ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

DEPARTMENT OF PROJECT MANAGEMENT

POST GRADUATE PROGRAM

A Study on Risk Attitude and Management in Construction Projects Evidence from Elmi Olindo Contractors Private Limited Company

A Research Project Report submitted in Partial Fulfillment of the Requirements for the Award of Master of Arts Degree in Project Management

By: Benny Bahata

Advisor: Teklegiorgis Assefa (Asst. Prof.)

July, 2019

Addis Ababa, Ethiopia

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Approved by Board of Examiners

Teklegiorgis Assefa (Asst. Prof.)	_____	_____
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Internal Examiner	Signature	Date
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External Examiner	Signature	Date

ENDORSEMENT

This Research Project entitled ‘A Study on Risk Attitude and Management in Construction Projects – Evidence from Elmi Olindo Contractors Private Limited Company’ has been submitted to Addis Ababa University School of Commerce, Department of Project Management, with my guidance and approval as a University Advisor.

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Teklegiorgis Assefa

(Asst. Professor)

DECLARATION

I Benny Bahata, declare that this Research Project entitled ‘Risk Attitude and Management in Construction Projects – Evidence from Elmi Olindo Contractors Private Limited Company’ is my own original work. It contains no material which has been accepted for the award of any other degree of the University or any other institution of higher learning. All sources of materials used for the research paper have been duly acknowledged.

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Benny Bahata

AKNOWLEDGEMENT

I would like to express my sincere appreciation and thanks to Teklegiorgis Assefa (Asst. Professor) for his time, patience and guidance throughout this research.

I would also like to especially thank my family for putting up with my absence and the many hours of work required to conduct this research. Thank you Mekdy, Hiyab, Naomi and Mamy.

My appreciation also goes to Elmi Olindo Contractors Plc, the project managers and project management team members who gave their valuable time filling the questionnaires, answering the interviews and also giving me their valuable suggestions and recommendations. I trust that the findings will be of benefit to you and the project management discipline and that they will provide insights for further investigation into the intricacies of managing uncertainty and risk in complex project environments, to continually improve project delivery into the future.

ABSTARCT

The Ethiopian construction industry is subject to more risk and uncertainty than many other industries. The primary purpose of this study was to analyze risk attitude and management in construction projects undertaken by Elmi Olindo Contractors Plc, a grade 1 contractor operating in Ethiopia for over 70 years. Several literatures were assessed to show the relationship of risk attitude, risk taking behavior, risks in the Ethiopian construction industry, risk management systems and processes. Consequently, the research questions were aimed at identifying the risk attitude and perception among project managers and project management team in construction projects undertaken by Elmi, and also identifying the risk management systems, practices and processes implemented both at a project level as well as at a company level. A survey strategy was employed that allowed the collection of quantitative and qualitative data that was analyzed in order to meet the research objectives. A census was undertaken to determine the target population that consisted of 36 project managers and project management team members that had decision making roles in the 15 construction projects undertaken by Elmi at the time of the study. A response rate of 91.67% was achieved and was found to be acceptable. The research findings showed that there is a predominant negative perception of risk among the project managers and project management team members of Elmi Olindo Contractors Plc. Most of them view themselves as individuals that take calculated risks. While undertaking construction operations in their view the company faces technical risks, management related risks, socio-political risks, financial risks and environmental risks. Elmi doesn't have a risk management guideline, standard, auditing mechanism and has rarely organized trainings and workshops on risk management planning, implementation and monitoring in order to improve the knowledge and awareness of the decision makers (i.e. project manager and the project management team members) that at the moment are forced to rely only on their experience and eventual academic courses taken. Further research can be undertaken to assess the risk attitude and perception of different stakeholders involved in the construction sector as well as their risk management strategies, systems and practices.

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1. INTRODUCTION

1.1 Background of the study

Construction projects are undertaken in dynamic, complex and challenging environments and therefore the eventual success of these projects is clouded by uncertainty and risk.

Having the right plan is essential for any project, and we need to engage the best people to execute the plan. Unfortunately fulfilling both of these conditions does not guarantee success. There are a host of factors which may play a role in determining the outcome whether a project has been successful or not. These are called project risks.

According to Tesfaye (2018), the Ethiopian construction industry is subject to more risk and uncertainty than many other industries. The development of a construction project from inception to completion takes a long time and involves many phases. It brings workers with different skills and interests together and involves the use of large and diverse sets of equipment. All of these complex requirements have to be handled with proper co-ordination to provide a smooth flow of activities. It is necessary to identify and analyze the risks that may appear during the execution of the project.

Consequently, the success of every project will eventually depend on the risk attitude of decision makers, project managers and project management team involved in construction activities and also the establishment of an efficient risk management system.

This study presumed that there is a biased and overlooked risk attitude among decision makers, project managers and project management team involved in construction projects that will establish a weak, confused and inefficient risk management process which constitutes one of the major causes of failure in construction projects. This study focuses on construction projects undertaken by Elmi Olindo Contractors Plc which is a Grade 1 General Contractor operating in Ethiopia for over 70 years.

This study was carried out in 15 building construction projects undertaken by Elmi Olindo Contractors Plc at the time of the study, in order to assess the risk attitudes and management practices employed by decision makers i.e. project managers and project management team members. The projects are located in Addis Ababa as well as in different parts of Ethiopia.

The following table highlights the number of projects and their geographical location in Ethiopia.

Table 1: Location and number of projects

Item No.	Projects Location	No. of projects
1	Addis Ababa	9
2	Sebeta	1
3	Debrezeit / Bishoftu	1
4	Debreberhan	1
5	Gondar	1
6	Bedele	1
7	Harar	1
	TOTAL	**15**

Source: *Active construction projects from company data (2019)*

The projects were selected based on the approval obtained and the projects timing in relation to the research undertaken. All the projects that the study addressed were at the stage of execution (implementation) during the time this study was undertaken.

