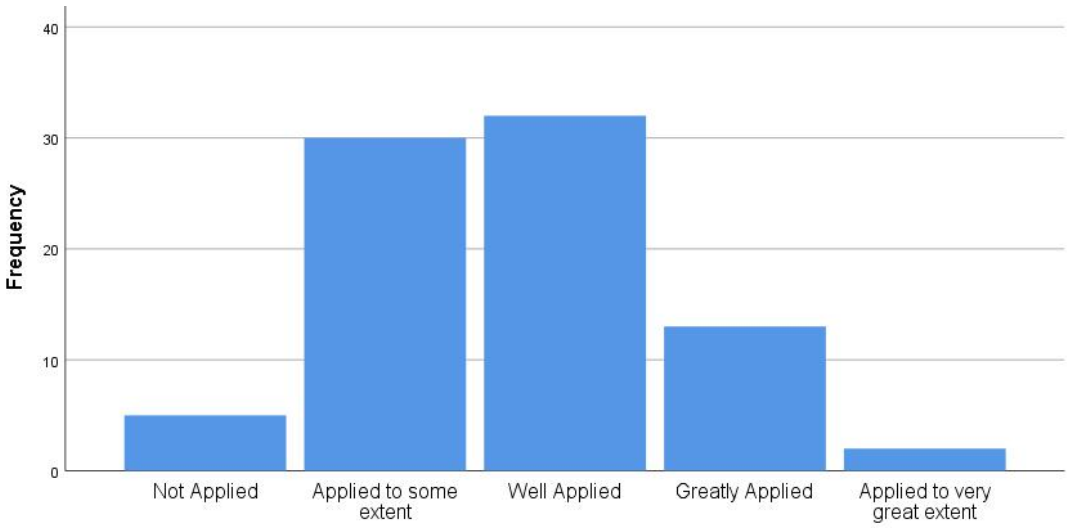
Figure 4.20: Identifying risks that require most attention



Source : Field Survey, (2022)

Figure 4.20. summarizes response related to identifying risks that require the most attention by quantifying their relative contribution to the overall project risk management, 42.7% responded well applied, 30.5% responded applied to some extent, and 26.8% responded greatly applied.

Figure 4.21: Risk matrix that defines probability and impact of risk



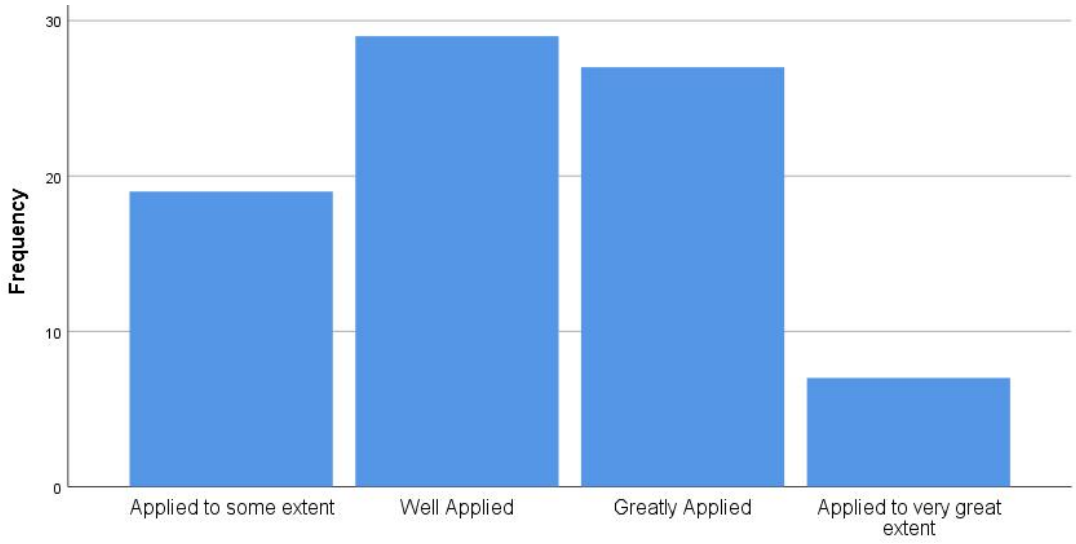
Source : Field Survey, (2022)

Figure 4.21. shows that having risk matrix that define probability and impacts of the risks, 36.6% of respondents have answered that applied to some extent, 39% well applied, 15.9% greatly applied, 2.4% applied to very extent, and 6.1% respondents have answered not applied.

Based on the response of the interviewee's, it can be observed that the company has applied risk analysis and evaluation practices, includes a process in place to quantify risk, contingency plan for risk analysis, a probability of achieving specific objectives, and identifying risk that require most attention. Therefor the researcher concluded that company has implemented to well accepted level.

