ADDIS ABABA UNIVERSITY
SCHOOL OF COMMERCE
PROJECT MANAGEMENT STREAM

ANALYSIS OF RISK MANAGEMENT PRACTICES IN CONSTRUCTION COMPANIES: FOCUING ON YOTEK CONSTRUCTION, FLINTSTONE ENGINEERING AND AKIR CONSTRUCTION.

BY:
GETACHEW YIRGA

A PROJECT WORK SUBMITTED TO THE ADDIS ABABA UNIVERSITY – SCHOOL OF COMMERCE IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF ARTS DEGREE IN PROJECT MANAGEMENT

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JUNE, 2017
ADDIS ABABA, ETHIOPIA

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DECLARATION

I, the undersigned, declare that this study entitled as "Analysis of **Risk Management Practices in Construction Companies: Case Yotek Construction, Flintstone Engineering and Akir Construction**, is my own work. I have carried out all the research project works independently with the guidance and support of the research advisor. This study had not been submitted to any degree/diploma in this school or any other institution.

Getachew Yirga

Signature: _____

Date: ----------

CERTIFICATION

This is to certify that Getachew Yirga has completed his thesis entitled "**Risk Management Practices in Construction Companies: Focusing on "Yotek Construction, Flintstone Engineering and Akir Construction",** In my opinion all the materials used for the thesis have been duly acknowledged and his thesis is appropriate to be submitted as a partial fulfillment for the requirement of Master of Arts Degree in Project Management (MAPM).

Advisor

Temesgen Belayneh (PhD)

Signature: ----------

Date: ----------

Approved By Board Committee:

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Examiner	**Signature**
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Examiner	**Signature**
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Advisor	**Signature**

Acknowledgements

First and foremost, let the greatest thanks be to the Almighty God.

Next, I would like to express my deepest gratitude to my advisor, ***Temesgen Belayneh (PhD),*** *for his continuous guidance and advices throughout the preparation of this project work.*

I also acknowledge the contributions of all questionnaire survey respondents and participants. To answer such questions about risk management was not an easy task!

Last but not least, very special thanks go to my precious family members- Finan Getachew (Babisho), Niyat Getachew (Tatu) and my wife Weyni Araya- I LOVE YOU!!

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Acronyms:

AAU – Addis Ababa University

AASC - Addis Ababa University School of Commerce

CSAE – Central Statistics Agency of Ethiopia

SPSS – Statistical Packages for Social Sciences

RM -- Risk Management

RMP – Risk Management Process

RMS - Risk Management System

RR – Response Rate

PMBOK – Project Management Body of Knowledge

PMPG - Project Management Process Groups

PMI – Project Management Institute

CONTENTS

Abstract

Critical reviews of the existing theory and practice of Risk Management within the construction industry particularly in Ethiopia and the world at large suggest that risk management, as one of the nine knowledge areas of the project management, is not only underutilized but also, generally, not well understood. These are simply manifested in the results shown on the ground that construction projects facing time and cost overruns besides to their inferior quality products. The research findings which have been summarized and presented in this study were carried out based on three local construction companies' named Yotek Construction, Flintstone Engineering and Akir Construction with the objective of analyzing status of RM practices in construction companies in general and specifically how the risk planning, identification, analyzing, responding and monitoring and controlling experiences or practices. To do so, survey questionnaires were distributed to selected experts particularly related to the risk management practices area like planning, designing and /or executions / implementation levels to see deep in to the detail practices. The findings showed that with some ups and downs, there were some hints of risk management practices specifically, risk management is recognized as a very important input, formal procedures to RM are practiced and RM is a continuous process but some practices still need improvements like team members should participate in risk identification, mainly there are no responsible body to handle and coordinate risks and subjective methods (such as judgments based on experience) rather than more sophisticated methods (such as mathematical techniques) are used to make decisions that affect the key project parameters. There are more or less risk management planning practices but not all team members are invited to participate and there are no defined and well-developed strategies to respond to risks. Risk monitoring and controlling are not done in compliance with the accepted standards and procedures which make risks either worse or might make difficulty to overcome them. In conclusion, RM is not yet fully and maturely practiced but partially and hesitantly. Recommendations are RM management should be in compliance with the standards, there should be a well-developed strategy and responsible body to handle risks.

Key Words and Phrases: Risk, Risk Management, Risk Management Process, Construction Projects.

CHAPTER ONE: INTRODUCTION

1.1. Background of the study

Despite the fact that each project is unique and should be managed accordingly, one thing is common to all projects- risk. Risk is any uncertainty that, if it occurs, would have an effect on achievement of one or more objectives negatively or positively (Kerzner 2009).

Risk management (RM) is a concept which is used in all industries, from IT related business, automobile or pharmaceutical industry, to the construction sector. Each industry has developed their own RM 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 a project success. While RM is described as the most difficult area within construction management (Winch, 2002; Potts 2008) its application is promoted in all projects in order to avoid negative consequences (Potts, 2008).

Risk management is a process called the risk management process (RMP) and consists of four main steps: identification, assessment, taking action and monitoring the risks (Cooper et al., 2005). In each of these steps, there are a number of methods and techniques which facilitate handling the risks.

The construction industry operates in a very uncertain environment where conditions can change due to the complexity of each project (Sanvido et al., 1992). The aim of each organization is to be successful and RM can facilitate it. However it should be underlined that risk management is not a tool which ensures success but rather a tool which helps to increase the probability of achieving success. Risk management is, therefore, a proactive rather than a reactive concept (Kerzner, 2009).

In many countries, Construction industry is an important part of the economy and is often seen as a driver of economic growth; especially in developing countries. Typically, construction industry contributes to 11% of gross domestic products (GDP) in most developing countries (Giang and Pheng, 2010).

Nevertheless, many construction activities are inherently risky such as working at height, working underground, working in confined spaces and close proximity to falling materials, handling load manually, handling hazardous substances, noises, dusts, using plant and

equipment, fire, exposure to live cables, poor housekeeping and ergonomics. Despite its importance, therefore, construction industry is considered as being risky with frequent and high accidents rate and ill-health problems to workers, practitioners and end users (HAS, 2006).

And, this only to be more severe if there exists no or little integrated risk management plan and implementation. There are sound economic reasons like reducing costs and business efficiency for reducing risk, as well as ethical and regulatory reasons (HAS, 2006)

Hence, this research, with these facts as a background, first explores the practices of risk management in **the three construction companies** and evaluates against the theoretical practices to create an organizational setting in which ideal risk management practice in any construction work/project.

The framework of the paper begins with a statement of the research problem following which the research questions that were pursued are designated. Thereafter the fundamental concepts related to RM and the RM process together with empirical research is reviewed to determine existing practices. The research methodology is then described, following which, the study's results and findings are discussed. Lastly conclusions and recommendations are made

1.2. Problem Statement

Construction is believed to be the sign of development and development by itself is addressing the peoples' welfare and satisfaction. Many of the construction activities in the country, especially in Addis Ababa, are booming at an alarming rate but how are the associated risks managed?

Research works like Frezewd (2016) and Yimam (2014) show that 'very little or no proper risk management exists' in many business areas in Ethiopia. So is the construction sector.

From the introductory discussions, one can see that risks, if not properly managed, especially the construction projects, can face great time, cost and quality problems. It can even eventually lead to termination. This shows there is a gap between the theoretical project risk management and the practices on the ground.

To this end, the researcher feels this gab has to be studied and filled.

To do so, the following problem statements are raised and proceed to get their answers.

- What is the level of the practice of risk management in construction projects?

- How aware are the construction projects and the respective companies with regard to risk planning, identification, analysis, controlling/monitoring and responding and, incorporating as management plan? And how many of them do implement?

1.3. Research Questions

The research study is basically on the practices of risk management in the construction projects of the three case companies. It has been depicted that construction industry is the integral part of the future of a country, especially Ethiopia. It's the most risky industry too. But, studies reviewed indicated that there is 'little or no risk management practices'. Why? Is it because this is simply ignored, or, not well understood? To answer this question, the study pursued the following theoretical and empirical research questions:

- Is risk management recognized as one the project management knowledge areas?
- What is the extent to which risk management is applied in construction projects, currently?
- What are the current practices with regard to risk management in the construction projects/companies?
- What risk management planning practices are adopted?
- What methods, if any, are used to identify risks that occur in their projects?
- How do the team members analyze the risks occurring in their projects?
- Which risk response option/s do they choose for their risk mitigation action in their projects?
- What are the practices of risk monitoring and controlling in their projects?

1.4. Objectives of the Study:

The objectives of the study are twofold with one main objective and some specific objectives:

1.4.1. General Objective:

- To analyze and find out the risk management practices in the construction projects.

1.4.2. Specific Objectives:

- To analyze and find out the risk planning practices in the construction projects?
- To analyze and find out the risk identification practices in the construction projects.
- To analyze and find out the risk analysis practices in the construction projects.
- To analyze and find out the risk responding practices in the construction projects.

- To analyze and find out the risk monitoring and controlling practices in the construction projects.

1.5. Significance of the Study

The importance of this research stems from the essence of risk management itself, for the reason that risk management has been identified as one of the most important tools in determining any project success;

This analysis tries to investigate the status of risk management practices in construction companies' focusing on Yotek Construction, Flintstone Construction and Akir Construction projects.

The output of this study will have the following contributions: The case Construction companies will gain practical risk management explanations; next the consultants will be beneficial too. And, in general, all stakeholders in the construction industry, be individual or group, governmental or non-governmental, will benefit from the study results in one or the other way to know the overall level of risk management status by comparing with the theoretical risk management principles where by improving their conditions meet their project objectives and goals on time, if not in time.

Indirectly, it will help to change the risk management status of the industry as new directions of the research output will enable, to strengthen the awareness of the government and stakeholders for the same.

Private sectors, which are directly or indirectly involved in construction as well as community health, safety and risk management, are believed to be direct beneficiaries since they will have additional information source about the condition risks if they act in accordance with the recommended output of this study.

On the top of these, the findings of the research can initiate other scholars to carry out further studies after identifying the gaps that this study failed to address.

1.6. Scope of the Study

Any study from the early beginning will have its own scope to determine the level and extent of the study, similarly this paper has also its own focus.

The scope of this study is limited to the three construction companies where selected representatives of the team members will be contacted and from which 45 (forty five) selected individuals will be taken to fill the questionnaires.

1.7. Limitations of the Study

This study has some limitations and they are discussed as below:

- It only focused on only three companies which makes it difficult to generalize from
- Financial and time constraints since the issues have many interrelated points that must be seen together.
- Some individuals and/or respondents who participate in the survey might not be genuine in answering the questionnaires.
- There are a lot of construction companies in the country and in the city in particular whereas only representatives are considered and hence may limit study.
- All project management knowledge areas are inter-related but we took her only one of them which raises the issue of attribution gap.

1.8. Organization of the Study

The research contains five chapters and starts with an introductory part which gives an overview of the study followed by literature overview in order to provide the theoretical context about the project in general terms with the focus on the project risk management. Further, a description of the research area and how the construction industry is operating in the field of risk management is provided. RM, including the definition of risk, a descriptive part of the steps of the RMP, is then presented in order to establish the foundation for this thesis.

In the third chapter, the design and methodology of the research is detailed including the data types, collection techniques, procedures, analysis methods and ethical considerations.

Subsequently, in the fourth chapter, results from conducted surveys are presented, analyzed and interpreted to show how the projects practice and works with regard to risks and risk management and, based on which conclusion and recommendation are summarized in chapter five..

CHAPTER TWO: REVIEW OF RELATED LITERATURE

2.1. Introduction and Definitions

A project is a one-off process with a single definable end-result or product. Much of project management is concerned with planning and controlling the three key variables associated with projects. These variables are time, cost, and quality (Kerzner, 2009). They are interrelated and a change in any single variable frequently has a significant impact on the others (Audrius B. et al. ,2012),And, according to PMI (2013), a project is a temporary endeavor undertaken to create a unique product, service or result.

It is the process of planning and executing a piece of work from inception to completion to achieve safe achievement of objectives on time, within cost limits and to the specified standards of quality (Kerzner, 2009).And; the organizing, planning, directing, coordinating and controlling of all project resources from inception to completion to achieve project objectives on time, within cost, and to required quality standards.

Construction project is no different and most of the cyclical patterns in construction are similar to the business-cycle characteristics of investment in the macro-economic literature (Audrius B. et al., 2012),.

These similarities are not a coincidence since construction activity is a type of investment (Mohamed A., 2011). Construction, as recorded in national accounts, includes housing construction, construction of business structure, and infrastructure related construction (Ibrahim, 2011).