1.2 Background of the Company

Elmi Olindo Contractors Plc is a local construction company registered at the Ethiopian Ministry of Construction and Urban Development as a grade 1 general contractor. It has been operating in the Ethiopian construction industry for over 70 years. With extensive experience in the building construction sector Elmi is currently undertaking several construction projects in Addis Ababa as well as in different parts of Ethiopia. In 2018 the annual turnover of the company has reached close to 1 billion birr. It has a combined workforce of 3,200 employees composed of internationally and locally engaged skilled/unskilled personnel that have ample experience in the construction sector and have worked for the company for many years.

1.3 Statement of the Problem

As every child is special every project is special and unique in terms of the problems that arise, while setting the priorities and resources assigned to it, the environment in which it operates and the project manager's attitude and style used to guide and control project activities, since each project is meant for something (Maheswari ,2015***).*** Therefore, there is no standard formula that can be applied for projects in order to guarantee their success but the application of project management brings a unique focus shaped by the goals, resources and schedule of each project.

According to the Project Management Institute (PMI) project management is the application of knowledge, skills, tools, and techniques to project activities in order to meet the project requirements. Project management draws on ten areas among which we find Risk Management (PMBOK, 2013).

Risk is any unexpected event that might affect the people, processes, technology, and resources involved in a project. Unlike issues, which are certain to happen, risks are events that could occur, and one may not be able to tell when. Because of this uncertainty, project risk requires serious preparation in order to manage them efficiently (Bonnie, 2018).

Construction is a risky endeavor. The uniqueness of a construction project comes with its own set of challenges and opportunities. Identifying and managing risks can be tricky, but not impossible with careful planning and execution. When a potential risk turns into reality it can challenge, disrupt and derail a project. In order to avoid failure, one needs to be able to implement the appropriate risk management systems in order to properly assess, control and monitor risks once they've been identified.

Perception of risk is highly dependent on risk attitudes which are influenced by personality, awareness, culture, religious beliefs, superstitions etc…Risk attitudes of decision makers, project managers and project management team will establish the necessary mindset to apply efficient risk management systems and practices in construction projects. Furthermore, having the knowledge and awareness of the appropriate risk management tools, techniques and processes is critical for managing projects in the Ethiopian construction industry which is subject to diverse political, financial and social dynamic complexities that will determine the accomplishment of project objectives. Literature on risk management in Ethiopia shows that, risk management in the construction sector is under-researched, findings are inconsistent and weak; paving the way to erratic assumptions and impromptu reactions to

risk that are visible in the majority of the failed government driven or private sector driven small, medium and large scale projects.

Elmi Olindo Contractors Plc is among the leading private construction companies in the Ethiopian construction sector and has been in operation for over 70 years. Over the years it has managed to accumulate extensive experience in the construction of building projects. The success of the company in managing and delivering small, medium and large scale projects is highly attributable to its experience in the field. On the other hand, the company is seen to lack the knowledge and application of scientific project management systems, tools and techniques that impact the efficiency of its operation and poses many challenges to achieving its project objectives. Based on a close review and assessment of the project management practices adopted (company and project documents), it was observed that the company does not have a systematic and organized risk management system. Consequently, risk management in projects is totally left out to decision makers: project managers and project management team which is at the mercy of their awareness, knowledge and attitude towards risk.

Recent data from the company shows that among the many challenges projects are impacted by there are: time delays, cost overruns, quality matters, health and safety hazards, personnel related matters, construction materials and equipment importation delays, tools and machinery breakdowns etc…Meanwhile Elmi does not have a risk management policy or manual/guideline at a company level nor at a project level. Therefore, the process of identification and assessment of the factors which may have a negative impact on the achievement of the company's business/project objectives is inexistent. Consequently, classification, assessment and monitoring of major risks based upon their potential impact, the likelihood of their occurrence and the level of preparedness of the company to face up to them is not effectively undertaken. Furthermore, at a project level some of the projects do not have: a standard risk management process, risk register, accidents records etc. Risk is managed on an adhoc day to day basis. With regards to occupational health, safety and environment protection, records show that the company has a standard methodology that is loosely applied and enforced in projects. Therefore, compliance to risk prevention mechanisms is very weak. Consequently, there is a lack of a systematic and organized/compiled reporting as well as safety related accident records at a project level and at a company level.

In line with the above, this study aimed at assessing the risk attitudes and management among decision makers i.e. project managers and project team members in construction projects undertaken by Elmi Olindo Contractors Plc.

1.4 Research Questions

In attempting to address the issues highlighted under the statement of the problem, the following research questions were developed:

1. What is the risk attitude and perception among project managers and project management team members in construction projects undertaken by Elmi Olindo Contractors Plc?
2. What are the risks present in the Ethiopian construction industry in general as well as risks faced by Elmi Olindo Contractors Plc while undertaking construction projects in different parts of Ethiopia?
3. What are the risk management systems, practices and processes implemented by Elmi Olindo Contractors Plc both at a project level as well as at a company level?

1.5 Objectives of the study

This study assumed that there is a probability of increasing the chance of achieving project objectives by having the right attitudes towards risk and also establishing the proper risk management systems and practices. The study tried to show the practice of Elmi Olindo Contractors Plc in undertaking its construction activities in Ethiopia.

In view of the above, the general objective of the study is to examine the risk attitudes and management practices in construction projects undertaken by Elmi Olindo Contractors Plc and to emphasize their importance for the success of projects.

The specific objectives are:

1. To identify the risk attitude and perception among project managers and project management team members in construction projects undertaken by Elmi Olindo Contractors Plc.

2. To identify the risks present in the Ethiopian construction industry in general as well as risks faced by Elmi Olindo Contractors Plc while undertaking construction projects in different parts of Ethiopia.

3. To identify the risk management systems, practices and processes implemented by Elmi Olindo Contractors Plc both at a project level as well as at a company level.

1.6 Significance of the study

The findings and recommendations of this study may be of great importance to decision makers i.e. project managers and project management team members involved in construction projects to enhance their awareness, knowledge and attitude towards risk which is essential and crucial in establishing the appropriate risk management practices and mechanisms which will eventually contribute for the success of construction projects.

The study may also enlighten and inform all stakeholders involved in construction projects undertaken by Elmi Olindo Contractors Plc how matured and prepared the projects are in terms of risk management.