4.4.3. Risk Response Strategies

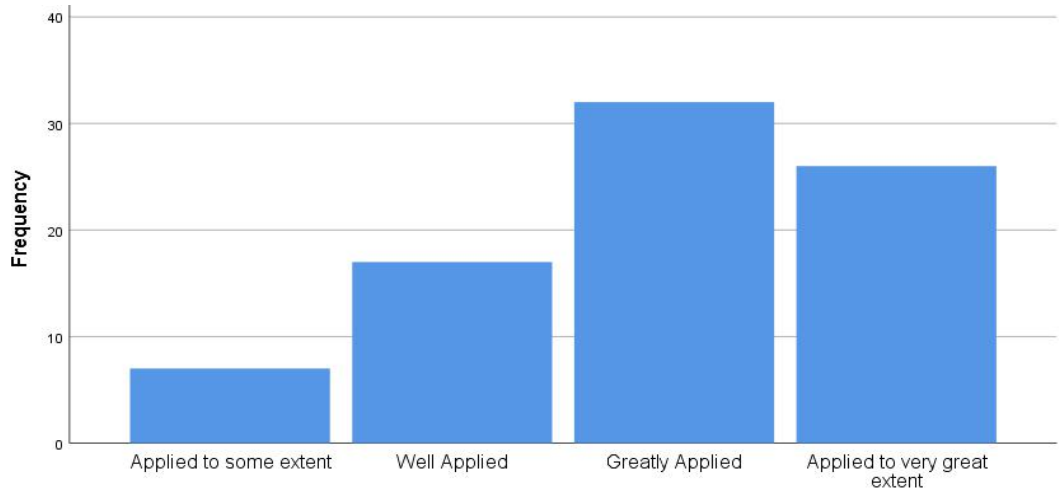
Figure 4.22: Techniques of risk response plan



Source : Field Survey, (2022)

Figure 4.22. Summarize risk response techniques are in place, 35.4% of respondents have answered that well applied, 32.9% applied greatly, 23.2% applied to some extent, and 8.5% applied to very great extent.

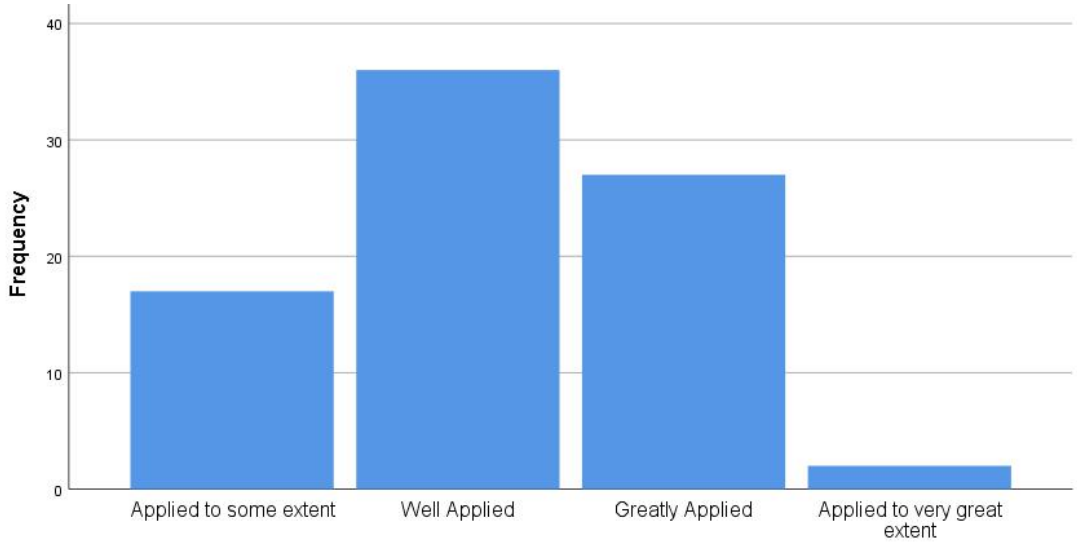
Figure 4.23: Use of risk avoidance techniques



Source : Field Survey, (2022)

Figure 4.23. about risk avoidance techniques are 39% of respondents have answered that greatly applied, 31.7% applied to very great extent, 20.7% well applied, and 8.5% to some extent.

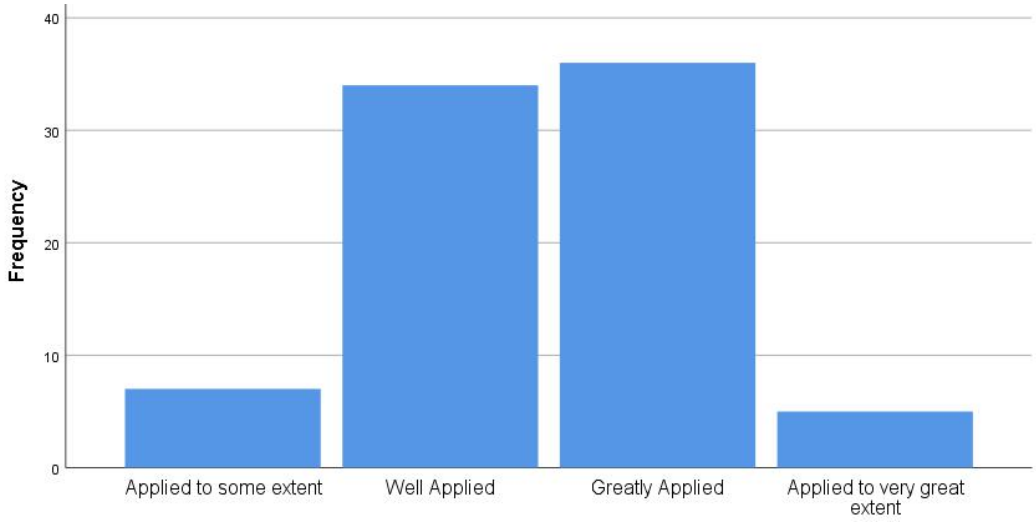
Figure 4.24: Contingency plan for risk response strategies



Source : Field Survey, (2022)

Figure 4.24. shows that the use of contingency plan for risk response strategies, 43.9% of the respondents have answered that well applied, 32.9% greatly applied, 20.7% applied to some extent, and 2.4% applied to very great extent.