According to a report by CSA (2007 E.C.), in Ethiopia, construction is showing a sign of a highly accelerated expansion in recent years but at the same time is facing hurdles in terms of time, cost and quality .

Risk is pervasive. It is a universal experience and inescapable. We all face risk - some people more frequently and more willingly than others (Kerzner, 2009). While some worry constantly about risk, others cheerfully seek it out (Hamid A., 2005). Risk surrounds us, but we are not always fully conscious of it, nor do we consistently respond to it wisely or effectively (Ekateria O.,2008).

Since a project is an endeavor in which human, material and financial resources are organized in a novel way, to undertake a unique scope of work of given specification, within constraints

of cost and time, so as to achieve unitary, beneficial change, through the delivery of quantified and qualitative objectives (Turner, 1992), it highlights the change-inducing nature of projects, the need to organize a variety of resources under significant constraints, and the central role of objectives in project definition. It also suggests inherent uncertainty related to novel organization and a unique scope of work, which requires attention as a central part of effective project management.

Hence, to achieve goals and objectives of such inherent uncertain endeavor, risk management is mandatory.

2.2. Theoretical Reviews

The theoretical review states the basic theories regarding the project management and project risk management including the tested practices that should be followed to effectively and efficiently achieve project goals and objectives under risky and uncertain project environment. This review starts with highlights project management and goes detail to success impacts of risk management.

An effective risk management process encourages the construction company to identify and quantify risks and to consider risk containment and risk reduction policies. Construction companies that manage risk effectively and efficiently enjoy financial savings, and greater productivity, improved success rates of new projects and better decision making. (Sharon S.,2014)

Risk management in the construction project management context is a comprehensive and systematic way of identifying, analyzing and responding to risks to achieve the project objectives. Research results by Audrius B. et al.,(2012) show that the construction companies surveyed significantly differs from the construction companies in different countries in the adoption of risk management practices and to manage the risk effectively and efficiently, the contractor must understand risk responsibilities, risk event conditions, risk preference, and risk management capabilities

2.2.1. Project Management

As mentioned above, a project is a unique, complex, and sequentially connected activities having one specific objective goal and that must be completed within a specified time, within budget and to a specification utilizing the limited resources (Wysocki, 2014) while project management is, according to PMBOK Guide, a process consisting five process groups –

project initiation, project planning, project executions, project monitoring and controlling and project closure.

Figure 2.1.project-management time–cost–quality continuum (source: PM context Module, AASC)

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Most authors agree that project management is about achieving time, cost and quality targets, within the context of overall strategic and tactical client requirements, by using project resources.

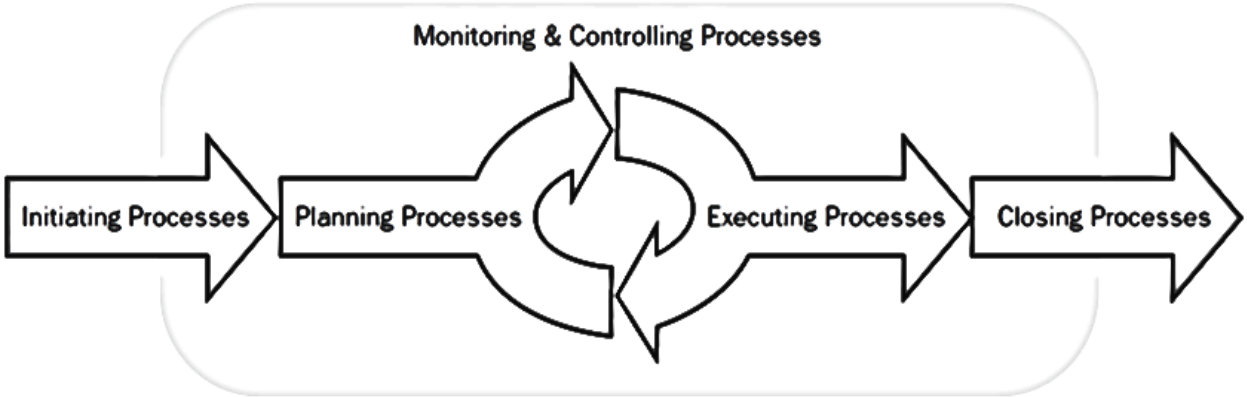


Figure 2.2. The five process groups of Project Management (Source: AASC Module)

2.2.2. Project Risk Management

According to the PMBOK® Guide's recognition, there are nine knowledge areas typical of almost all projects. The nine knowledge areas are:

1. Project integration management.
2. Project scope management.
3. Project time management.
4. Project cost management.
5. Project quality management.
6. Project human resource management.
7. Project communications management.
8. **Project risk management.**
9. Project procurement management

Risk, one of the nine PM knowledge area, is an uncertain event or condition that, if it occurs, has a positive or negative effect on a project objective (PMI,2000) or risk is an uncertain event or set of circumstances that, should it occur, will have an effect on the achievement of the project's objectives (APM,1997). Here, it is to be noted that it is useful to define 'risk' as an uncertain effect on project performance rather than as a cause of an (uncertain) effect on project performance. Such a definition of project 'risk' is 'the implications of uncertainty about the level of project performance achievable' (Hamid, 2005).

Therefore, Risk management is the process in which the project manager and project team identify project risks, analyze and rank them, and determine what actions, if any, need to be taken to avert these threats (Mohammed, 2011). Associated with this process are the costs, time, and quality concerns of the project brought about by the solutions to those risks. In addition, the reactions to risks are analyzed for any secondary risks the solutions may have created. A successful risk management practice is one in which risks are continuously identified and analyzed for relative importance (Hamid, 2005)

As per Turner's (2009) argument, project management is basically risk management.

Risk management is the act or practice of dealing with risk. It includes planning for risk, identifying risks, analyzing risks, developing risk response strategies, and monitoring and controlling risks to determine how they have changed. And, Proper risk management is proactive rather than reactive, positive rather than negative, and seeks to increase the probability of project success. (Kerzner, 2009).

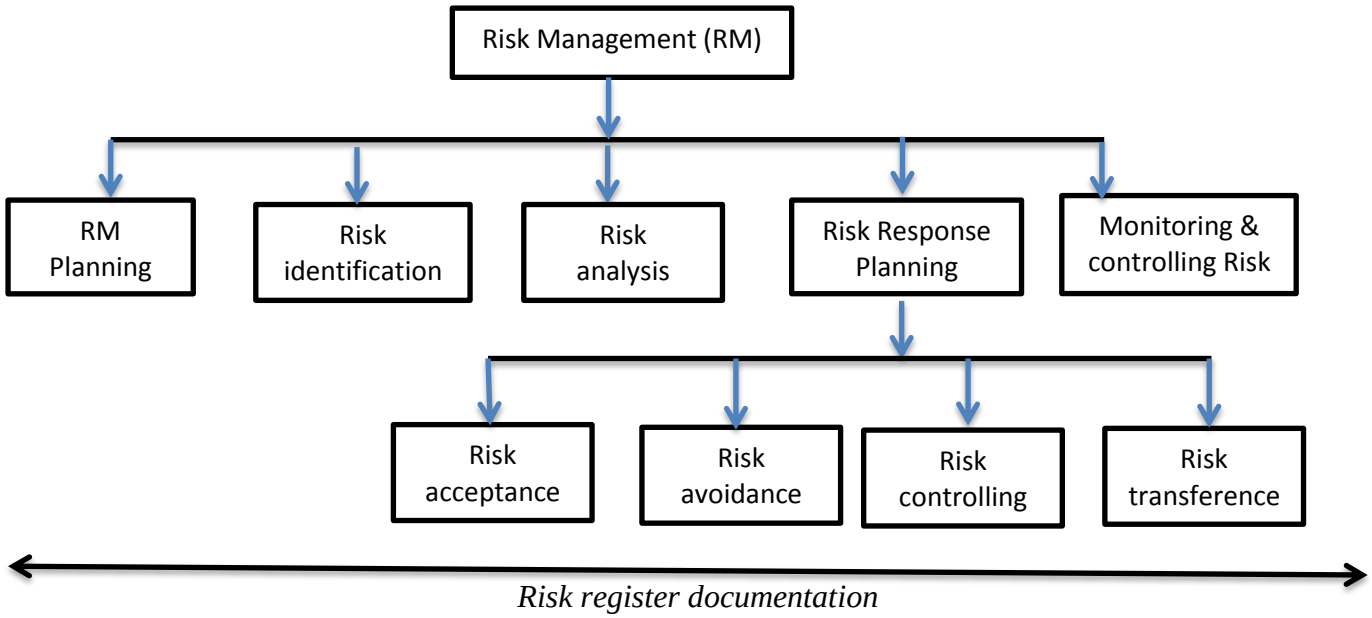


*Figure: 2.3. Overview of the risk Management process (*Source, Richardson, 2015)

2.2.2.1. Planning Risk Management

Planning risk management has been, as exhaustively as possible, defined by the Project Management Body of Knowledge (*PMBOK Guide, 11.1)* as the process of developing and documenting an organized, comprehensive, and interactive strategy and methods for identifying and analyzing risks, developing risk response plans, and monitoring and controlling how risks have changed or deciding how to approach and plan the risk management activities for a project.

2.2.2.2. Risk Identification

Risk identification is the process of examining the program areas and each critical technical process to identify and document the associated risk (*PMBOK Guide, 11.2)*. It is the process of finding, recognizing, and describing risks (Kerzner, 2009). A satisfactory process of risk identification is crucial to effective risk management, since unidentified risks cannot be systematically managed (Richardson, 2015). Yet they remain risks. It is therefore worthwhile for any organization interested in implementing a RMS to spend time in considering how best to undertake this process (PMBOK Guide). Essentially, risk identification sets out to answer the question: what could threaten the satisfactory achievement of this objective, the completion of this task, the application of this technology, the acquisition of this resource, or the performance of this organization? Or, to put it another way: what could happen to make this project decision a bad one?

The purpose of the risk identification step is to "generate a comprehensive list of risks based on those events that might create, enhance, prevent, degrade, accelerate, or delay the achievement of objectives"

2.2.2.3. Risk Analysis

The process of examining each identified risk to estimate the probability and predict the impact on the project. It includes both qualitative risk analysis (*PMBOK Guide* 11.3) and quantitative risk analysis (*PMBOK Guide* 11.4).

i. **Qualitative Risk Analysis:** the process of assessing the impact and likelihood of identified risks. This process prioritizes risks according to their potential effect on the project objectives. It is one way to determine the importance of addressing specific risks and guiding risk responses (PMBOK Guide 11.3).

ii. **Quantitative Risk Analysis:** This aims to analyze numerically the probability of each risk and its consequence on project objectives, as well as the extent of overall project risk. (PMBOK Guide 11.4).

Risk analysis/estimation can be quantitative, semi quantitative or qualitative in terms of the probability of occurrence and the possible consequence. For example, consequences both in terms of threats (downside risks) and opportunities (upside risks) may be high, medium or low (AASC- Module, 2015). Probability may be high, medium or low but requires different definitions in respect of threats and opportunities. Different organizations will find that different measures of consequence and probability will suit their needs best.

2.2.2.4. Risk Responses:

The process that identifies, evaluates, selects, and implements one or more strategies in order to set risk at acceptable levels given program constraints and objectives (Kerzner, 2009). This includes the specifics on what should be done, when it should be accomplished, who is responsible, and associated cost and schedule (Ekaterina,2008). A risk or opportunity response strategy is composed of an option and implementation approach. Response options for risks include acceptance, avoidance, mitigation (also known as control), and transfer. Response options for opportunities include acceptance, enhance, exploit, and share. The most desirable response option is selected, and a specific implementation approach is then developed for this option.

i. **Risk Acceptance (i.e., retention):** In some instances it is possible for a stakeholder organization to reward itself for retaining a risk. This presupposes that the risk identification

and analysis processes of risk management have been implemented, at least to some extent. An excavation subcontractor tendering for a construction project might retain the risk of storm water flooding the excavations, but reward himself by increasing the unit price rate for the work.

Retaining risks without mitigating them presumes that the decision is an informed one and based upon analysis which indicates that any reduction treatment has a negative cost/benefit ratio. Retaining residual risks shares the same presumption, in terms of further reduction beyond that already achieved.