It may also give a general insight to the academic & professional society about the attitudes towards risk and also the risk management practices employed in construction projects undertaken by a grade 1 contractor like Elmi Olindo Contractors Plc.

Last but not least, this study will serve as a spring board and reference for further studies in this field.

1.7 Scope of the study

The scope of this study is limited to the ongoing construction projects undertaken by Elmi Olindo Contractors Plc, which may restrict generalization of the findings to all contractors operating in the Ethiopian construction sector. This study does not consider completed projects of the company under consideration.

This study tried to underline the fact that since risk is associated with project decision-making, it is the decision-makers within the organization who will experience risk most directly, and who should be closely involved in managing it. Therefore, the study focused on collecting data only from project managers and project management team members. Nevertheless, risk management cannot be attributed to a single individual or a group of individuals but is a collaborative effort shared by all parties involved that need to have the necessary mindset and awareness.

1.8 Organization of the study

This study contains five chapters:

- Chapter One is an introductory part containing discussions on background of the study, background of the company, statement of the problem, questions and objectives of the study, significance of the study, scope of the study and organization or layout of the study.
- Chapter Two presents literature review with general descriptions by different researchers on risk, attitude, risk attitude, risks in construction, risk management, project manager, project management team, national culture, empirical literature review, summary of literature review and conceptual framework
- Chapter Three discusses about research methodology
- Chapter Four presents research findings and discussions
- Chapter Five contains research conclusions, recommendations and areas for future study

2. LITERATURE REVIEW

2.1 Introduction

This section presents the findings from different reviewed literatures on risk, attitude, risk attitude, risk in construction projects and risk management.

2.2 Theoretical Research

2.1.1 Risk

Risk can be defined as an event or occurrence that may negatively impact the project.

A more complete definition therefore might be “an uncertain event or condition that, if it occurs, has a positive or negative effect on at least one [project] objective” (Project Management Institute, 2004, p238). Similarly, according to APM 1997, Risk is an uncertain event or condition that, if it occurs, it can bring a positive or negative effect on a project objective (PMBOK, 2000). Risk also can be defined as an uncertain event or set of circumstances if it occurs, it will give effect on the achievement of the project’s objectives.

The key distinction between uncertainty and risk arises from consideration of consequences. Perhaps the simplest definition of risk is “uncertainty that matters”, since uncertainty without consequence poses no risk (Hillson and Murray, 2006).

2.1.2 Attitude

According to Cambridge Dictionary Attitude is defined as “a feeling or opinion about something or someone, or way of behaving that is caused of this”.

The term “attitude” as applied to internal human mental processes and positioning is used to refer to chosen responses to situations. Some attitudes may be deeply rooted, representing core values for the individual or group, but they nevertheless represent a choice. Other attitudes may be more malleable. Attitudes differ from personal characteristics in that they are situational responses rather than natural preferences or traits, and chosen attitudes may therefore differ depending on a range of different

influences. Clearly if these influences can be identified and understood, the possibility of changing them is introduced, allowing individuals and groups to manage their attitudes proactively.

This attribute of attitudes to be capable of modification is essential to the case for understanding and managing risk attitudes. If attitudes were fixed inherent attributes of individuals, inborn and unchangeable, then while it might be possible to understand them it would never be possible to manage them. The attitudes of individuals or groups would then not be comparable to an aircraft flying freely through the air, but would instead be like a cruise missile pre-programmed to strike a fixed target (Hillson and Murray, 2006).

2.1.3 Risk Attitude

If "risk" is defined as "an uncertainty that could have a positive or negative effect on one or more objectives", and "attitude" is defined as "chosen state of mind, mental view or disposition with regard to a fact or state", then combining the two gives an initial definition of "risk attitude" as "chosen state of mind with regard to those uncertainties that could have a positive or negative effect on objectives" (Hillson and Murray, 2006).

It is a fact that risk attitudes to a particular situation vary from person to person, team to team, organization to organization and, some would say, nation to nation. Risk attitude is a source of significant bias on decision-making and the effectiveness of the risk management process (David *et al.* 2015).

Griffin et.al (2009) have studied the relationship between effect of national culture and corporate risk-taking and in their study they assume that national culture affects the risk-taking of managers working in businesses.

A positive relationship between risk aversion and religiosity is observed in a number of studies (Dohmen *et al*. 2011; Hilary and Hui, 2009; Liu, 2010; Miller and Hoffmann, 1995). Nevertheless, most of these studies establish a link between risk aversion and religion driven by social aspects of church membership, rather than by religious beliefs themselves.

Effective project risk management systems are implemented by individuals and therefore, the risk attitude of these individuals can have an important impact on the successful implementation of risk systems. Although there is no agreement on a single definition of risk attitude, they all relate to the

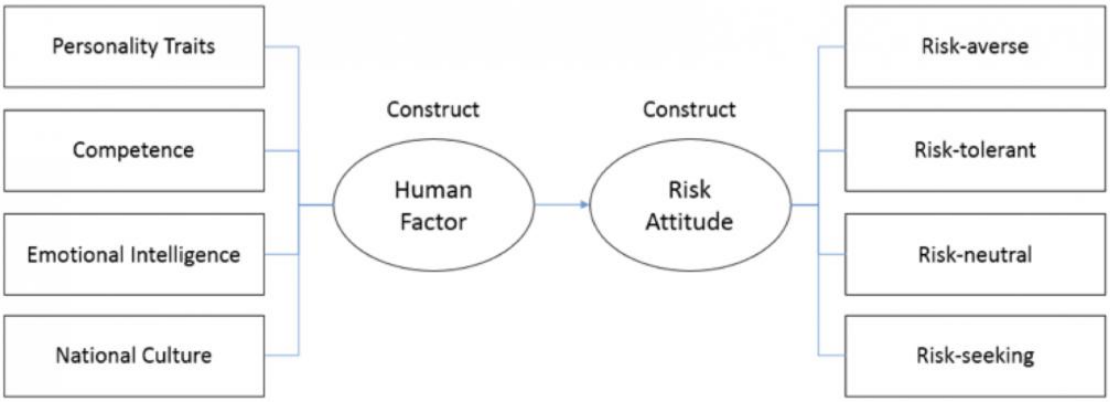
mindset selected as a response to uncertainties driven by the perception of individuals. The national culture environment within which the project team members operate has a major influence on risk attitudes (Ahmad, 2016).