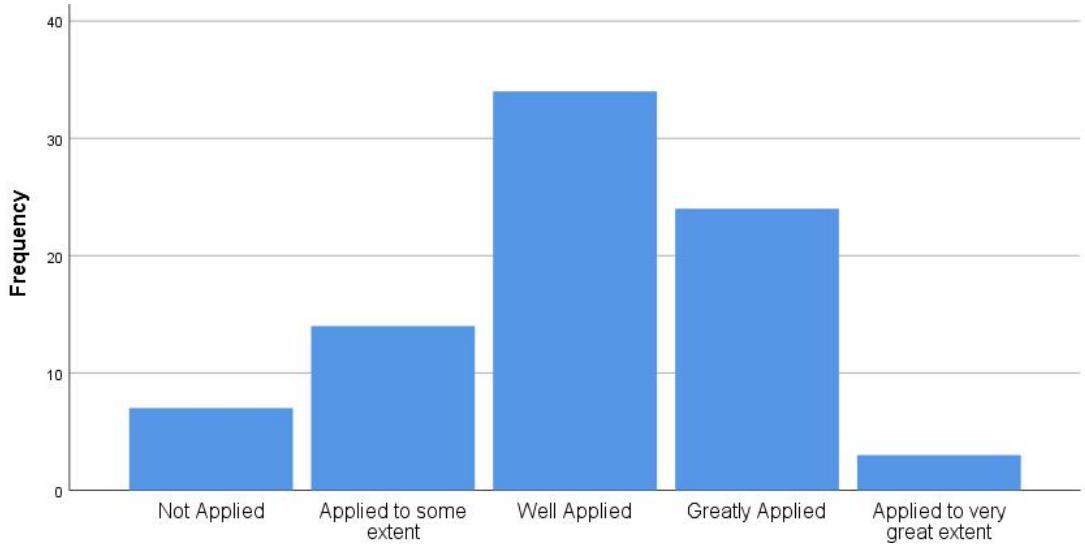
Figure 4.25 : Risk transfer techniques to third party



Source : Field Survey, (2022)

Figure 4.25. shows that the use of risk transfer techniques to third party, 43.9% the respondents have answered that greatly applied, 41.5% well applied, 6.1% applied to very great extent, and 8.5% applied to some extent.

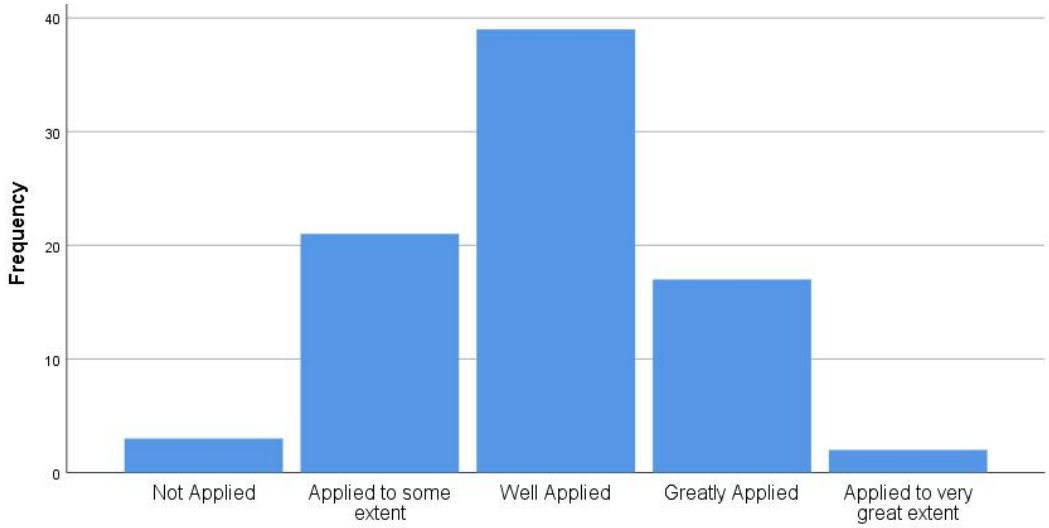
Figure 4.26 : Risk Acceptance / Retention



Source : Field Survey, (2022)

Figure 4.26. summarizes the use of risk acceptance and retention, 41.5% of respondents have answered that the organization have a well applied risk acceptance and retention technique, 29.3% of respondents answered that greatly applied, 17.1% applied to some extent, 8.5% of respondents have answered not applied, and 3.7% of respondents answered that applied to very great extent.