Beyond this, of course, there will be risks unwittingly retained by the organization simply because they have not been identified.

ii. **Risk Avoidance**: Avoiding a risk means deliberately taking another course of action so that it cannot arise in the new circumstances for that project. Note that this is not the same as eliminating risk. In fact, risk elimination is rarely possible: if it becomes necessary to revert to the former circumstances the risk will return. The ultimate form of risk avoidance is not to proceed with the project at all. However, this extreme is seldom adopted as a response to one project risk factor in isolation.

iii. **Risk Control (e.g., mitigation):** No risk should be avoided, transferred or retained without first checking to see if it is possible to reduce it and then retain the residual risk.

For anyone with a professional interest in risk management, reducing risk is probably the most absorbing area of involvement. The stakeholder is deliberately attempting to minimize risk in some way. All dimensions of the risk should be examined, since it may be possible to reduce the probability of occurrence, the impact consequences, or the duration of exposure to the risk. Combinations of any two or even all three, of these may be contemplated in some risk circumstances. The nature of the risk will influence which of the risk factors can be mitigated, and the context will influence the possible extent of mitigation. For natural risks, for example, it is rarely possible to reduce the chance of occurrence (although planning a project to avoid seasonal weather extremes is one approach).

iv. **Risk Transfer:** In electing to transfer risk, a project organization is seeking to shift the burden of a particular risk to another stakeholder. This is a common response in project situations where stakeholder supply chains or networks are easily distinguished, as attempts will be made to transfer risks progressively along the supply chain or to the more distant

extremities of the network. Typically, a project client will transfer risks to a contractor, who in turn will transfer them to subcontractors or suppliers.

The mechanisms used to transfer risks in such situations include, *inter alia*, head contract agreement clauses, subcontracts and supplier agreements.

The principle of risk transfer forms the distinguishing characteristic between many alternative forms of project procurement and delivery, such as joint ventures, public/private partnerships, and the Private Finance Initiatives in many countries (Hamid, 2005). In the construction industry, it is noticeable in procurement systems such as design/build (D & B), design-build-finance-operate (DBFO), build-own-operate (BOO), build-own-operate-transfer (BOOT) and many others (Sharon, 2014).

Common to nearly all of these is the intention to transfer risk away from the client stakeholder and towards the contractor organization Insurance is a transfer mechanism for risks that are insurable: theft, injury, and damage to property or equipment. This introduces a third party risk transferee to the situation, thereby involving another stakeholder in the project.

v. **Combination responses to risk:** Combinations of retention, reduction and transfer responses to risk are possible. Since risk avoidance aims to change the circumstances through which a particular risk arises, this response cannot be used in combination with others (Kerzner, 2009).

Probably the most common example of combination risk response is the transfer of risk through insurance, while at the same time retaining a small amount of the impact by accepting liability for a fixed excess sum in the insurance policy agreement (AASC-Module, 2015).

Table.2.1. Summary of Risk responses options

Type of Response	Use for Risk or Opportunity	Descriptions
Avoidance	Risk	Eliminate risk by accepting another alternative, changing the design, or changing a requirement. Can affect the probability and/or impact.
Mitigation (control)	Risk	Reduce probability and/or impact through active measures.
Transfer	Risk	Reduce probability and/or impact by transferring ownership of all or part of the risk to another party, or by redesign across hardware/software or other interfaces, etc.
Exploit	Opportunity	Take advantage of opportunities.
Share	Opportunity	Share with another party who can increase the probability and/or impact of opportunities.
Enhance	Opportunity	Increase probability and/or impact of opportunity.
Acceptance	Risk and opportunity	Adopt a wait-and-see attitude and take action when triggers are met. Budget, schedule, and other resources must be held in reserve in case the risk occurs or opportunity is selected.

(Source: Kerzner, 2009, pg.784)

2.2.2.5. Risk Monitoring and Controlling

The process that systematically tracks and evaluates the performance of risk response actions against established metrics throughout the acquisition process and provides inputs to updating risk response strategies, as appropriate (PMBOK 11.6.). This is monitoring residual risks and identifying new risks, ensuring the execution of the risk plans, and evaluating their effectiveness in reducing risks.(PMBOK 11.6).accordig to the knowledge book, risk monitoring and control is an ongoing process for the life of the project. This is because risks change as the project matures, new risks develop or else anticipated risks disappear.

2.3. Main Sources of risk in project management

Every movement or action is risky and risk is present ever where in our activities. But, the sources of risk in construction projects may be divided / classified in two ways: first, in general, into three groups :(Kerzner, 2009)

a. **Internal or controllable risks** (e.g. design, construction, management and relationships);
b. **External or uncontrollable risks** (e.g. financial, economic, political, legal and environmental); (PMBOK)
c. **Force majeure risks**. Risks that projects / parties involved might face because of acts of God, wars, terrorism, or other such events :(Kerzner, 2009).

On the other hand, projects risks can be grouped as:

i. **Financial risks**: Those originate from cash flow and profitability. (Kernzer, 2009).
ii. **Technical risks**: basically related to the development and operation of the deliverables. And, to the utilizations of technology and its impact on the direction of the project. (Kernzer, 2009).
iii. **Human**: the most complex and hardly predictable source of project risks related to the project staffs, the managers and the customers.
iv. **Market**: the risk related to the failure of the product developed in the market.

Therefore, when we combine and see the most related sources of the construction projects risks are: **Technical, Financial and Human**. And, the researcher took these parameters in the survey.

2.4. Project Risk Management and Project Success

Risk is one of key factors that can positively affect working effectively inside the firm if it was practiced in the proper way. By doing such organization can achieve capital value of rareness and capital value of limitability via which the firm can build stronger competitive advantage by developing maintaining and retaining core competencies; which can in its turn maximize the organization's market share, reputation maximize shareholder equity and stake holder goals and maintaining the maturity stage of the firm's life cycle in which it can maintain the peak stage for all of its activities by recognizing, encouraging and retaining the peak performance.

An effective use of project management techniques such as risk and value management are considered as key supporting processes and to add to them quality, cost, time and change control (Fewings, 2005); all together generate an integrated approach to the project success.

Ineffective projects are forced to react to problems; effective projects anticipate those (Loosemore et al., 2006).

Risk management requires top-level management support, acknowledgment that risks are realities, and a commitment to identify and manage them. One discriminator of a successful organization or project is the use of risk management to anticipate potential negative conditions, problems, and realities.

2.5. Empirical theoretical reviews

Although there are no as many studies as possible made in this area of knowledge, the available ones were found to critically discuss the weaknesses of the risk management practices. Many of them discuss and conclude about the importance and developments of the industry in general but they still missed the risks associated. They never considered that any development is nothing more than waste of time and other resources without the proper management of risk.

This is why the necessary analysis of risk management practices of the construction projects was needed and hence this study.

It is true that construction is a sign of development and country or city starts construction activities, just like in Addis, means there is, at least, the thought of jumping from what has been to what it should be in the overall outlook of the specific country/city. When we start such a project, it is wise enough that we see the associated risks in the process how effective efficient they would if risk management is associated with them.

Therefore, the study gap that many of the researchers failed was the risk management practices.

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

3.1. Research Design

The classification of research purpose most often used in the research methods' literature is the threefold one of exploratory, descriptive and explanatory (Saunders, 2004). If this study is mainly on portraying a profile having a clear picture of the phenomena on which you wish to collect data prior to the collection of the data, descriptive design takes the lead.(Robson 2002:59).Accordingly, the descriptive design is selected for this study as explained by Kothari(2004) that the description of the state of affairs as it exists currently.

To provide the smooth sailing of the study, the researcher is opting to proceed as:

Questionnaires were prepared carefully which included the basic questions like respondent's background information, educational status and the close-ended reaction questions aiming at perception and practices of the activities made to manage risks in their respective projects. Data collection was done by distributing questionnaires to purposively selected construction project team members of the case companies. And the respondents were guided with the way they should fill with some explanations to lessen the possible mistakes.

Then, the collected raw data were analyzed using SPSS (using a descriptive statistics) to see the different implications of the results. Based on which concrete conclusions and recommendations are forwarded.

3.2. Data Sources and Types

Basically, there are two types of data types and sources: primary and secondary data types / sources (Saunders et al., 2009). In this study, only the primary data collected through questionnaires from the pre-selected team members are used.

3.3. Sampling design

For this study, the non-probability sampling method is selected Since the researcher deliberately selected the sample against one or more trait to give what is believed to be a representative sample. Nonprobability sampling (or non-random sampling) provides a range of alternative techniques to select samples based on your subjective judgment (Saunders, 2009). Purposive or judgmental sampling enables you to use your judgment to select cases that will best enable you to answer your research question(s) and to meet your objectives. This form of sample is often used when working with very small samples (Saunders, 2009) and it is the method where the researcher deliberately selects the subjects against one or more

trait to give what is believed to be a representative sample (David E. Gray 2004).Therefore, under the non-random sampling research design group, purposive is chosen.

3.4. Sampling Techniques

There respondents had to be selected in such a way that they should be appropriate and /or with expertize directly or indirectly related to the planning, designing and /or executions of the projects. Purposive sampling is to pick out the sample in relation to some criteria important for the particular study (Singh, 2006). Purposive / judgmental sampling is often used when working with small population and enables us to select cases that best fit to answer the research questions and meet objectives (Saunders et al., 2009). In special situations the use of a purposive sample is chosen as the form of data collection (Neuman, 1997).

Hence, according to the suggestions above, in this study, the purposive sample provided the means to investigate a specialized population of the employees in the construction companies who are involved in the planning, designing and executions of the project.

3.5. Target Population and Sampling size

Samples that are too large may waste time, resources and money, while samples that are too small may lead to inaccurate results (Donald, 1972). Hence, appropriate sample size determination is a mandatory task to this regard.

In order to determine number of sample from the population, target population of employees in the three construction companies who are team members and other participants in carrying out the planning, designing and /or execution activities of the construction projects were set.

Since the target population is homogeneous that means the members of the population are similar on the characteristic under study (Donald, 1972), we can take the minimum sample size possible to minimize time, cost and other resources while not affecting the accuracy and other characteristics. Hence, from the data obtained from the respective company's Human Resources records, there are, on average, 150 members of such people in each company; which makes a total of 450 target populations.

Next, sample size was determined by adopting the Curry (1984), Professor of Educational Research's "rule of thumb" on sample size determination. (See Table.3.1. below)

Teferi (2015) had used this rule and done his research.

Table.3.1. Dr. John Curry's "Rule of Thumb" on Sample Size Determination

"Rule of Thumb"	Range of Population Size(N)	Sample Size as a Percentage of Population(S)
RT-1	The larger the population size, the smaller the percentage of the population required to get a representative sample	
RT-2	0-100	100%
RT-3	101 - 1000	10%
RT-4	1001 - 5000	5%
RT-5	5001 - 10000	3%
RT-6	Above 10000	1%

(Source: J.Curry, 1984, with some modifications)

The target populations are the team member who are directly participating in the project executions and those who are members of the planning and designing of the projects and was estimated to be 450. Therefore, according to the Rule of Thumb number 3 (RT-3), a 10% of the target population was taken, sample size was 45. And 45 questionnaire booklets, 15 to each company, were distributed to individuals in the respective companies.

3.6. Procedures of data collection

The data collection was carried out in quantitative methods in such a way that Questionnaire (quantitative) forms were physically distributed to the selected 45 team members and collected back within three weeks' time.

Table 3.2. Questionnaire Distribution Administration in the companies.

	Planning	Design	Execution	Total
Yotek Con'n	5	5	5	15
Flintstone Con'n	5	5	5	15
Akir Con'n	5	5	5	15
Total	15	15	15	45

(Source: Own estimation June, 2017)

3.7. Data analysis methods

Quantitative data collected through questionnaires were compiled on SPSS and interpret them on answering each question. Then, from these analyses conclusions will be drawn.

- Quantitative data will be collected and then
  - Compile the data on an SPSS- descriptive statistics.
  - Interpret the data on answering each question.
  - Draw conclusions

3.8. Research Trustworthiness

In establishing trustworthiness of the research, two concepts are usually taken into account – validity and reliability (Robson 2002). Validity is concerned with the accuracy of the results; it is the extent to which the questionnaires measure what we wanted to measure. Reliability refers to obtaining the same results when repeating exactly the same study and following the same procedures; which is the accuracy / precision of one's measuring procedure or the extent to which a test or questionnaire is homogenous, and allows a reliability coefficient to be calculated. Validity is tested and approved by gaining expert feedback prior to distribution of the questionnaires while the reliability is checked using the SPSS' Cronbach's-Alpha test coefficients and the result is as follows.