Human perception of the risks present or absent in a particular situation biases decision-making. For risk management to be effective there is no option but to understand and manage risk attitude.

Research and experience both indicate that one of the reasons why risk management promises so much and often delivers so little is due to the attitudes that individuals and groups of people hold towards the perceived threats and opportunities. Attitude can be defined as a 'chosen state of mind, mental view or disposition with regard to a fact or state'. Many of the attitudes we adopt may be habitual, but we nevertheless are free to choose a different course (David and Ruth, 2015).

According to Pengcheng *et al.* (2018) the individual's ability, knowledge, skills and other factors, as well as the level of project management, will directly affect the construction project, and the rules and regulations of the organization will form constraints on individuals and the project team. Construction projects include government, owners, contractors, designers, consultants and many other participants; their risk attitudes and behaviors will have an impact on the project. In addition, construction projects also involve human risk in the phases of design, implementation and operation, as well as human risk with respect to safety management, quality management, time management and so on.

Based on research conducted by Ahmad (2016) risk attitudes are influenced by many factors such as: individual, group, organizational and situational factors. In addition, risk attitudes are also highly influenced by human factors related to the project team members. Human factors can be defined as individual, group and organizational factors that impact the achievement of project goals by influencing project team members' behavior. Individual factors can refer to competence, motivation level, emotional intelligence and cultural background, group factors can refer to leadership styles, communication methods, coordination and empowerment, and organizational factors can refer to corporate policies, procedures and senior management style.



Source: *The relationship between human factor variables and risk attitude variables*, *Ahmad (2016)*

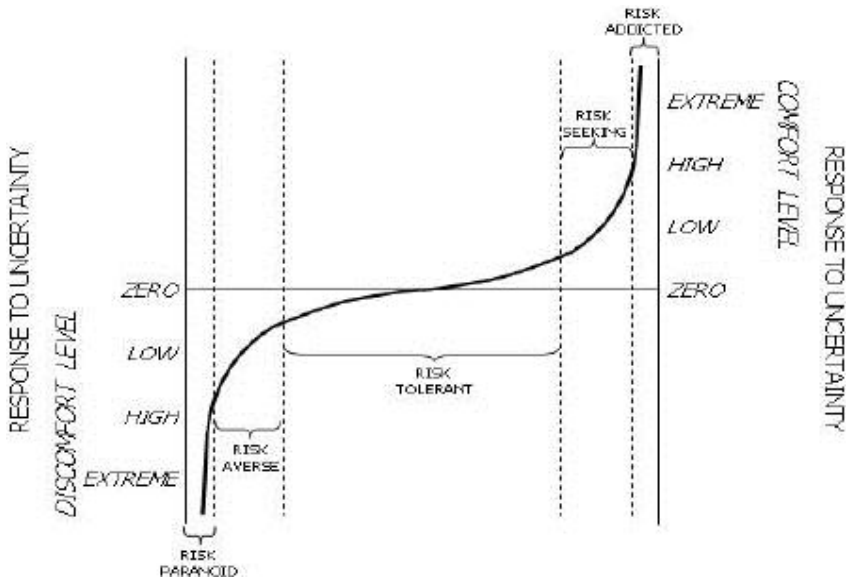
According to Leonard and Don (2003), the manager's own risk attitude will determine the courses of action to be followed. Those who are cautious by nature may avoid risky situations and fail to capture opportunities as a consequence. Those who are extreme risk seekers are blind to the danger presented by particular courses of action. As a consequence of their compulsion extreme risk takers usually disappear from the scene. The vast majority of people lie between these extremes.

In general risk attitudes can be classified into:

Risk aversion is a type of attitude where an individual gravitates toward certain, as opposed to uncertain, events. On the other hand, *Risk seeking* is a type of attitude or behavior where a person is inclined to take on less-certain activities in lieu of more certain ones. In the middle are *risk neutral/tolerant* individuals, who have an indifferent attitude toward risk.

Hillson & Murray-Webster (2005) have developed a risk attitude spectrum which in addition to the attitudes highlighted above adds *Risk paranoid* and *Risk addicted* behaviors which are the extreme attitudes in the spectrum. All the attitudes in the spectrum are categorized based on comfort and discomfort levels in relation to response to uncertainty.

Considering inputs first, the chosen risk attitude is influenced by the perception of the degree of risk exposure associated with a given situation, and risk perception in turn is affected by a complex web of factors, referred to as the "triple strand" of influences (conscious, subconscious, and affective factors). It is common to speak about only a few specific risk attitudes, such as risk-averse, risk-seeking, risk-tolerant, or risk-neutral. But in fact, risk attitude exists on a continuous spectrum with an infinite number of possible positions. Faced with a given risky situation, a particular individual or group might exhibit a risk attitude anywhere on this spectrum.



Source: *Risk Attitude Spectrum, Hillson & Murray-Webster (2005)*

2.1.4 Risks in Construction

Construction is a complex and challenging process. Among other things, it requires interpretation of and compliance with many laws, codes, and regulations; gathering of considerable resources, including labor, equipment, and material; and communications with and coordination among multiple parties, such as the owner, the design professional, other contractors and subcontractors, and suppliers, all of whom may have differing purposes and goals. In addition, many factors are unknown or unknowable at the start of any project. Not surprisingly then, risks are an expected part of this process (Surety Learn, 2014).

Despite its prominent role, the construction industry in Ethiopia, like in other developing countries, faces many challenges in its practice. Some of these challenges are project overruns, poor quality, inappropriate procurement systems, and a failure to cope with project requirements and the inability to adopt best practices (Tadesse *et al*. 2016). Studies show that in Ethiopia around 1.8 million people are involved in construction activities, and with regards to the number of occupational/workplace accidents construction comes second (with approximately 1.9 million cases) after transportation (Shahida, 2019).