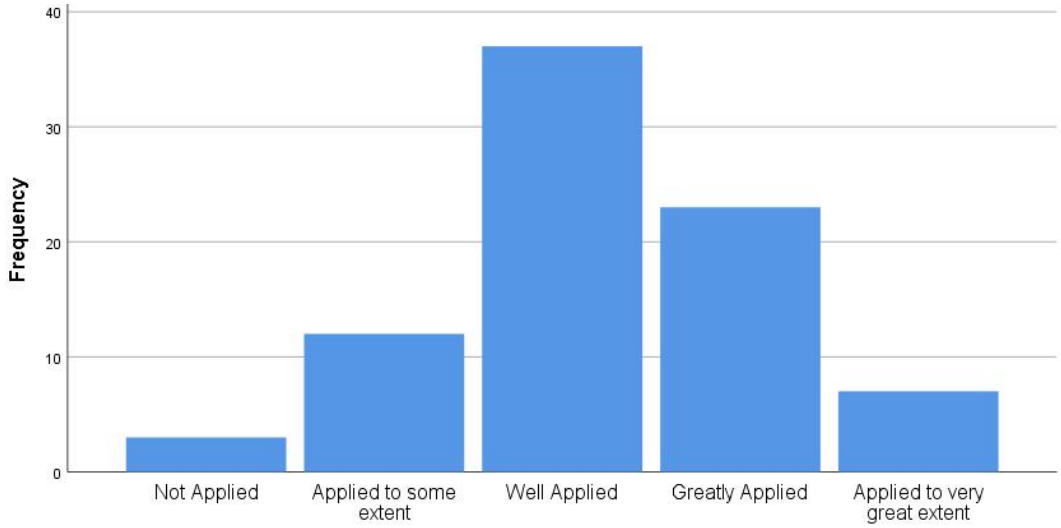
Figure 4.27 : Risk reduction to acceptable threshold level



Source : Field Survey, (2022)

Figure 4.27.summarizes the use of risk reduction to acceptable threshold, 47.6% of respondents have answered that the organization have a well applied risk reduction to acceptable threshold technique, 25.6% of respondents answered that applied to some extent, 20.7% of respondents have answered that greatly applied, 3.7% of respondents have answered not applied, and 2.4% of respondents answered that applied to very great extent.

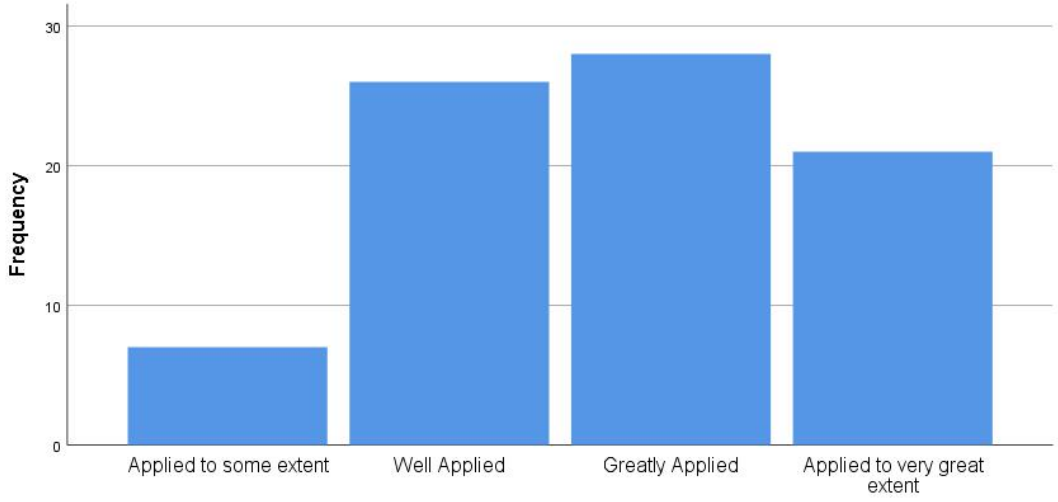
Figure 4.28 : Use combination of retention, reduction, and transfer response to risk



Source : Field Survey, (2022)

Figure 4.28. summarizes, the use of retention, reduction, and transfer of risks. 45.1% of respondents have answered that the organization have a well applied combination of risk response technique, 28% greatly applied, 14.6% applied to some extent, 8.5% applied to very great extent, and 3.7% of respondents have answered not applied.

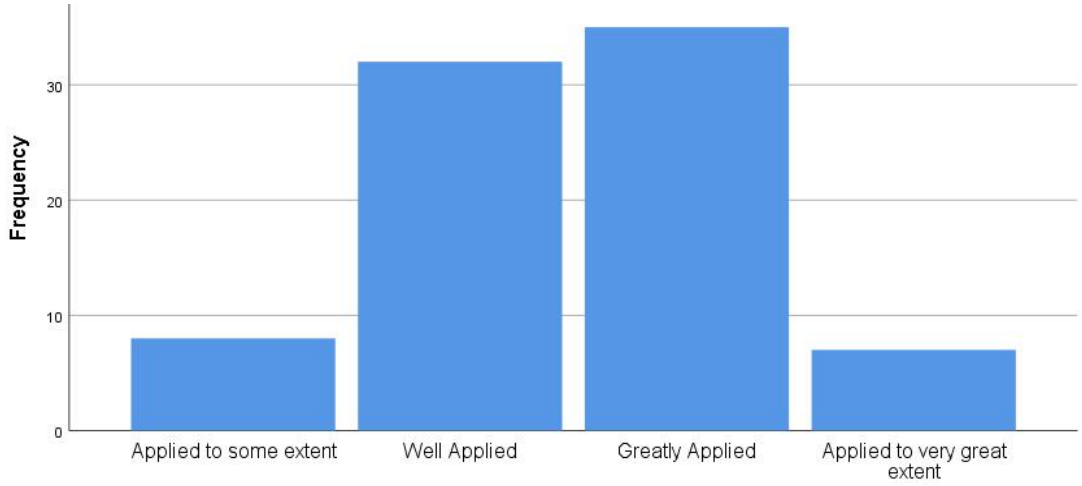
Figure 4.29 : Personnel assigned for each agreed risk response