Table 3.3. Reliability Statistics Test results

Cronbach's Alpha	N of Items
.920	34

(Source: Own survey results, June, 2017)

3.9. Ethical Considerations

The study thoroughly followed the research ethics. Accordingly, study purpose was clearly stated to the respondents and that all the collected data will be confidential. Besides, all citations are referenced as per the ethical ways.

CHAPTER FOUR: DATA PRESENTATIONS, ANALYSIS AND INTERPRETATIONS

4.1. Introduction:

Data collected through questionnaires from the purposively selected respondents were carefully fed to the SPSS software. Then, using the SPSS descriptive statistics, these data were analyzed to determine the trends of the actual practices of risk management in the selected projects/companies. and interpreted critically. Hence, this chapter presumably deals with these details of data presentation, analysis and interpretations.

4.2. Response Rate:

A questionnaire booklet consisting of 34 questions was distributed to 45 individual respondents selected from the project team members working at three different levels- the project planning team, design team and the project execution team.

All of the 45 questionnaires distributed to the selected respondents were filled properly and returned back. Therefore, this shows that the response rate (RR) was 100% which is more than suitable to proceed with. Accordingly, analysis and presentation was carried out as follows.

4.3. Informants General Information:

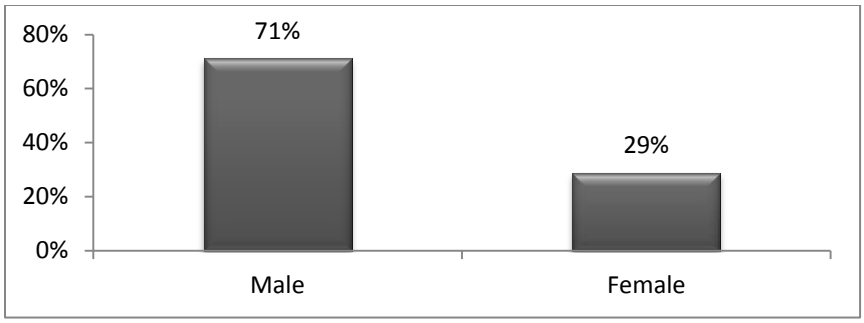
Part one of the questionnaires was intentionally designed to extract the general information – age, Sex, educational level and work experiences of the respondents and their distributions followed by their interpretations are summarized as below.

Table 4.1. Respondents' Age Distributions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-30 Years	10	22.2	22.2	22.2
	31-40 Years	17	37.8	37.8	60.0
	41-50 Years	16	35.6	35.6	95.6
	Above 50 Years	2	4.4	4.4	100.0
	Total	45	100.0	100.0	

(Source: own survey results June, 2017)

From table 4.1., it can be seen that about 22.2% (10) of the 45 respondents' age was between 20 -30 years;37.8% (17) of them were between the age of 31-40 years; 35.6% (16) of them at the age group of 41-50 years and 4.4 % (2) of the respondents were above 50 years of age. This shows that majority of the informants were within the age group of 31-40 years.



(Source: own survey results June, 2017)

Figure 4.1: Respondents Sex Distributions

The genders of the respondents were seen to be 71. % (32) males while 29% (13) of them were females. (Figure 4.1. above). The distribution shows that most (more than half) of the respondents were male.

Table 4.2. Distribution of Respondents' Educational Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma	2	4.4	4.4	4.4
	Degree	33	73.3	73.3	77.8
	Masters	10	22.2	22.2	100.0
	Total	45	100.0	100.0	

(Source: own survey results June, 2017)

According to the analysis results for the educational level, we can see from table 4.2 above that, 4.4% (2) of the respondents were diploma holders, 73.3% (33) of them were first degree holders, while 22.2% (10) of them were postgraduates (master's degree holders) and from which it is seen that most of the respondents held an educational level of first degree which in turn indicates that the respondents had enough knowledge background to respond to the study subject area.

Table 4.3. Respondents' work experience in the area

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 1 Year	3	6.7	6.7	6.7
	1-5 Years	18	40.0	40.0	46.7
	6-10 Years	14	31.1	31.1	77.8
	11-15 Years	6	13.3	13.3	91.1
	Above 15 Years	4	8.9	8.9	100.0
	Total	45	100.0	100.0	

(Source: own survey results June, 2017)

Work experiences of the respondents in the area (construction) were analyzed and observed to be distributed as 6.7 % (3) below one year, 40.0 % (18) between 2-5 years; 31.1% (14) between 6-10 years while 13.3 % (6)of them between 11-15 years and 8.9%(4) of them had above 15 years of experience in the area. (Table 4.3. above). This showed that majority of the respondents had between 2 to 5 years of work experience in the construction area which in turn points that they are quiet experienced to the industry deeply.

Table 4.4. Respondents' work experience in the company

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 1 Year	4	8.9	8.9	8.9
	1-3 Years	12	26.7	26.7	35.6
	4-6 Years	11	24.4	24.4	60.0
	7-10 Years	8	17.8	17.8	77.8
	Above 10 Years	10	22.2	22.2	100.0
	Total	45	100.0	100.0	

(Source: own survey results June, 2017)

In addition to the related work experience in the construction area, respondents were requested to fill for how long they worked in their current respective company and resulted were analyzed as distributed in table 4.5. Accordingly, only 8.9% (4) worked below 1 year, 26.7 % (12) of them had between 1-3 years of experience, while 24.4 % (11) of them had worked for 4-6 years and 17.8 % (8) of are in the category of 7 -10 years of experience and the rest 22.2 % (10) were with the current

company for more than 10 years. Here, it's clear that most of the respondents worked in their respective current companies / projects for 1-3 years and it shows that they had enough time to well know their respective company's trends and standards especially with regard to risk management practices.

4.4. Project Risk Management Respondents:

The respondents were also presented with questions targeted to know the general risk management awareness and know-how and their responses are summarized as follows.

Table 4.5. RM is very important and has more advantages than disadvantages

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	8.9	8.9	8.9
	Uncertain	4	8.9	8.9	17.8
	Agree	6	13.3	13.3	31.1
	Strongly agree	31	68.9	68.9	100.0
	Total	45	100.0	100.0	

(Source: own survey analysis results June, 2017)

From table 4.6 above, we see that only 8.9 % (4) of the respondents strongly disagreed and equally 8.9 % (4) were uncertain that risk management is very important having more advantages than disadvantages but 13.3 % (6) agreed while 68.9 % (31) of them strongly agreed that RM is very important and has more advantages than disadvantages.

Therefore, these presentations show that almost all of the respondents agreed or strongly agreed that risk management is mandatory and accordingly next questions were presented as follows.

Table 4.6. There exists formal procedure of risk management in the company

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	5	11.1	11.1	11.1
	Disagree	3	6.7	6.7	17.8
	Uncertain	11	24.4	24.4	42.2
	Agree	12	26.7	26.7	68.9
	Strongly agree	14	31.1	31.1	100.0
	Total	45	100.0	100.0	

(Source: own survey analysis results June, 2017)

Another statement posed to the respondents was whether there exists formal procedure of risk management in the company or not and was reacted by 11.1 % (5) strong disagreement and 6.7 % (3) disagreement while 24.4 % (11) of them were uncertain whether it existed or not. But, 26.7 % (12) of them agreed and even 31.1 % (14) of them had strong agreement with statement as indicated in table 4.6 above. Hence, we can see that majority of the respondents agreed or strongly agreed that there exists formal procedure of risk management in their respective companies.

Table 4.7. Standard and Defined risk RM guideline exists in the company

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	6.7	6.7	6.7
	disagree	3	6.7	6.7	13.3
	uncertain	15	33.3	33.3	46.7
	agree	16	35.6	35.6	82.2
	strongly agree	8	17.8	17.8	100.0
	Total	45	100.0	100.0	

(Source: own survey analysis results June, 2017)

We saw that majority of the respondents agreed or strongly agreed risk management is very important having more advantages than disadvantages (table 4.5 above) and having this, we requested whether it has formal procedure of management in the company and results (table 4.6) showed that most of the respondents agreed or strongly agreed that there exists formal procedure of risk management in

their respective companies. Then, the researcher continued to request whether there are standardized and defined risk management guidelines in their respective companies and the responses were as tabulated in the above table 4.7.and, it can be seen that only 6.7 % (3) strongly disagreed and equally 6.7 % (3) disagreed while 33.3 % (15) of them were uncertain that there are standardized and defined risk management guidelines in their respective companies. But, 35.6 % (16) and 17.8 % (8) of them agreed and strongly agreed respectively that there are standardized and defined risk management guidelines. And, we can observe that most of the respondents agreed or strongly agreed that there exists Standardized and defined risk management guidelines in the case companies.

Table 4.8. There is responsible body to handle risk management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	6.7	6.7	6.7
	disagree	7	15.6	15.6	22.2
	uncertain	16	35.6	35.6	57.8
	agree	8	17.8	17.8	75.6
	strongly agree	11	24.4	24.4	100.0
	Total	45	100.0	100.0	

(Source: own survey analysis results June, 2017)

Respondents were also requested to suggest whether there is responsible body in the respective company to handle risks that occur in the project / company and their responses were as in the table 4.8 above where 6.7 % (3) of them strongly disagreed and 15.6 % (7) disagreed while 35.6 % (16) of them were still not certain whether there exists responsible body to handle risks or not. In contrast, 17.8 % (8) of the respondents agreed 24.4 % (11) of them strongly agreed even.

From these results, we can see that majority of the respondents were not sure that there exists a responsible body to handle risks that occur in the companies and /or projects.

Table 4.9. RM is a continuous process in the company/project

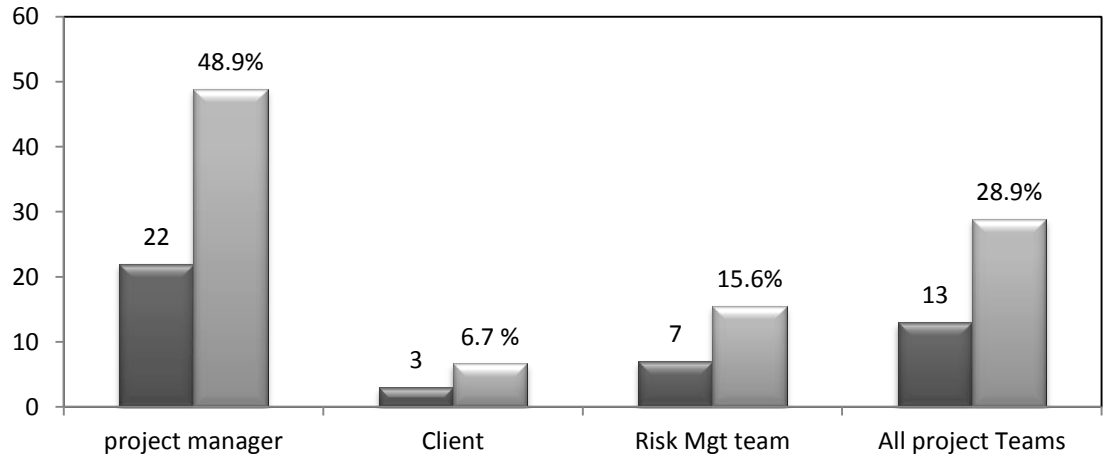
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	5	11.1	11.1	11.1
	disagree	4	8.9	8.9	20.0
	uncertain	12	26.7	26.7	46.7
	agree	14	31.1	31.1	77.8
	strongly agree	10	22.2	22.2	100.0
	Total	45	100.0	100.0	

(Source: own survey analysis results June, 2017)

The other very important question raised to respondents was the intended to know about the process of risk management- whether it is a continuous process or not.

As it can be seen from the above table 4.9, 11.1 % (5) strongly disagreed that risk management is a continuous process in their company / project and 4.9 % (4) disagreed while 26.7 % (12) of them were still uncertain if it's continuous process or not but 31.1 % (14) and 22.2 % (10) of the respondent agreed and strongly agreed with the idea respectively.

Hence, we can see from the result distributions that most of the respondents agreed or strongly agreed that risk management is a continuous process in their respective companies.