Risk is unavoidable in almost all construction projects. Because of exposure to the outdoors, construction is affected by both daily and seasonal weather variations. It is also often influenced significantly by the availability of local construction financing, labor, materials, and equipment etc. These and all the above mentioned factors make construction a very risky undertaking. Construction is

especially important in developing countries since it can greatly contribute to the economic growth but as mentioned above the industry is faced with a lot of problems (Addis, 2014).

Risk consequences in construction projects may reach an undesirable level because of inadequate resources and lack of advancements in technologies, therefore a thorough awareness and identification of risks is essential to prepare suitable strategies (Essays UK, 2018).

According to Tyler Riddell (2017) Construction Risks can be categorized into the following six categories:

1. *Technical risks*: This can include uncertainty of resources and availability of materials, inadequate site investigation, or incomplete design etc...

2. *Environmental risks*: include natural disasters, weather, and seasonal implications etc….

3. *Management related risks*: include uncertain productivity of resources.

4. *Financial risks*: Inflation, local taxes, and availability and fluctuation in foreign exchange etc...

5. *Socio-political risks*: Customs and import restrictions and difficulties disposing of equipment etc…

The study undertaken by Tadesse *et al.* (2016), on "Assessment on Performance and Challenges of Ethiopian Construction Industry" demonstrated that the level of construction project management practice in terms of adapting general project management procedures, project management functions, tools & techniques to be unsatisfactory. Particularly the level of practice in terms of safety, risk and time management was found to be very low.

Regarding challenges, the study identified that time, cost and risk management as the most challenging issues for professionals in managing their day to day's activities. The assessment on the extent of deviation from plan or predetermined requirements on these issues also reinforce this result. The amount of schedule slippage ranges between 61-80% and that of planed costs and other variables such as risk, quality, resources utilization and safety deviates in the range of 21-40% from predetermined requirements, planned or anticipated at the beginning.

2.1.5 Risk Management

Risk Management is an important component of project management. In fact, it is one of the 10 knowledge areas covered under the Project Management Book of Knowledge developed by the Project Management Institute.

Risk management is a system which aims to identify and quantify all risks to which the business or project is exposed so that a conscious decision can be taken on how to manage the risks (Essays UK, 2018).

In the simplest terms, Risk management process is taking preemptive actions to avoid and minimize any kind of jeopardy to a project in future (Akshay, 2018).

Risk management process is nothing but a series of steps that help identify and migrate the risks for the successful closure of a project. If done correctly and sincerely, construction risk management will reduce not only the likelihood of an event occurring, but also the magnitude of its impact.

Risk management is probably the most difficult aspect of project management. A project manager must be able to recognize and identify the root causes of risks and to trace these causes through the project to their consequences. Furthermore, 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 (Nerija and Audrius, 2012).

Managers need to ensure delivery of projects to cost, schedule and performance requirement. To achieve this involves identifying and managing the risks to the project at all project stages from the initial assessment of strategic options through the procurement, fabrication, construction and commissioning stage (Shankar and Balasubramanian, 2015).

Effective risk management is key to project success. Inclusion of cultural understanding and an ability to unify shared values across multiple cultures (individuals) will positively influence the quality of project planning, execution and completion (Bakker *et al*. 2006).

According to Shirolkar et.al (2017) Risk management process starts with **risk identification**, which is identifying the type and the source of risks. It continues with classifying the types of risks and their impact to the project. **Risk assessment/analysis** will filter and priorities the identified risks.

Following the risk assessment/analysis, **risk response** plan is then developed. During project implementation, the risks identified and their responses are **monitored and controlled.**

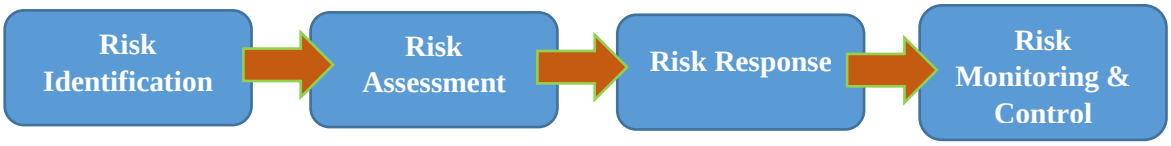


Figure 1: Risk Management process in construction projects

According to Akshay (2018), the risk management process is analyzed in detail below:

1. Risk Identification
    - *Brainstorming*: - All the relevant people associated with the project convene and discuss all the aspects of the project comprehensively and raise their ideas and thoughts foreseeing the risks in their perceptions. There is a facilitator who notes it all down and differentiates between the imperative and unnecessary ones.
    - *Delphi technique*: - Questionnaires are answered in anonymity by a group of expert panelists in rounds followed with an aim of converging towards one mutual answer by improved judgement after consecutive rounds. The process is stopped after a predefined stop criterion (no. of rounds, stability).
    - *Interview/Expert opinion*: - Experienced personnel and relevant people are consulted for their opinions and advice to avoid factors affecting risk.
    - *Past experience*: - Similar projects are brought up and perused rigorously to identify the factors that could affect the project.
    - *Checklists*: - A predetermined list of all the risks that could pose a threat to the project are delved, drawn and juxtaposed from the previously completed projects with analogous criterion.

2. Risk Assessment/Analysis
    - *Qualitative method*: - It is usually used for small and medium-scaled projects and involves listing and collating the risks and prioritizing and deprioritizing them as per the opinions of relevant people. The risks are also rated as high, medium or low depending on the collected opinions and risk tolerance boundaries in the organization. Qualitative method is also used when there is not enough data available or when there is some stiff time constraint attached to the project.
    - *Quantitative method*: - Quantitative methods have to do with analyzing the effect of risks with crunching data and numbers and is used for large projects. Some major Quantitative assessment methods are: Decision tree analysis, expected monetary value, expert judgement, fault tree analysis, fuzzy logic, probability distribution, sensitivity analysis, Monte Carlo estimations etc. Quantitative analysis requires a greater effort as it demands oodles of data for getting a precise and accurate analysis.
3. Risk Response
    - *Risk Transfer*: - There are various ways through which one can transfer risks from their projects to the third parties. Purchasing insurance, outsourcing intricate and sophisticated work to an experienced organization, using a fixed price contract instead of unit price contract and the complete removal of warranty and guarantee terms.
    - *Risk mitigation*: - Reducing the impact of the risks that are inevitable and nontransferable in a project is termed as risk mitigation or risk reduction. Reviewing your project, alleviating complexities in procedure, providing additional testing et cetera are some ways through which one can mitigate risks.
    - *Risk Acceptance*: - Every project carries risk in some form. Some risks have to be hauled and made a part of the project with the consensus of all the relevant parties associated with the project. Keeping cost and time factor in view, management authorities must be informed regarding the consequence in case the risk occurs.
4. Risk Monitoring and Control