Source : Field Survey, (2022)

Figure 4.29. show that personnel are assigned for agreed risk responses, 34.1% of respondents have answered that the organization have a greatly applied personnel assigning technique for agreed risk response, 31.7% well applied, 25.6% applied to very great extent, and 8.5% of respondents have answered applied to some extent.

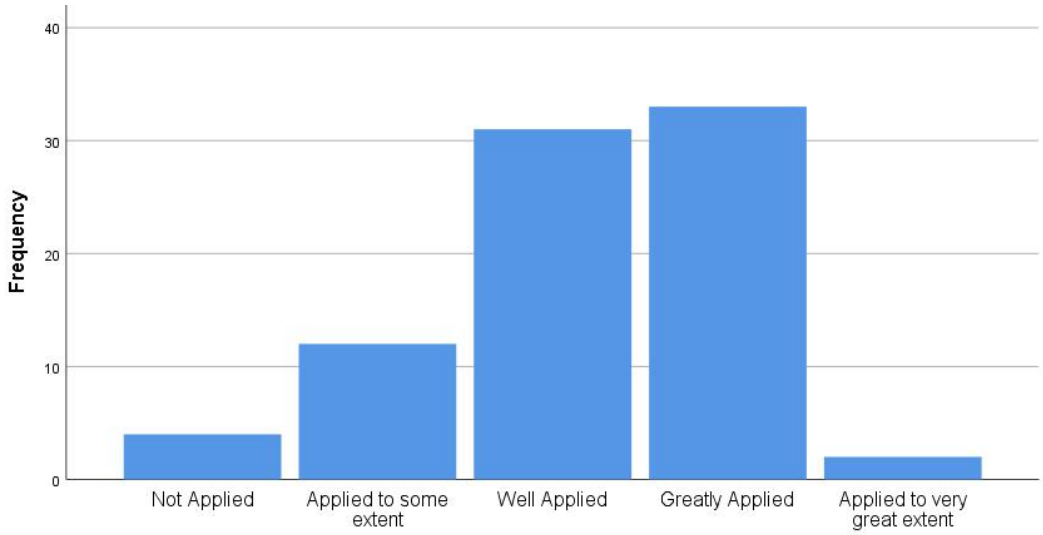
Figure 4.30 : Contingency plan is allocated for time



Source : Field Survey, (2022)

Figure 4.30. summarizes that contingency plan is allocated for time, 42.7% of respondents have answered that the organization have a greatly applied allocation of contingency plans with time technique, 39% of respondents have answered that well applied, 9.8% of respondents have answered applied to some extent, and 8.5% of respondents have answered that applied to very great extent.

Figure 4.31 : Contingency plan is allocated for cost



Source : Field Survey, (2022)

Figure 4.31. summarizes that contingency plan is allocated for cost, 40.2% of respondents have answered that the organization have a greatly applied allocation of contingency plans with cost technique, 37.8% of respondents have answered that well applied, 14.6% of respondents have answered applied to some extent, 4.9% of respondents have answered not applied, and 2.4% of respondents have answered that applied to very great extent.

Based on the response of the interviewee's, it can be observed that the company has applied risk response strategies, included assigned techniques in place, risk acceptance, reduce risk to acceptable threshold level, assigned personals for risk response, and contingency plan allocated with time and cost. Therefore the researcher concluded that the company has implemented to well accept level.

4.5. Risk Management tools and techniques

Table 4.6 : Tools and techniques used for risk management plan

Existence of Any tools/techniques used for risk management planning?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Applied	2	2.4	2.4	2.4
	Applied to some extent	7	8.5	8.5	11.0
	Well Applied	37	45.1	45.1	56.1
	Greatly Applied	23	28.0	28.0	84.1
	Applied to very great extent	13	15.9	15.9	100.0
	Total	82	100.0	100.0	

Source : Field Survey, (2022)

Table 4.6. shows the existence of tool and techniques for risk management planning, 45.1% of the respondents have answered that well applied, 28% greatly applied, 15.9% applied to very great extent, 8.5% applied to some extent , and 2.4% not applied.

Figure 4.7 Tools and techniques for risk identification

Existence of Any tools/techniques used for risk management identification?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Applied	3	3.7	3.7	3.7
	Applied to some extent	14	17.1	17.1	20.7
	Well Applied	33	40.2	40.2	61.0
	Greatly Applied	24	29.3	29.3	90.2
	Applied to very great extent	8	9.8	9.8	100.0
	Total	82	100.0	100.0	

Source: Filed survey (2022)

Table 4.7. shows the existence of tool and techniques used for risk identification, 40.2% well applied, 29.3% greatly applied, 17.1% applied to some extent, 9.8% applied to very great extent, and 3,7% not applied.