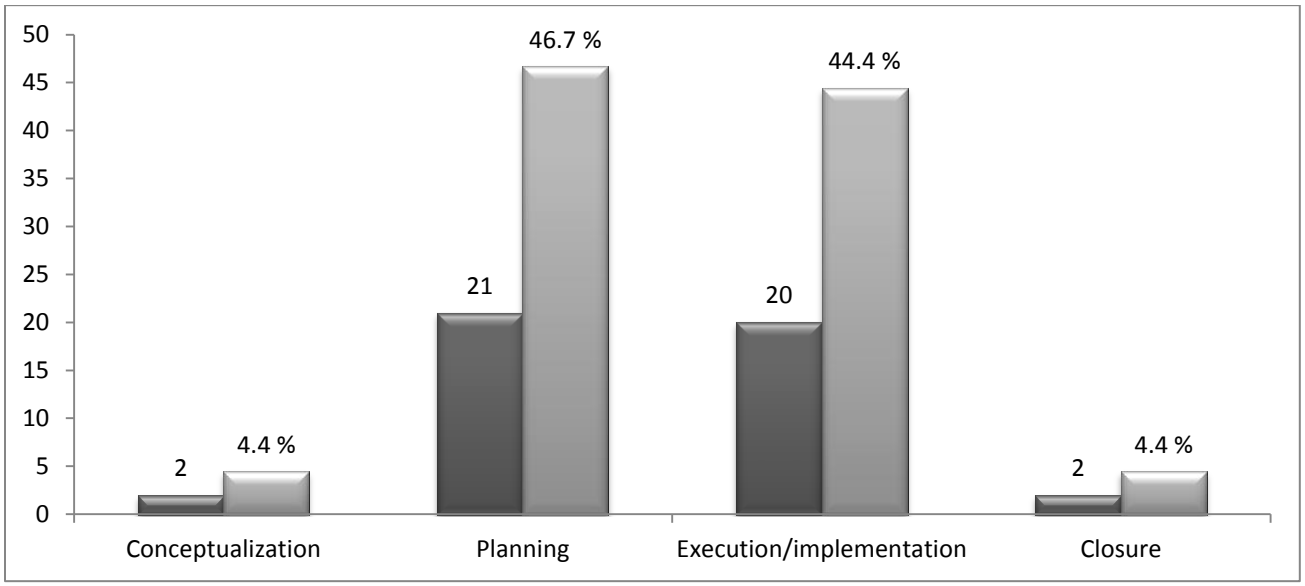


(Source: own survey analysis results June, 2017)

Figure 4.2 risks that occur in the company or projects are mostly handled by

The other important question respondents were request to comment was who handles the project risks that happened to occur, and they reacted in such a way as it can be seen in Figure 4.2 to be 48.9 % (22) responded that the project manager did so, while 6.7 % (3) answered the client handles where as 15.6 % (7) of them chose that risks in the projects were handled by the risk management team and 28.9 % (13) of the respondents believed that all project teams handle the risk together.

From this, it can be seen that greater number of the respondents chose that the project manager handles most of the risks that occur in their respective projects/companies.



(Source: own survey analysis results June, 2017)

Figure 4.3 At which stage of the project risk management is applied

An intentional question to dig out at which stage of the projects is usually risk management is applied was forwarded to the respondents and their response pattern is as depicted in figure 4.3. Above in which 4.4 % (2) of them responded risks are managed at the conceptual stage of the projects and 46.7 % (21) of them replied that the planning stage is their appropriate stage at which risks are managed. At the execution / implementation stage, 44.4 % (20) of the respondents forwarded that it's where risks are managed while 4.4 % (2) of the respondents suggested that risks are managed at the closure stage of the projects.

Here, it can be seen that majority of the respondents responded risk is managed / applied at the planning stage of the projects.

4.5. Project Risk Planning Respondents:

The researcher also forwarded a certain questions to the respondents as to how the risk planning as a risk management process is practiced in the case companies and their responses are analyzed and presented below:

Table 4.10: There exists careful planning to execute risk management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	8.9	8.9	8.9
	disagree	1	2.2	2.2	11.1
	uncertain	10	22.2	22.2	33.3
	agree	20	44.4	44.4	77.8
	strongly agree	10	22.2	22.2	100.0
	Total	45	100.0	100.0	

(Source: Own survey analysis results June, 2017)

A crucial question intended to know whether there existed careful planning to execute risk management was forwarded and the summary of the responses as seen on table 4.12.

8.9 % (4) of the respondents strongly disagree and only 2.2 % (1) disagreed that there were careful planning to carry out risk management while 22.2 % (10) were still uncertain about that. But, 44.4 % (20) of them agreed and even 22.2 % (10) of them strongly agreed that there existed careful planning to execute risk management.

Accordingly, it was seen that greater number of the respondents confirmed that there existed careful planning stage to execute risk management.

Table 4.11: Related stakeholders are involved in planning risks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	8.9	8.9	8.9
	disagree	11	24.4	24.4	33.3
	uncertain	13	28.9	28.9	62.2
	agree	15	33.3	33.3	95.6
	strongly agree	2	4.4	4.4	100.0
	Total	45	100.0	100.0	

(Source: Own survey analysis results June, 2017)

A proposed requesting statement was made to know whether all related stake holders are involved in planning and the reactions of the respondent were analyzed and summarized as in table 4.11 above which can be discussed as follows.

From the 45 selected respondents, 8.9 % (4) of them strongly disagreed that stake holders are involved in risk planning and 24.2% (11) of them disagreed while 28.9 % (13) of them were uncertain about the involvement of the stake holders. But, 33.3 % (15) of them agreed and the remaining 4.4 % (2) of the strongly agreed that relevant stake holders are involved in their respective companies during risk management planning.

Therefore, it can be seen that majority of the respondents agreed that stake holders were involved in planning risk management.

Table 4.12: Meetings are held to gain expert knowledge in planning risk

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	8.9	8.9	8.9
	disagree	8	17.8	17.8	26.7
	uncertain	7	15.6	15.6	42.2
	agree	12	26.7	26.7	68.9
	strongly agree	14	31.1	31.1	100.0
	Total	45	100.0	100.0	

(Source: Own survey analysis results June, 2017)

The researcher was also curious to know whether meetings are held to gain / gather knowledge from experts in the area during planning and a statement was made to know to see the responses and they were as shown in table 4.12. above in which , 8.9 % (4) of them strongly disagreed that meetings are held to gain / gather knowledge from experts in the area during risk planning and 17.8 % (8) of them disagreed while 15.6 % (7) of them were uncertain about such meetings of knowledge gatherings. But, 26.7 % (12) of them agreed and the remaining 31.3 % (14) of them strongly agreed that meetings are held to gain / gather knowledge from experts in the area during planning in their respective companies.

Therefore, it can be seen that majority of the respondents strongly agreed that meetings are held to gain / gather knowledge from experts in the area during planning in their respective companies.

Table 4.13: Environmental factors are included in planning risks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	4.4	4.4	4.4
	disagree	2	4.4	4.4	8.9
	uncertain	7	15.6	15.6	24.4
	agree	25	55.6	55.6	80.0
	strongly agree	9	20.0	20.0	100.0
	Total	45	100.0	100.0	

(Source: Own survey analysis results June, 2017)

A requesting statement target at obtaining information whether environmental factors were included or not in planning risks was made to the respondents and the reactions of the respondent were analyzed and summarized as in table 4.13 above from which one can read that, 4.4 % (2) of them strongly disagreed that environmental factors were included in risk planning and 4.4% (2) of them disagreed while 15.6 % (7) of them were uncertain about the inclusion of the environmental factors. But, 55.6 % (25) of them agreed and the remaining 20 % (9) of them strongly agreed that there is environmental factors inclusion in their respective companies during risk management planning. Thus, it can be seen that majority of the respondents agreed that environmental factors were included in planning risk management.

Table 4.14: Planned trainings on how to handle risks are held to team members

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	4.4	4.4	4.4
	disagree	6	13.3	13.3	17.8
	uncertain	9	20.0	20.0	37.8
	agree	15	33.3	33.3	71.1
	strongly agree	13	28.9	28.9	100.0
	Total	45	100.0	100.0	

(Source: Own survey analysis results June, 2017)

Table 4.14 above clearly shows the tabulation of the reactions of the respondents to the statement that says there exists planned trainings given to the team members on how to handle risks; in which 4.4 % (2) of them strongly disagreed and 13.3% (6) disagreed with that comment while 20.0 % (9) remained uncertain. But, 33.3 % (15) agreed and even 28.9 % (13) strongly agreed that they do plan and conduct trainings to facilitate risk management handling by the team members.
Based on these, it's shown that majority of the respondents agreed that environmental factors are included in risk planning scenarios.

Table 4.15: Risk management plan is incorporated to project plan

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	4.4	4.4	4.4
	disagree	11	24.4	24.4	28.9
	uncertain	7	15.6	15.6	44.4
	agree	7	15.6	15.6	60.0
	strongly agree	18	40.0	40.0	100.0
	Total	45	100.0	100.0	

(Source: Own survey analysis results June, 2017)

Finally, to see in to the efficiency of the risk planning activity another important question was raised as to comment whether the planned risk management activities were incorporated to the projects' plan and the respondents reacted in such a way as it can be seen in table 4.15 above where 4.4 % (2) strongly disagreed with that and 24.4 % (11) of them disagreed while 15.6 % (7) of them were still uncertain. But, 15.6 % (7) of them agreed and 40.0% (18) of them even strongly agreed that risk management plan is well incorporated with the respective project plan.

From this, it can be seen that greater number of the respondents strongly agreed that Risk management plan is incorporated to project plan in their respective projects/companies.

4.6. Project Risk Identification Respondents:

Risk identification is the second step in risk management process, knowing this from the theoretical background, the researcher also forwarded a certain questions to the respondents as to how the risk identification as a risk management process is practiced in the case companies and their responses are analyzed and presented below

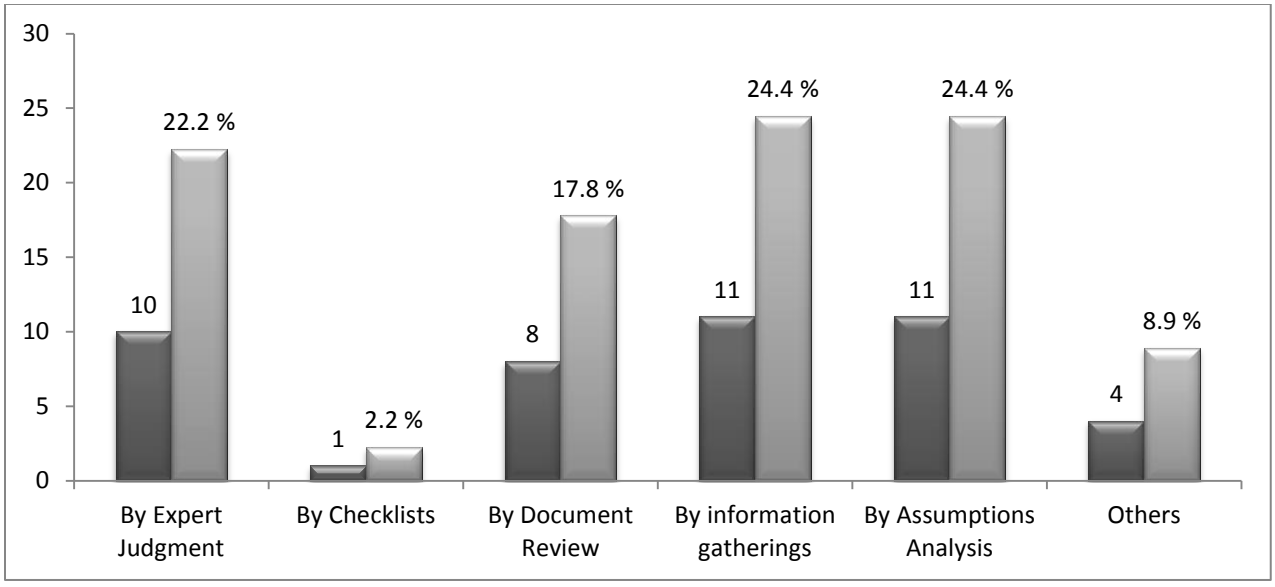
Table 4.16: Source & type of risks are identified ahead & responsibility is made

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	4.4	4.4	4.4
	disagree	5	11.1	11.1	15.6
	uncertain	11	24.4	24.4	40.0
	agree	17	37.8	37.8	77.8
	strongly agree	10	22.2	22.2	100.0
	Total	45	100.0	100.0	

(Source: Own survey analysis results June, 2017)

A requesting statement was made to know whether Source and type of risks are identified ahead and responsibility is made or not and the respondents' responses were as in the above table 4.16. According which 4.4 % (2) strongly disagreed with that and 11.1 % (5) of them disagreed while 24.4 % (11) of them remained uncertain. But, 37.8 % (17) of them agreed and 22.2% (10) of them even strongly agreed that Source and type of risks are identified ahead and risk responsibility is made.