To keep a rigorous check on the implementation of Risk identification, Risk assessment and Risk response risk monitoring and control is essential. Along with ensuring the execution of risk plans, it monitors the trigger conditions for contingencies and the probabilities of new impending risks during project execution. Team meetings and every singly checklist created during the initial stage get pored

over by the monitoring authority and corrective actions are taken as per the requirement. Monitoring and control is done throughout the life of the project.

2.1.6 Project manager

According to technopedia.com a project manager is the person responsible for leading a project from its inception to execution. This includes planning, execution and managing the people, resources and scope of the project. Project managers must have the discipline to create clear and attainable objectives and to see them through to successful completion. The project manager has full responsibility and authority to complete the assigned project. A project manager's responsibilities include overall management, but he or she is seldom directly involved with the activities that actually produce the end result. The position also oversees any associated products and services, project tools and techniques to help ensure good practices. In addition, project managers are responsible for recruiting and building project teams, and making projections about the project's risks and uncertainties.

Project managers are the spearheads of a project. They are responsible for ensuring that the project progresses as per initial plans and is completed within the specified deadline and gets delivered to the client without any flaws. He/she handles all the aspects of the project from project inception/initiation to project handover/delivery.

2.1.7 Project management team

According to project management knowledge.com the project management team is comprised of the individual and unique members of the project team who find themselves to be directly involved in any or all project management related activities. On some projects that exist on a smaller scope, it is possible that the project management team may actually not be a distinct and separate unit from the project team but rather may include all project team members of virtually all project team members. Typically, the project management team is broken down into some sort of a hierarchal format and that structure is typically headed up by a project management team leader, a term which is often used interchangeably with project manager.

Based on the review of Elmi Olindo Contractors Plc’s project structure obtained from the Human Resource Department, the project management team is responsible for leading construction projects from inception to final closure. It is composed of: senior project manager, project manager, assistant

project manager and site engineer. Usually the hierarchy and seniority within the team will depend on accreditation/certification as well as years of experience in the field. In general, the project management team shares the decision making roles during the execution of the projects, nevertheless the ultimate decision making and responsibility for the project usually rests on the senior project manager or project manager. The assignment of a senior project manager or a project manager as well as other project management team members to a specific project depends on the size and complexity of the project.

2.1.8 National culture

Culture is a collective phenomenon that is shared with people who live within the same social environment. It consists of unwritten rules of the social game. It is the collective programming of the mind that distinguishes the members of one group or category of people from others. Culture is learned, not innate. It derives from one's social environment rather than from one's genes. Culture should be distinguished from human nature on one side and from an individual's personality on the other, although exactly where the borders lie between nature and culture, and between culture and personality, is a matter of discussion among social scientists (Geert Hofstede *et.al.* 2010).

According to IGI Global national culture is defined as the cumulative deposit of knowledge, experience, beliefs, values, attitudes, meanings, hierarchies, religion, notions of time, roles, spatial relations, concepts of the universe, and material objects and possessions acquired by a group of people in the course of generations through individual and group striving.

According to Eerik (2017) cultural dimensions have both direct as well as indirect impacts on risk-taking. National cultural differences may directly or indirectly affect corporate risk-taking decisions, through their effects on the institutional, economic, and industrial environments in which a company finds itself. Formal institutions and informal national cultural norms are strongly connected. More precisely, it is possible that formal institutions such as government and public services are even the product of cultural norms because the political and economic rules are all linked to the society's view of how things should work.

2.3 Empirical Research

In general, it can be said that risk management in construction projects is overlooked and inexistent causing many challenges on the success of projects. Research undertaken in this sector (Risk attitude and management) is very limited, but some of the findings from local and international researches are reviewed below.

Effective project risk management seems to be far more closely aligned with developing the right attitudes, expectations and relationships in and around the project team and with the key stakeholders (Patrick, 2008).

A Research conducted by Mohammad and Nicholas (2012) on "Attitudes, perceptions and practices of contractors towards quality related risks in south Australia" showed that 65.21% of the respondents indicated that, they did not follow any kind of standard risk management process.

According to a Research conducted to identify contractors' opinion on the significance of the construction projects risks; and second, to explore the risk analysis and risk management practices in the Lithuanian construction companies, Nerija and Audrius (2012) showed that in the European Union construction is the sector most at risk of accidents, with more than 1300 people being killed in construction accidents every year. Worldwide, construction workers are three times more likely to be killed and twice as likely to be injured as workers in other occupations. The costs of these accidents are immense to the individual, to the employer and to society. They can amount to an appreciable proportion of the contract price Furthermore, this study showed that the risk management perceivers are the project participants, and a contractor is any entity which has the power to influence project decision making directly. Related to experience, only 11% of the respondents affirmed that they have experience in risk management. Most of them are project manager and have more than 15 years' experience; it proofs that the relationship between risk perception and experience of respondents. And even 34% of the respondents affirmed that they have no experience in risk management, while 55% of the respondents affirmed that they do not have enough experience in risk management (Nerija and Audrius, 2012).

Tadesse *et al.* (2016) conducted an assessment on performance and challenges of Ethiopian construction industry. Their study showed that the perception of respondents regarding the overall performance of Ethiopian construction industry in practicing the construction project management

practices was rated as 56.52 % and 37.68 % respectively, indicating “Poor” and “Moderate” rating of their perception.