Figure 4.8.Tools and techniques for risk analysis

Existence of any tools/techniques used for risk analysis?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Applied	5	6.1	6.1	6.1
	Applied to some extent	18	22.0	22.0	28.0
	Well Applied	30	36.6	36.6	64.6
	Greatly Applied	20	24.4	24.4	89.0
	Applied to very great extent	9	11.0	11.0	100.0
	Total	82	100.0	100.0	

Source: Filed survey (2022)

Table4.8. shows the existence of tool and techniques used for risk analysis, 36.6% well applied, 24.4% greatly applied, 22% applied to some extent, 11% applied to very great extent, and 6.1% not applied.

Figure 4.9. Tools and techniques for risk response

Existence of any tools/techniques used for risk response?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Applied	2	2.4	2.4	2.4
	Applied to some extent	14	17.1	17.1	19.5
	Well Applied	37	45.1	45.1	64.6
	Greatly Applied	24	29.3	29.3	93.9
	Applied to very great extent	5	6.1	6.1	100.0
	Total	82	100.0	100.0	

Source: Filed survey (2022)

Table 4.9. shows that the existence of tool and technique used for risk response, 45.1 % of respondents have answered that the company have well applied risk

response, 29.3% greatly applied , 17.1% applied to some extent, 6.1% applied to very great extent, and 2.4% not applied.

Based on the response of the interviewee's, it can be observed that the company has applied risk management tool and techniques, including Microsoft project software and earned value measurement techniques. Therefore the researcher concluded that the company has implemented to well accepted level.

4.6. Challenges of Risk Management Practice

Table 4.10. Challenges related to construction issues

Does the organization face challenges related to construction issues? Such as Scarcity of labor and resource, design change, and Environmental effects.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Applied to some extent	11	13.4	13.4	13.4
	Well Applied	31	37.8	37.8	51.2
	Greatly Applied	26	31.7	31.7	82.9
	Applied to very great extent	14	17.1	17.1	100.0
	Total	82	100.0	100.0	

Source: Filed survey (2022)

Table 4.10. summarizes that challenges related to construction issues, 37.8 % well applied, 31.7% greatly applied, 117.1% Applied to very great extent, and 13.4% applied to some extent.

Table 4.11. Challenges related to financial and economical issues

Does the organization face challenges related to financial and economical issues? Such as Price Fluctuation and Inflation.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Applied to some extent	13	15.9	15.9	15.9
	Well Applied	30	36.6	36.6	52.4
	Greatly Applied	28	34.1	34.1	86.6
	Applied to very great extent	11	13.4	13.4	100.0
	Total	82	100.0	100.0	

Source: Filed survey (2022)

Table 4.11. shows that challenges related financial issues, 34.1% of respondents have answered that greatly applied, 36.6% well applied, 13.4% applied to very great extent and 15.9% applied to some extent.

Table 4.12. Challenges related to political and legal issues

Does the organization face challenges related to political and legal issues? Such as policy change and local law.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Applied	4	4.9	4.9	4.9
	Applied to some extent	33	40.2	40.2	45.1
	Well Applied	22	26.8	26.8	72.0
	Greatly Applied	16	19.5	19.5	91.5
	Applied to very great extent	7	8.5	8.5	100.0
	Total	82	100.0	100.0	

Source: Filed survey (2022)

Table 4.12. shows that challenges related to political and legal issues, 40.2% applied to some extent, 26.8% well applied, 19.5% greatly applied, 8.5% applied to very great extent, and 4.9% not applied.

Based on the response of the interviewee's, it can be observed that the company has faced challenges of risk management practices, including scarcity of labor and resource, design change, price fluctuation, inflation, and policy changes. Therefore the researcher concluded that the company deals with construction, financial, and political risks to well accepted level.

4.7. Benefits of having risk management plan

When the interviewees were asked to describe the benefits of risk management plan the majority of their responses include the reduction of project cost and time by helping avoid pitfalls that might occur during the project that affect this factors; helps to identify and manage project risks; provide better quality data for decision making; helps provide a framework to deal with project risks and helps form consistent and efficient work operation.

4.8. Categories of risks

In this section the researcher discussed that categories of risks that the company faced mainly based on respondent's opinions. The information gathered from respondents opinion the company faced frequently management risks, and technical risks rather

than external risks. Based on this the researcher suggest that the company must have to work on management skill of employees and herring skilled professionals work on project implementation team.

4.9. Most common challenges of risk management

In this section the researcher discussed the most common challenges of risk management practices with respect to respondent opinions. According to respondents response the company faced, budgeting issues, unrealistic deadline, lack of communication, team conflict, and budget restriction and changes most of the time.

4.10. Impact of risk management for success and Failure

In section discussed that impact of risk management for success and failure of the project according to respondent's opinions. Mainly the respondents described that risk management has a great impact for the success of the project. Risk management plan has a great impact for the success of the project by provides a framework how to deal with project risks, forecast future risks of the project, improve resource deployment, and scale up employee confidence. Therefor, based on respondent's opinion, risk management practice has a great impact on the success of project objectives.