From this, it can be seen that majority of the respondents mildly agreed that Source and type of risks are identified ahead and respective responsibility is made in their respective companies.



(Source: Own survey analysis results June, 2017)

Figure - 4.4. How risk is identified in the respective companies / projects

The researcher had been curious once again that how the potential risks were being identified and forwarded such a question to the respondents to get the results as in figure 4.4. Where 22.2% (10) of them responded risks were identified by expert judgment and only 2.2% (1) of them believed by checklists while 17.8 % (8) of them had a favor to the document review methods. Information gathering and assumptions analysis were chosen equally by 24.4 % (11) of the respondents. The remaining 8.9 % (4) of the respondents suggested that other methods were used to identify potential risks in their companies.

Thus, most of the respondents confirmed that potential risks in the projects / companies were identified either by information gatherings or by assumption analysis.

Table 4.17: All team members in the project do participate in risk identification

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	4.4	4.4	4.4
	disagree	1	2.2	2.2	6.7
	uncertain	20	44.4	44.4	51.1
	agree	16	35.6	35.6	86.7
	strongly agree	6	13.3	13.3	100.0
	Total	45	100.0	100.0	

(Source: Own survey analysis results June, 2017)

Table 4.17 depicts the reactions of the respondents to the statement 'all team members in the respective project/company do participate in identifying potential risks' and it can be observed that 4.4 % (2) of them strongly disagreed with that and 2.2% (1) of them disagreed while 44.4 % (20) of them remained reluctant where as 35.6 % (16) of the respondents agreed and the remaining 13.3 % (6) strongly agreed that team members in the respective project/company do participate in identifying potential risks.

Here, it's observed that majority of the respondents were uncertain whether team members participate or not in identifying potential risks or not.

Table 4.18: Risk is clearly identified in such a way that it's ready for the next step (analysis)

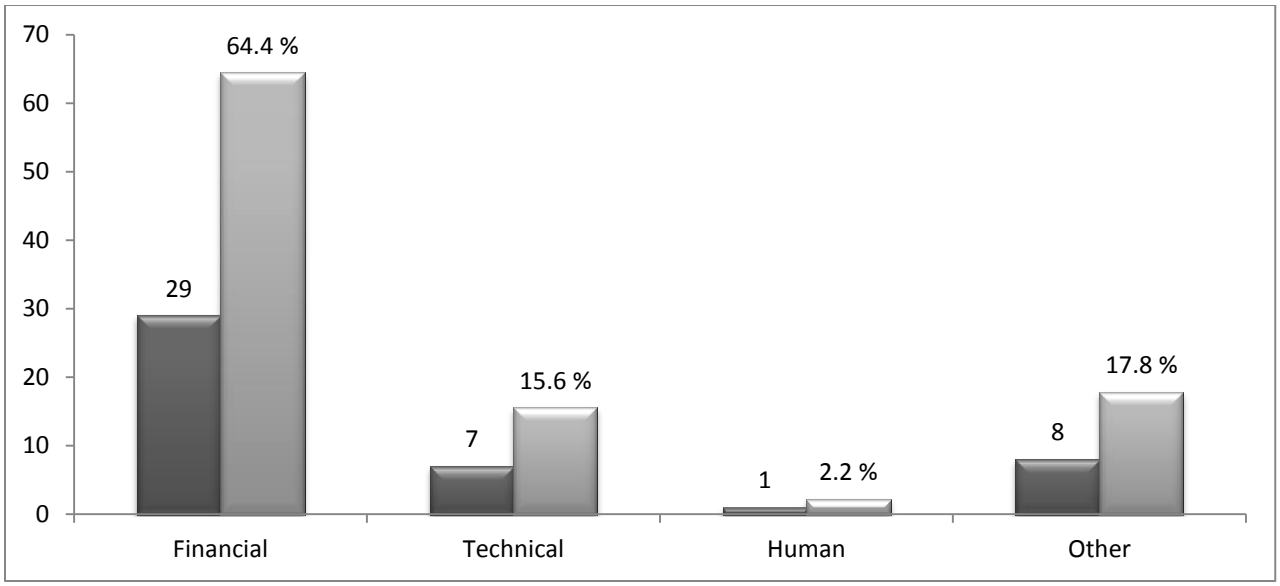
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	5	11.1	11.1	11.1
	uncertain	13	28.9	28.9	40.0
	agree	18	40.0	40.0	80.0
	strongly agree	9	20.0	20.0	100.0
	Total	45	100.0	100.0	

(Source: Own survey analysis results June, 2017)

One of the qualities of completeness of the risk identification process is to put the risks once identified in such a way that they are ready for analysis.to know this characteristics, the researcher had raised such a statement to the respondents and their responses as indicated in table 4.18 above.

Here, we can read that 5 of them (11.1%) disagreed that the once identified risks fully ready to the next step of risk management while 13 of them (28.9%) were not sure of that scenario. But, 18 of the 45 respondents (40%) agreed and 9 (20%) of them even strongly agreed that the query was right.

From which we could see that majority of the respondents agreed that the once identified risks fully ready to the next step of risk management and equal number of respondents also either disagreed or were uncertain.



(Source: Own survey analysis results, 2017)

Figure - 4.5. Most common source of risk in the companies' projects

In the risk identification stage of risk management, respondents were also asked which source of risk was most common and their responses were as presented in the figure above (Figure-4.5) in which 29 respondents (64.4%) put financial risk at the top and 7 (15.6%) of them claimed for technical risks but only 1 (2.2%) respondent said human related risks while the remaining 8 (17.8%) respondents opted for other sources of risks.

It can be read that the majority of the respondents chose that financial risks are the most commonly faced sources of risks in their respective companies.

4.7. Project Risk Analysis Respondents:

Before going to the final action of risk management – responding- risks have to be analyzed and measured in terms of their severity and probability of occurrence and then labeled. The researcher was curious whether such stages are passed through and posed certain questions to the respondents to this end whose responses were analyzed and presented below.

Table 4.19: Risks are characterized and labeled in terms of their impacts and probability of occurrences

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	uncertain	20	44.4	44.4	44.4
	agree	21	46.7	46.7	91.1
	strongly agree	4	8.9	8.9	100.0
	Total	45	100.0	100.0	

(Source: Own survey analysis results June, 2017)

The once identified and made ready risks in the risk identification stage have to be characterized and labeled according to their impacts severity and their probability of occurrence. A question was raised to assess whether this stage was practiced or not and the respondents responses were seen to be distributed as in table 4.19 above where 44.4% (20) of them were just uncertain while 46.7% (21) of them agreed that the risks once identified were characterized and labeled according to their impacts severity and their probability of occurrence and the rest 8.9%(4) strongly agreed.

In sum, we can see that majority of the respondents agreed risks were characterized and labeled according to their impacts severity and their probability of occurrence.

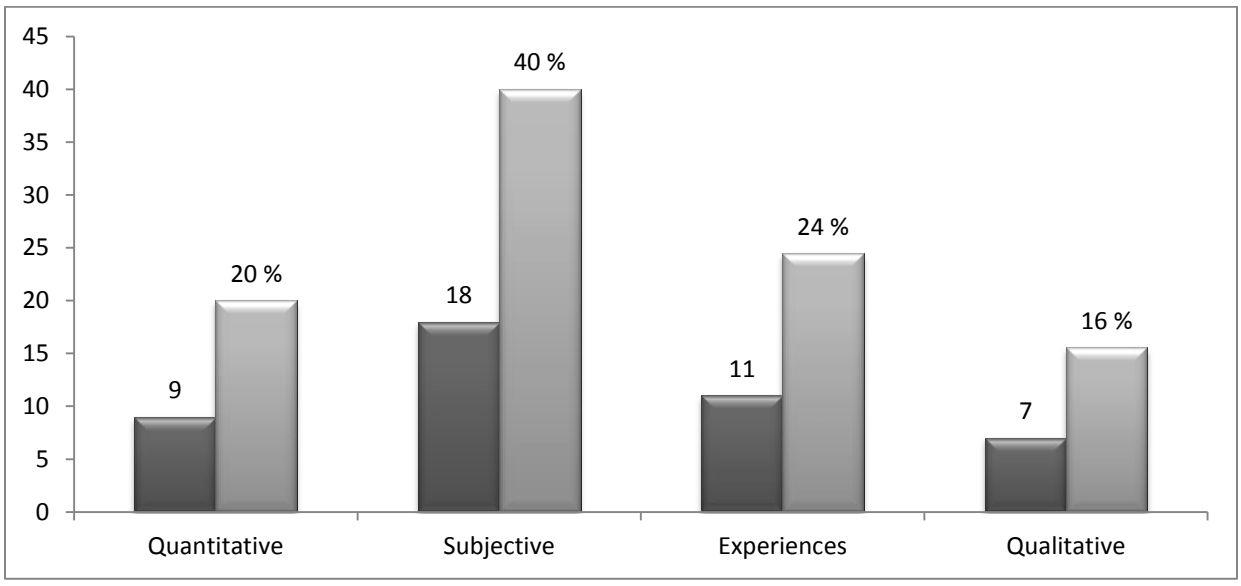
Table 4.20: There exists risk analysis measuring system in the company/project

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	8	17.8	17.8	17.8
	uncertain	13	28.9	28.9	46.7
	agree	21	46.7	46.7	93.3
	strongly agree	3	6.7	6.7	100.0
	Total	45	100.0	100.0	

(Source: Own survey analysis results June, 2017)

Table.4.20 above shows the distribution of the respondents to the requesting statement whether there exists risk analysis measuring system in the respective company and 8 (17.8%) of them disagreed with that while 13 (28.9%) of them were uncertain. But, 21 (46.7%) agreed and 3 (6.7%) of the respondents even strongly agreed.

Thus, greater number of the respondents was observed to agree that there exists risk analysis measuring system in their respective company.



(Source: Own survey analysis results June, 2017)

Figure 4.6. Most used method of forecast of risk occurrences in the company

Figure 4.6. Above tried to reveal the respondents' reaction to the most used method of forecast of risk occurrences in their company and 20% (9) of them responded that numerical Analysis methods (Quantitative) is the most common, 40% (18) of them favored Probability based on an expert judgment (Subjective) as 24% (11) of them chose the Probability ranking based on past experience and the rest 16% (7) of the respondents preferred the Probability assessment based on historical data (Qualitatively).

Therefore, the greatest number of respondents responded that the subjective method is most used method forecast of probability of risk occurrences in their respective companies.

4.8. Project Risk Responses Respondents:

Responding appropriately to the once identified and analyzed risks is the last stage before risk monitoring and controlling in the risk management process, knowing this from the theoretical background, the researcher also forwarded a certain questions to the respondents as to how the risk response as a risk management process is practiced in the case companies and their responses are analyzed and presented below

Table 4.21: Identified and analyzed risks are allocated in a well-defined manner

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	8	17.8	17.8	17.8
	uncertain	13	28.9	28.9	46.7
	agree	19	42.2	42.2	88.9
	strongly agree	5	11.1	11.1	100.0
	Total	45	100.0	100.0	

(Source: Own survey analysis results June, 2017)

According to table 4.21 above which depicts the respondents responses distributions with regard to question whether the once identified and analyzed risks were allocated in well defied manner in their respective companies, we can read that 17.8% (8) of them disagreed, 28.9% (13) remained uncertain, 42.2% (19) of them agreed and 11.1 % (5) strongly agreed that the identified and analyzed risks were allocated in well defied manner in their respective companies. From which we can observe that majority of the respondents agreed with statement.

Table 4.22: There is well-developed strategy to respond to risk

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	6	13.3	13.3	13.3
	uncertain	18	40.0	40.0	53.3
	agree	16	35.6	35.6	88.9
	strongly agree	5	11.1	11.1	100.0
	Total	45	100.0	100.0	

(Source: Own survey analysis results June, 2017)

After well definition and allocation of the analyzed risks, the selection of a proper risk response options are sought for and respondents were requested to react to the statement that said there exists well developed risk response strategy in their respective companies and their reactions were collected and presented as in the table 4.22 above according to which only 13.3 % (6) of them disagreed as 40% (18) of them were not sure. But, 35.6% (16) of them agreed and 11.1 (5) of them strongly agreed that there existed well developed risk response strategy in their respective companies.

Here, we could see that majority of the respondents were uncertain whether there existed well developed risk response strategy in the case companies or not.