Bahiru *et al.* (2017) examined the impact of risk in Ethiopian construction project performance. The study showed that on average, there is about 15.33% cost increment beyond the initially estimated cost of projects and about 84% time overrun according to if the risk factors have the delay of project more than 1 quarter, the risk level is high and if it is more a year and its impact is very high in terms of time and if it increases from 10% - 20% cost, it is high in risk level.

2.4 Summary of Literature Review

Risk is an uncertainty that could have a positive or negative effect on project objectives. Attitude on the other hand is a chosen state of mind, mental view or disposition with regard to a fact or state. Therefore, risk attitude is a chosen state of mind with regard to those uncertainties that could have a positive or negative effect on project objectives.

Research and experience both indicate that one of the reasons why risk management promises so much and often delivers so little is due to the attitudes that individuals and groups of people hold towards the perceived threats and opportunities. It is also a fact that risk attitudes to a particular situation vary from person to person, team to team, organization to organization and, some would say, nation to nation. Risk attitude is a source of significant bias on decision-making and the effectiveness of the risk management process. Human perception of the risks present or absent in a particular situation biases decision-making. The national culture environment within which the project team members operate has a major influence on risk attitudes. Furthermore, risk attitudes are highly influenced by, individual factors (competence, motivation level, emotional intelligence and cultural background), group factors (leadership styles, communication methods, coordination and empowerment), and organizational factors (corporate policies, procedures and senior management style).

For risk management to be effective there is no option but to understand and manage risk attitude.

Research on challenges of the Ethiopian Construction Industry demonstrated that the level of construction project management practice in terms of adapting general project management procedures,

project management functions, tools & techniques to be unsatisfactory. Particularly the level of practice in terms of safety, risk and time management was found to be very low.

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. Effective risk management is key to project success. Inclusion of cultural understanding and an ability to unify shared values across multiple cultures (individuals) will positively influence the quality of project planning, execution and completion.

Project managers are the spearheads of a project. They ensure that the project is completed within the specified deadline and gets delivered to the client without any flaws. He/she handles all the aspects of the project from project initiation to project delivery. They are responsible for the overall project management as well as recruiting and building project teams, and making projections about the project's risks and uncertainties.

Elmi Olindo Contractors Plc's project structure shows that the project management team is responsible for leading the project from inception to final closure. In general, the project management team shares the decision making roles during the execution of the projects, nevertheless the ultimate decision making and responsibility for the project usually rests on the senior project manager or project manager.

This study aimed at assessing the risk attitude and management in construction projects undertaken by Elmi Olindo Contractors Plc, in the hopes that the findings and recommendations could close the gap and contribute to the very limited literature in the area.

Table 2: Summary of Empirical Literature

Author(s)	Focus of study	Methodology	Key findings
Mohammed & Nicholas (2012)	Attitudes, perceptions and practices of contractors towards quality related risks	Descriptive design	About 65.21% of the respondents indicated that, they did not follow any kind of standard risk management process
Nerija and Audrius (2012)	Contractors' opinion on the significance of the construction projects risks/risk analysis and risk management practices in the Lithuanian construction companies	Descriptive design	Only 11% of the respondents affirmed that they have experience in risk management. Most of them are project manager and have more than 15 years' experience. 34% of the respondents affirmed that they have no experience in risk management, while 55% of the respondents affirmed that they do not have enough experience in risk management
Tadesse *et al.* (2016)	Performance and challenges of Ethiopian construction industry	Descriptive design	Construction project management practices was rated as 56.52 % and 37.68 % respectively, indicating "Poor" and "Moderate" rating of their perception.
Bahiru *et al.* (2017)	Impact of risk in Ethiopian construction project performance	Descriptive design	15.33% cost increment beyond the initially estimated cost of projects and about 84%-time overrun