4.11. Problems caused by poor risk management

Based on the information gathered form respondents the researcher discussed problem caused by poor risk management. The respondents mentioned frequently time delay, budget escalation, unsatisfied stakeholder, and project failure. There for a poor risk management practices puts the project in a critical situations and for the worst case scenario may cost the project itself.

CHAPTER FIVE

Conclusion and Recommendation

This research had five major objectives which were to assess risk awareness, Investigate the benefits of risk management practices, Evaluate the main challenges of project risk management practice, Assess the practice of project risk management, and Identify problems caused by poor Risk Management practices in construction projects at Ayat.

The reviewed literature showed that construction risk management practices are vital in any construction projects and that different risk management techniques should be used starting from the risk planning stage to make projects successful. Most building construction projects in Ethiopia fail to meet their objectives and the questionnaire was devised to discover if lack of proper risk management procedures might be contributory to this effect among other things. The questionnaire survey was believed to contain all the important research questions which were helpful in fulfilling the research questions.

The results of the questionnaire survey and discussion of the findings in line with the literature review were presented in the previous section. In this section the conclusions derived from the research findings and the recommendations are presented.

5.1. Conclusion

All of the parties involved in the Ayat Real State building construction projects are aware of the concept of risk management, use risk management practices are well applied but further improvements are essential to implement them greatly applied, and project located at CMC has unrealistic delivery date to customers and that brings unsatisfied customers.

5.2. Recommendation

A special attention should be given to managing Managerial, and Technical areas of risk since they were identified as most, relevant clauses that deal with risk should be included in the construction Projects and the risk allocated to the party that is in the best position to control and manage it in order to increase the odds of achieving the project objectives, Managing team conflict is essential for project success so proper conflict management techniques are vital,and most of the employees are acquired knowledge through study so more training secession are important to grade up employees knowledge.

I recommend further research be conducted on the subject; By using case study on few selected construction companies and their projects, and Involving other sectors of the construction industry.

References

Abebe Dinku. (2022). A Study on Construction Contract Risk Management Practices in Ethiopian Building Construction Projects. A Study on Construction Contract Risk Management Practices in Ethiopian Building Construction Projects.

Allard, C. (2017). *Regional Economic Outlook, April 2017, Sub-Saharan Africa*. INTERNATIONAL MONETARY FUND.

Dionne, G. (2013). Risk Management: History, Definition, and Critique. *Risk Management and Insurance Review*, *16*(2): 147–166. https://doi.org/10.1111/rmir.12016

Editor. (2022). *A Guide to the Project Management Body of Knowledge, Third Edition [PMBOK Guides] by Project Management Institute [Project Management Institute,2004] [Paperback] 3rd Edition* (First Printing ed.). Project Management Institute, Inc.

Harrington, S. E., & Niehaus, G. (2003). Capital, corporate income taxes, and catastrophe insurance. *Journal of Financial Intermediation*, *12*(4), 365–389. https://doi.org/10.1016/j.jfi.2003.07.001

Morris, P. (2006). *Translating Corporate Strategy Into Project Strategy: Realizing Corporate Strategy Thought Project Management*. Project Management Institute.

Project Management Institute & Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge*. Project Management Institute.

Rabel, W. H. (1968). New Perspectives on Risk Management: Further Comment. *The Journal of Risk and Insurance*, *35*(4), 610. https://doi.org/10.2307/250889

Ward, S., & Chapman, C. (2003). Transforming project risk management into project uncertainty management. *International Journal of Project Management*, *21*(2), 97–105. https://doi.org/10.1016/s0263-7863(01)00080-1

Well-Stam, V. D., Lindenaar, F., Kinderen, V. S., & Bunt, D. B. V. P. (2004). *Project Risk Management: An Essential tool for Managing and Controlling Projects* (1st ed.). Kogan Page.

Zhang, I. (2007). Economic Consequences of the Sarbanes-Oxley Act of 2002. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.961964

Pinto, J. K. (2022). *Project Management: Achieving Competitive Advantage, 5th edition*. PEARSON INDIA.

NEGA, F. E. T. E. N. E. (2008). Causes And Effects Of Cost Overrun On Public Building Construction Projects In Ethiopia. *Causes And Effects Of Cost Overrun On Public Building Construction Projects In Ethiopia*, 1–20.

S. (2021, May 9). *Construction in Ethiopia and opportunities in the Ethiopia building industry*. Alliance Experts.

https://www.allianceexperts.com/en/knowledge/countries/Africa/business-opportunities-in-the-ethiopia-construction-sector/

HABTEMARIAM, M. E. S. F. I. N. (2019). Factors Affecting Construction Projects Performance: The Case Of Save The Children.

Mesfin, A. (2014). A Study on Construction Contract Risk Management Practices in Ethiopian Building Construction Projects. *A Study on Construction Contract Risk Management Practices in Ethiopian Building Construction Projects*.

Nega, F. E. T. E. N. E. (2008). Causes and effects of cost overrun on public building construction projects in Ethiopia. *Causes and effects of cost overrun on public building construction projects in Ethiopia*.

Appendix

ST ’ Mary ’ s University School of Graduate Studies

Questionnaire Filled by Ayat Real State Employees

Part 0ne :- The objective of this questionnaire is to gather information about the risk management practice of construction projects at Ayat real State. Based on your response, The researcher will conduct a study for academic purposes. To achieve this, you are kindly requested to answer the questions honestly. You do not write your name. Finally, I would like to thank you very much for your cooperation and for sparing your valuable time for my request.