Table 4.23: Budget, schedule & resources factors are considered in responding to risk

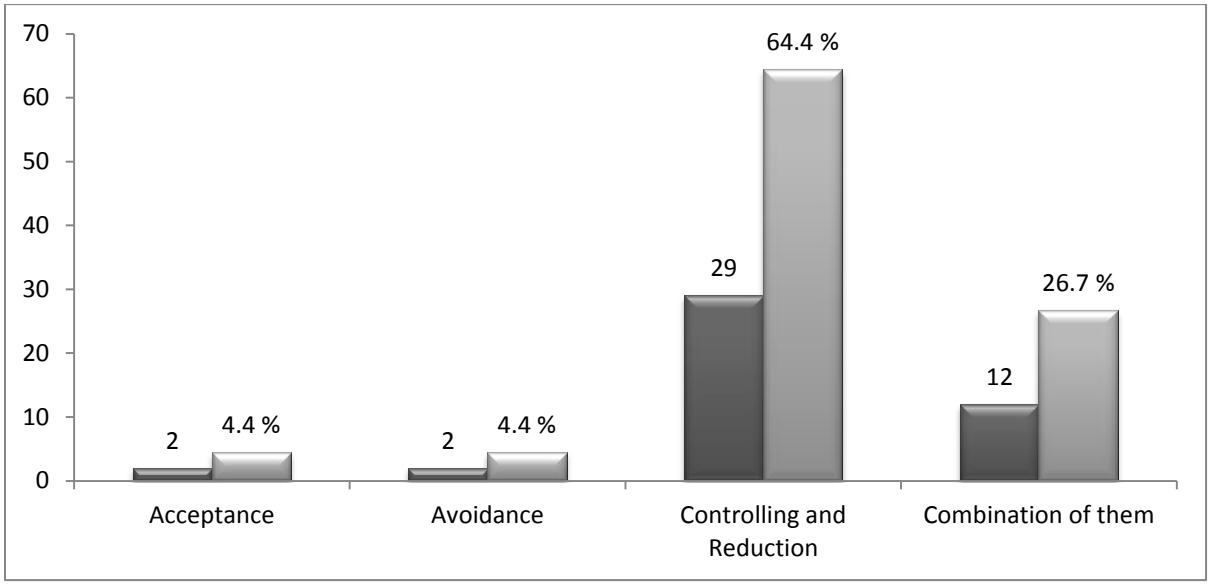
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	3	6.7	6.7	6.7
	uncertain	12	26.7	26.7	33.3
	agree	25	55.6	55.6	88.9
	strongly agree	5	11.1	11.1	100.0
	Total	45	100.0	100.0	

(Source: Own survey analysis results June, 2017)

Table 4.23. Shows the distributions of the answers to the questions which was raised by the researcher to extract reactions whether budget, schedule and resources factors were considered during responding to the risks and according to the same table: only 6.7% (3) of the respondents disagreed,

26.7 % (12) of them remained uncertain, 55.6% (25) of them agreed and 11.1%(5) strongly agreed that budget, schedule and resources factors were considered during responding to the risks.

Accordingly, we could observe that majority of the respondents agreed that budget, schedule and resources factors were considered during responding to the risks in their respective companies.



(Source: Own survey analysis results June, 2017)

Figure 4.7. Most commonly used method of risk response options in the company

After doing all the risk responses preparations, the next stage is to respond to the risks efficiently, effectively and appropriately. The researcher once again depended for the reactions of the respondents as how most commonly responded to risks in their companies/projects. Their reactions were as in figure 4.7 above from which only 4.4%(2) of them responded acceptance, equal number of them said avoidance, while 64.4% (29) of them favored for controlling and reducing options and 26.7% (12) chose combination the other methods were the Most commonly used method of risk response options in their companies.

Therefore, it was seen that majority of the respondents confirmed that the most commonly used method of risk response was the risk controlling and reduction option.

4.9. Project Risk Monitoring and Controlling Respondents:

Once a risk response is made doesn't mean risk management is over because risk is versatile and pervasive. Thus, we have to systematically track and evaluate the performance of the applied risk response actions against established metrics in which there might be residual risks and /or totally new risks. Hence, risk monitoring and controlling concept comes and the researcher considered once again certain questions to dig out the practices of risk monitoring and controlling the case companies.

Accordingly, responses/reactions to the questions and / or proposed statements were collected and analyzed as follows.

Table 4.24: Currently Projects are monitored & controlled based on the results

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	6.7	6.7	6.7
	uncertain	13	28.9	28.9	35.6
	agree	15	33.3	33.3	68.9
	strongly agree	14	31.1	31.1	100.0
	Total	45	100.0	100.0	

(Source: Own survey analysis results June, 2017)

Table 4.24. above shows the distributions of the reactions of respondents to whether projects in the respective companies' projects are currently monitored and controlled as per the results of the risk management results and it can be seen that only 3 (6.7%) of them strongly disagreed while 13 (28.9%) of them remained uncertain. 15 (33.3%) agreed and 14 (31.1%) strongly agreed.

Summing, majority of the respondents agreed that projects in the respective companies are currently monitored and controlled according to the risk analysis and responses results.

Table 4.25: Project risk monitoring & controlling comply with the standards and procedures

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	2	4.4	4.4	4.4
	uncertain	21	46.7	46.7	51.1
	agree	16	35.6	35.6	86.7
	strongly agree	6	13.3	13.3	100.0
	Total	45	100.0	100.0	

(Source: Own survey analysis results June, 2017)

The other probing statement the researcher wanted to be reacted was whether risk monitoring and controlling practices were in compliance with the standards and procedures and the respondents reacted as summarized in table 4.25. above. According to this table, 2 (4.4%) of them disagreed but 21 (46.7%) of them were not sure whether risk monitoring and controlling practices were in compliance with the standards and procedures. 16 (35.6%) of the respondents agreed and the remaining 6 (13.3%) strongly agreed. From these results, we can deduce that greater number of the respondents was uncertain to whether risk monitoring and controlling practices were in compliance with the standards and procedures

Table 4.26: There exists available information to supplement risk control & monitor

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	uncertain	13	28.9	28.9	28.9
	agree	25	55.6	55.6	84.4
	strongly agree	7	15.6	15.6	100.0
	Total	45	100.0	100.0	

(Source: Own survey analysis results June, 2017)

Table 4.26. shows respondents reactions summary to whether there existed readymade information to supplement risk monitoring and controlling which showed that 13 (28.9%) of them remained uncertain while 25 (55.6%) of them agreed and 7 (15.6%) respondents even strongly agreed that risk monitoring and controlling was supplemented with available pieces of information.

Hence, majority of the respondents agreed that there existed available information to supplement risk controlling and monitoring in their respective companies.

Table 4.27: Risks are monitored & controlled in line with the goals and objectives of the project/company

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	3	6.7	6.7	6.7
	uncertain	10	22.2	22.2	28.9
	agree	21	46.7	46.7	75.6
	strongly agree	11	24.4	24.4	100.0
	Total	45	100.0	100.0	

(Source: Own survey analysis results June, 2017)

Another stimulating statement posed by the researcher to know whether risk monitoring and controlling was no at the expense of their company's goals and objectives rather inline and supportive and the respondents' reactions were as summarized in table 4.27. above.

Where only 3 (6.7 %) of them disagreed and 10(22.2%) of them were uncertain. But, 21 (46.7%) of the respondents had agreed and 11(24.4%) strongly agreed that risks were monitored and controlled in line with the goals and objectives of the companies.

Therefore, it is deductible that majority of the respondents agreed that risks are monitored and controlled in line with the goals and objectives of the project/company

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1. Introductions:

In this chapter the data analyzed, presented and interpreted in the previous chapter are summarized. Next, based on the summary of the major findings, conclusions are made and finally, important recommendations will be forwarded to improve and consolidate the current practices and future prospects.

5.2. Summary of Major Findings:

The major findings in the study, from the analysis, presentations and interpretations in chapter four, are collected and summarized as follows.

According to the responses from the respondents to the basic and general questions regarding risk management awareness and practices, it was found that risk management is very important having more advantages than disadvantages; and there existed formal procedures of risk management beside to standardized and well-defined risk management process.

The analysis also showed that there existed no responsible body to handle risks and uncertainties that occur in their projects but the project manager mostly observed to deal with them. Moreover, though risk management is a continuous process in the companies, it more applied at the planning stages of the projects.

With regard to the analysis results of the responses concerning the risk management planning practices, majority of respondents confirmed that there existed careful planning process to execute risk management in which all related stakeholders are involved and meetings are held to gain expert judgments as an input to planning risk management. Environmental factors are also taken in consideration during planning for uncertainties that may occur the projects of the companies. Besides, planned trainings are given to team members in the project on how to handle risk and uncertainties, and the risk management plan developed is finally incorporated to the project overall / master plan.

During risk identification stage, respondents' responses analysis disclosed that the source and type of risks are identified ahead with recognition of potential risk event conditions in the

construction project and the clarification of risk responsibilities is made and risks are mostly identified by a combination of information gathering and assumptions analysis equally.
Although the analysis results showed that not all team members in the project do participate in the identification of risks, risks are clearly identified in this step to develop a basis for the next steps that is analysis and control of risk management and the most common source of risks in the projects of the case companies, as agreed by the respondents, were financial risks.

According to the responses data analysis about the risk analysis stage, Most of the respondents agreed that before analyzing the identified risks, their characteristics are thought for and a description of each risk and its impacts or the subjective labeling of risk (high/medium/low) in terms of both risk impact and probability of its occurrence is made and there exists risk analysis measurement system in the projects/companies. They also replied that the most commonly used technique to forecast the probability of occurrence of risks in their projects is Probability based on an expert judgment (Subjective method) followed by Probability ranking based on past experience.

In connection to the risk responding stage of the risk management process, analysis of the responses from the respondents indicated that risks are properly identified and allocated in a well-defined manner and during responding to risk, factors like budget, schedule and resources are considered but majority of the respondents were not certain that there existed a well-developed strategy to respond to risk. Controlling and reducing - absorbing and attempting to minimize risk in some way – is the method most commonly practiced to respond to or mitigate risks that happened to occur in their projects according to the responses of the participants.

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The major findings about the risk monitoring and controlling practices of the case companies' projects indicated that majority of the respondents agreed risks are monitored and controlled based on the current results of the projects and there existed available information to supplement project risk monitoring and controlling. Besides, greater number of the respondents confirmed that risk were monitored and controlled in line with the goals and objectives of the companies while they remained uncertain that these risk monitoring and controlling practices were in compliance with the accepted standards and procedures.

5.3. Conclusions:

Risk management practices in the three construction companies have analyzed in the thesis project and to sum up the works, the following conclusions have been reached.

From the study analysis, it was found that there was no single responsible body to handle risks that happen to occur in the projects of the case companies and the project manager alone is claimed to do so most of the time. Even though risk management is found to be a continuous process throughout the project life cycles, it was identified that risk management is applied only at the planning stage most of the time.

The analysis results of the responses to the risk management planning practices, majority of respondents confirmed that there existed careful planning process to execute risk management in which all related stakeholders are involved and meetings are held to gain expert judgments as an input to planning risk management. Environmental factors are also taken in consideration during planning for uncertainties that may occur the projects of the companies. Besides, planned trainings are given to team members in the project on how to handle risk and uncertainties, and the risk management plan developed is finally incorporated to the project overall / master plan.

Sources and type of risks are identified ahead to identify potential risk events and conditions in the construction project and a responsible body assigned to clarify who handles which risk. Risks, identified by a combination of information gathering and assumptions analysis equally, are clearly identified in this step to develop a basis for the next steps. It was revealed that not all team members in the project do participate in the identification of risks and the most common source of risks in the projects of the case companies were found to be financial risks.

Risks were characterized and describe as per their s severity of impacts and probability of occurrences and then labeled high, medium or low for which a responsible body is made and there exists risk analysis measurement system in the projects/companies. The most commonly used forecasting technique of probability of occurrence of risks in the projects are the Probability based on an expert judgment (Subjective method) followed by Probability ranking based on past experience.

Risk responding processes are carried out by first properly identifying and allocating in a well-defined manner and considering factors like budget, schedule and resources to avoid or minimize the negative of risks while improving its positive side. There existed no well-developed strategy to respond to risk but Controlling and reducing is the method most commonly practiced to respond to or mitigate risks that happened to occur in their projects.

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Risk monitoring and controlling practices of the case companies' projects indicated that risks are monitored and controlled based on the current results of the projects and team members use available information to supplement project risk monitoring and controlling. Besides, it can be concluded that risk are monitored and controlled in line with the goals and objectives of the companies though these practices were not in compliance with the accepted standards and procedures.