1.Your position in the company?

Project manager [ ]

Project engineer [ ]

Members of project implementation team [ ]

Risk officer [ ]

Risk auditor [ ]

2.Educational Level :

PHD [ ] MA(MSc.) [ ] BSc [ ] Diploma [ ] Certificate [ ] other [ ]

3.Working Experience

Below 5 years [ ]

Between 6 and 10 years [ ]

Between 11 and 15 years [ ]

Between 16 and 20 years [ ]

Above 20 years [ ]

5. Do you have an idea of project risk management?

Yes [ ] No [ ]

6. How do you became aware of risk management?

Study [ ] Training [ ] Other [ ]

Part two :- Employees opinion related questions about risk management practice of Ayat Real State.

The following statements are presented on five points scale to gather information about practices, challenges, tools, and techniques/strategies of risk management applied to Ayat Real State construction projects. Please Kindly indicate the extent to

which the following project risk management practices, challenges, and strategies are applicable within Ayat Real State. Choose from the five points stated below and mark with [x] against the most applicable response. The researcher may use the above five points as rank when necessary as they ranked.

1. Not Applied

2. Applied to some extent

3. well applied

4. greatly applied and ,

5. Applied to very great Extent

1	**General information about risk management plan**	**5**	**4**	**3**	**2**	**1**
A	Does your company have an effective and efficient risk management plan?					
B	Dose all stakeholders are included in developing a risk management plan?					
C	Does the organization use previous data to develop a risk management plan?					
D	Does the organization develop a Risk Breakdown Structure (RBS) to define risk categories?					
E	Do estimated resources and costs needed for risk management activities included in the project budget?					
F	Does risk management activities defined and included in the schedule?					
2	**Risk management practice**	**5**	**4**	**3**	**2**	**1**
2.1	**Risk Identification**					
A	Does the organization has processes or tools for project risk identification?					
B	Does the organization have a Brainstorming session?					
C	Does the organization use risk checklists?					

D	Does the organization has a risk registry?					
E	Does the organization use expert judgment for identified risks?					
F	Does the organization use experience and review of risk documentation?					
G	Does all key project participants involve in risk identification?					
H	Does the organization has a categorization of identified risks?					
2.2	**Risk Analysis and Evaluation**	**5**	**4**	**3**	**2**	**1**
A	Does the organization have established qualitative risk analysis methods and tools?					
B	Is there a process in place to quantify risks?					
C	Is there any cause and effect risk analysis?					
D	Is there a contingency plan for risk analysis?					
E	Does the organization assess the probability of achieving specific project objectives?					
F	Does the organization identify risks that require the most attention by quantifying their relative contribution to the overall project risk management? Such as:- Risk Ranking and Risk Classification.					
G	Does the organization have a risk matrix that defines probability or likelihood and the impact of the risk?					
2.3	**Risk Response strategies**	**5**	**4**	**3**	**2**	**1**

A	Dose the organization has techniques of risk responses in place?					
B	Dose the organization use Risk avoidance technique? (Taking another course of action)					
C	Dose the organization have a Contingency plan for risk response strategies?					
D	Dose the organization uses Risk Transfer techniques to third party? (e.g. Insurance company)					
E	Risk acceptance/ retention					
F	Dose the organization reduce risk to acceptable threshold level?					
G	Dose the organization uses combinations of retention, reduction and transfer responses to risk?					
H	Is there personnel assigned for each agreed risk responses? Such as:- health and safety management , risk officer					
I	Dose the Contingency plan is allocated for time?					
J	Dose the Contingency plan is allocated for cost?					
K	Based on the analyzed risks, dose risk management plan is developed and communicated to all stakeholders?					
L	Dose a risk matrix was/is developed for the project?					
k	Dose stake holders are satisfied by risk response strategies of the organization?					
3	**Risk management tool and techniques**	**5**	**4**	**3**	**2**	**1**
A	Existence of Any tools/techniques used for risk management planning?					

B	Existence of Any tools/techniques used for risk management identification?					
C	Existence of any tools/techniques used for risk analysis?					
D	Existence of any tools/techniques used for risk response?					
4	**Challenges of risk management practices**	**5**	**4**	**3**	**2**	**1**
A	Does the organization face challenges related to construction issues? Such as Scarcity of labor and resource, design change, and Environmental effects.					
B	Does the organization face challenges related to financial and economical issues? Such as Price Fluctuation and Inflation.					
C	Does the organization face challenges related to financial and economical issues? Such as Price Fluctuation and Inflation.					

Part three :- short answers questions (based on preponderant opinions)

1. What are the benefits of having risk management plan?

……
……
……
……

2. Which types of risk are frequently identified and categorized in to which categories?

A.Management Risk C. Internal Risk

B.External Risk D.Technical Risk

3. which management tools are applied to your projects?

A. PERT C. Critical path method

B. Microsoft project D. Earned value measurement

4. Based on your opinion, What are the most common challenges of risk management practices?

…..
……
……
……

5. Dose having risk management plan add a value to your project? If it is, Describe please.

…..
……
……
……

6. Dose risk management plan have an impact on the success and filer of a project? How?

……
……
……
……

7. State difficulties caused by poor risk management practice.

…..
……
……
……