All in all, it can be concluded that risk management is partially practiced in the case companies.

5.4. Recommendations:

The research has tried to exhaustively review different works related to the risk management. And, there happened that similar works showed there is little, if any, risk management practices. To this end, the researcher identified a gap between the theoretical essences of the topic as compared to the actual practices. To fill this gap, this study was conducted on the three construction companies' projects and the results revealed similar findings which indicated there are still things to be done. Therefore, possible recommendation is to tackle and narrow such gap is what most expected from a researcher and these are forwarded as follows:

Risk is not just one dimensional and can't be tackled alone, hence; it's highly recommended that all stakeholders participate and prepare a standard checklists and guidelines that should enable the team members in the case companies' projects in particular and all other construction projects / companies to properly exercise risk management in a well-defined scenario and in a continuous manner all-round the project management process groups.

Companies, whether these case companies or other else, are here recommended that they have to assign a responsible body to act up on risks in collaboration with the project teams. Of course, risk management is practiced in team but one responsible body to coordinate is mandatory otherwise it will remain being as 'everybody responsibility is no body's responsibility'. Risk has to be acted up on in continuous manner starting from the project inception all the way to the closure stages.

Responding to risks might be risky by itself either in the performance of the course of action in the projects or even in the risk to respond to too. Hence, proper and appropriate risk response option planning is doubly important and it is here by recommended to do so.

It is also worthily recommended that all team members should participate in the identification and in all stages of the project risk management process because risk should be revealed to all so it can followed up for timely acting up on and to make use of it.

The other important recommendation here is that companies in general or projects of a certain company in particular should, in collaboration, have a well-developed strategy to respond to risks.

Finally , this study was done focusing only three construction companies and depending expert respondents in these companies which makes a bit mild to fully conclude, though no research complete. Hence, the researcher recommends that further studies have to be to consolidate the idea by incorporating and expanding more companies of these kinds horizontally and more respondents from each company from the experts in the planning down to the executors to check / study that risk management is practiced in the whole cycle from the inception to the implementation.

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APPENDICES

APPENDIX I – QUESTIONNAIRES

APPENDIX II–OUTPUT SUMMARY TABLE AND FIGURES

APPENDIX I – QUESTIONNAIRES

Addis Ababa University

School of Commerce

Project Management Stream

MA Program

Dear Participant;

My name is Getachew Yirga. I am an MA student in project management at Addis Ababa University School of Commerce. As part and parcel of my MA in project management, I'm studying the ***Analysis of Risk Management Practices in construction projects***.

I kindly request you to participate in this study by patiently completing the questionnaires. And, I hereby assure you that all the information will remain confidential and do not include your name in the questionnaires.

Besides, I sincerely request you to respond to the questions as per the actual projects'/company's perspective, not the general perspective. And, as honestly as possible.

Needless to say, that your time is invaluable, please take few minutes of your precious time to complete the following questionnaires.

If you have any hesitation or question,

Email: getchyirga@yahoo.com

Tel: 0911844010

Thank you very much for your time and kind cooperation!!

Getachew Yirga

June, 2017

Addis Ababa, Ethiopia

Questionnaires

General instruction and information

Dear participant, this questionnaire booklet has three parts: part I – including questions about general information of the respondent, part II has multiple choice questions regarding basic information about risk management and part III comprises close-ended questions about the risk management survey.

Part I: General Information of respondent: tick (√) on the respective boxes

1. Age: 20-30 □ 31 – 40 □ 41 – 50 □ above 50 years □
2. Sex: Male □ Female □
3. Level of education: Diploma □ Degree □ Masters □ other □
4. Years of working experience in the area:
   Below 1 □ 1 – 5 □ 6 – 10 □ 11 – 15 □ above 15 □
5. Years of working experience in this company/project:
   Below 1 □ 1 – 3 □ 4 – 6 □ 7– 10 □ above 10 □

Part II: Basic Information questions (Circle one alternative that best matches your opinion regarding risk management)

1. Who mostly handles the uncertainties and hazards that occur in the project?
   a. The project manager
   b. The consultant
   c. The client
   d. A risk management team
   e. All project teams together
   f. Others ----------
2. In which stage of the project is risk management applied / implemented?
   a. At the project conceptualization stage
   b. At the project planning stage
   c. At the project execution implementation stage
   d. At the project closure stage
3. How is risk identified primarily in the project? (*Risk Identification*)
   a. By expert judgment
   b. By checklists
   c. By document review
   d. By gathering information
   e. By assumption analysis
   f. Other----------
4. What is the source of risk that your project / s usually face? (*Risk Identification*)
   a. Financial
   b. Technical
   c. Human
   d. Other
5. What techniques do you use to forecast the probability of occurrence of risks in your project? (*Risk Analysis*)
   a. Numerical Analysis methods (Quantitative)
   b. Probability based on an expert judgment (Subjective)
   c. Probability ranking based on past experience
   d. Probability assessment based on historical data (Qualitatively)
6. How do you mitigate / respond to risks that happened to occur in your project? (*Risk Response*)
   a. By acceptance – Retaining risks without mitigating them
   b. By transferring –shift the burden of a particular risk to another stakeholder
   c. By avoidance – deliberately taking another course of action
   d. By control and reduction – absorbing and attempting to minimize risk in some way.
   e. By combinations of these- mostly a,b & d

Part III: Main Questions on risk management practices in the project /company

Indicate your opinion by marking (you can put √ or ×) the corresponding appropriate box corresponding to the number against the respective questions on the following five point scale questions that best describes your perception about the risk management practices in the project / company.

Note: ***1*** *= strongly disagree,* ***2*** *= disagree,* ***3*** *= uncertain,* ***4*** *= agree* and ***5 =*** *strongly agree*

S/No	Questions / statements	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
Risk Management in General		**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
1	Risk management is very important and it has more advantages than disadvantages					
2	Company has specific processes of identifying risk associated with a project					
3	Your company/project has defined /standardized risk management process					
4	There is a responsible body to handle risk or uncertainty problem when it occurs					
5	Risk management is a continuous process in your company/project					
Risk Planning		**1**	**2**	**3**	**4`**	**5**
6	There is a systematic approach based on a careful planning to execute risk management in the project					
7	Related stakeholders are involved in risk planning process to manage risk					
8	Meetings are held to gain expert judgment in planning risks that might occur in the project					
9	To plan for uncertainties, environmental factors are included as inputs					
10	Trainings are given / planned to team members in the project on how to handle risk / uncertainties					
11	The risk management plan developed is incorporated to the project plan					
Risk Identification		**1**	**2**	**3**	**4`**	**5**
12	The source and type of risks are identified ahead with recognition of potential risk event conditions in the construction project and the clarification of risk responsibilities is made.					
13	In risk identification, all team members in the project do participate					
14	Risk is clearly identified in this step to develop a basis for the next steps: analysis and control of risk management.					
Risk Analysis		**1**	**2**	**3**	**4`**	**5**
15	Before analyzing the identified risk, its characteristics are thought for and a description of each risk and its impacts or the subjective labeling of risk (high/medium/low) in terms of both risk impact and probability of its occurrence is made					
16	There is risk analysis measurement system in the project/company					
Risk Responses		**1**	**2**	**3**	**4`**	**5**
17	Risks are properly identified and allocated in a well-defined manner					
18	Within your project/company, there is a well-developed strategy to respond to risk					
19	While responding to risk, factors like budget, schedule and resources are considered					
Risk monitoring and controlling		**1**	**2**	**3**	**4`**	**5**
20	Projects are monitored and controlled based on the results					
21	Risk Monitoring and controlling processes in the project complies with the standards and procedures					
22	Available information is used as supplement to control risks					
23	Risks that are already faced in the project are controlled in line with the goal and objective of the project					

APPENDIX II – OUTPUT SUMMARY TABLES AND FIGURES

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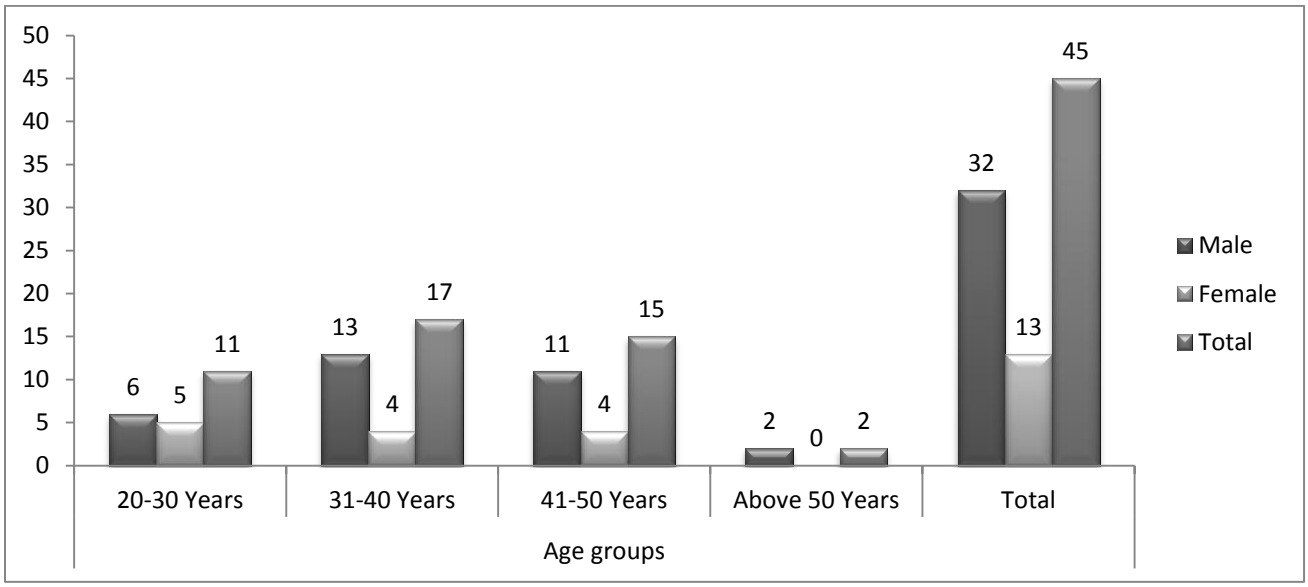

Figure-1. Respondents Age and Gender Distributions (Source: own survey data analysis June, 2017)

Table -1. Respondents' educational level and work experiences distributions

		Respondents' Educational Level			Total
		Diploma	Degree	Masters	
Respondents' work experience in the area	Below 1 Year	0	0	3	3
	2-5 Years	0	15	3	18
	6-10 Years	2	12	0	14
	11-15 Years	0	2	4	6
	Above 15 Years	0	4	0	4
Total		2	33	10	45

(Source: own survey data analysis June, 2017)

Table 2. Summary of Risk Management Responses an Median

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	6.7	6.7	6.7
	disagree	2	4.4	4.4	11.1
	uncertain	15	33.3	33.3	44.4
	agree	18	40.0	40.0	84.4
	strongly agree	7	15.6	15.6	100.0
	Total	45	100.0	100.0	

Table 3. Summary of Risk Management Planning Responses Computed at Median

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	4.4	4.4	4.4
	disagree	4	8.9	8.9	13.3
	uncertain	13	28.9	28.9	42.2
	agree	14	31.1	31.1	73.3
	strongly agree	12	26.7	26.7	100.0
	Total	45	100.0	100.0	

Table 4. Summary of Risk Identification Practices Responses Computed at Median

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	4.4	4.4	4.4
	disagree	2	4.4	4.4	8.9
	uncertain	14	31.1	31.1	40.0
	agree	23	51.1	51.1	91.1
	strongly agree	4	8.9	8.9	100.0
	Total	45	100.0	100.0	

Table 5. Summary of Risk Analysis Practices Responses Computed an Median

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	2	4.4	4.4	4.4
	uncertain	21	46.7	46.7	51.1
	agree	22	48.9	48.9	100.0
	Total	45	100.0	100.0	

Table 6. Summary of Risk Responding Options Responses Computed an Median

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	uncertain	21	46.7	46.7	46.7
	agree	17	37.8	37.8	84.4
	strongly agree	7	15.6	15.6	100.0
	Total	45	100.0	100.0	

Table 7. Summary of Risk Monitoring and Controlling Responses Computed at Median

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	uncertain	13	28.9	28.9	28.9
	agree	22	48.9	48.9	77.8
	strongly agree	10	22.2	22.2	100.0
	Total	45	100.0	100.0	