2.5 Conceptual Framework

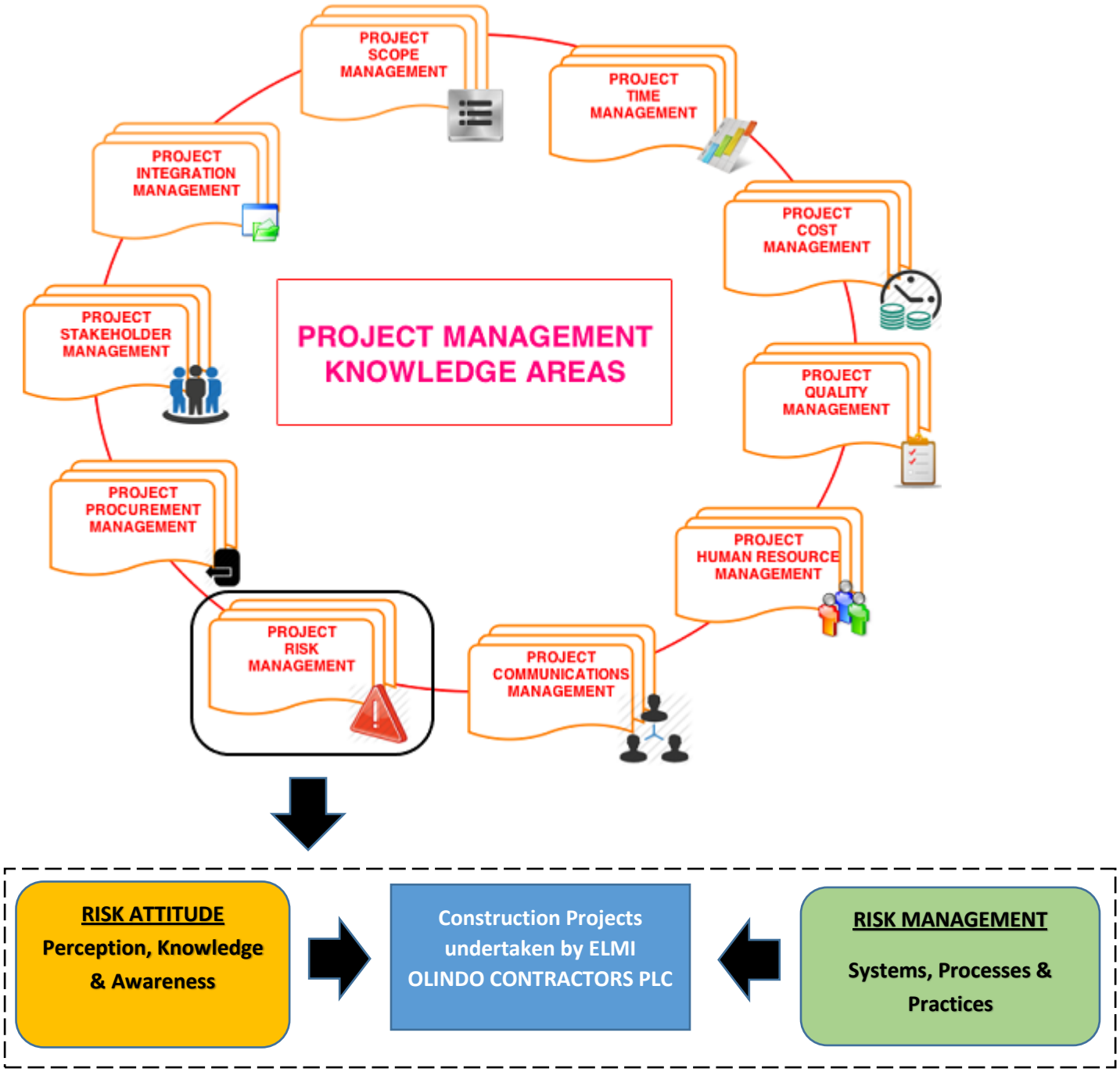


Figure 2: Conceptual Framework adopted from Project Management knowledge areas according to PMI (PMBOK 5th Edition)

3. METHODOLOGY OF THE STUDY

3.1 Introduction

This chapter is concerned with the overall plan, approach and design of the study; the purpose of the study, data sources and types, methods and procedures of data collection, analysis of findings and ethical considerations.

3.2 Research Approach and Design

This study takes on a descriptive approach in assessing risk attitudes and management in construction projects undertaken by Elmi Olindo Contractors Plc. Descriptive research design is a scientific method which involves observing and describing the behavior of a subject without influencing it in any way.

Consequently, this study follows the mixed approach (i.e., a combination of qualitative and quantitative approaches) to assess risk attitudes and management practices in the construction projects undertaken by Elmi Olindo Contractors Plc. The survey strategy employed in the study allows collecting quantitative and qualitative data which can be analyzed in order to gain an insight regarding the study area.

3.3 Target Population

The target population of this study consists of project managers and project management team members who are the decision makers and are responsible for managing construction projects undertaken by Elmi Olindo Contractors Plc. As per the data obtained from the human resources department of the company the number of members in the project management team (including the project manager) assigned to a specific project is based on the size and complexity of the project as well as the client requirements. At the time of the study, the total number of project managers and project management team members that were involved in managing 15 projects in Addis Ababa, as well as different parts of Ethiopia were 36 which formed the size of target population of this study.

Hence, this study used census approach as the size of target population was fairly manageable. In addition, the use of census provides a true measure of the population (no sampling error), benchmark

data may be obtained for future studies, and detailed information about small sub-groups within the population is more likely to be available.

Table 3: Location and number of Projects

Item No.	Project Location	No. of Projects	No. of Respondents
1	Addis Ababa	9	24
2	Sebeta	1	3
3	Debrezeit / Bishoftu	1	2
4	Debreberhan	1	2
5	Gondar	1	1
6	Bedele	1	2
7	Harar	1	2
	TOTAL	**15**	**36**

Source: *Active construction projects from company data (2019)*

Therefore, across all the 15 projects, the total population of the study was 36.

In order to meet the objectives of the study and answer research questions, it was found to be essential to consider all 36 respondents that have a decision making role in construction projects undertaken by Elmi Olindo Contractors Plc and were responsible for achieving project objectives. Furthermore, it was found to be appropriate to consider all those individuals that potentially possessed the desired knowledge on the study's subject matter and those that had a significant role and responsibilities in their respective project's risk management process. As such, all 36 respondents, who were able to offer insights from which an understanding could have been built, were considered from the 15 projects using census approach.

Table 4: Profile of Projects and Number of Respondents

Item No.	Name of project	Location	No. of Respondents
1	Foreign & Commonwealth Office Staff Accommodation, British Embassy	Addis Ababa	2
2	Aman Apartment Complex	Addis Ababa	2
3	BGI New Headquarters Building	Addis Ababa	4
4	New Zealand Embassy Fit-out works	Addis Ababa	2
5	Tikur Ambessa Specialized Hospital New Cardiac Center (Contract with Philips)	Addis Ababa	4
6	Indian Embassy New Chancery and Ancillary Buildings	Addis Ababa	3
7	Indian Embassy New Ambassador's Residence	Addis Ababa	1
8	Soufflet Malt Factory	Bole Lemi Industrial Park, Addis Ababa	2
9	Coca Cola New Factory	Sebeta	3
10	Heineken Breweries Factory Expansion (Phase 2 & 3)	Kilinto, Addis Ababa	4
11	Boortmalt Malt Factory	Debrebrerhan	2
12	Speranza Resort & Real Estate	Debrezeit / Bishoftu	2
13	Gondar University OR Center Renovation	Gondar	1
14	Harar Breweries Fire Alarm & Fire Fighting Installation	Harar	2
15	Bedele Breweries Fire Alarm & Fire Fighting Installation, New Changing room construction	Bedele	2
		TOTAL	**36**

Source: Own construction, based on company reports (2019)

3.4 Data type and source

Data for the study was collected using both primary and secondary sources. The primary data was obtained through design of questionnaires and interviews directed to a pool of project managers and project team members that had decision making roles and were responsible for managing construction projects undertaken by Elmi Olindo Contractors Plc at the time of the study. The secondary data was sourced from the published and unpublished sources such as credible web pages, thesis, journals, books and different published journal articles. The secondary data was used to get an insight of the problem and was considered for content validation of findings obtained from primary data.

3.5 Data Collection Method and Design

A survey research is a popularly used method of collecting information about a population of interest. There are many different types of surveys, several ways to administer them, and many methods of sampling. One of the key features of a survey research are questionnaires: a predefined series of questions used to collect information from individuals.

Self-administered questionnaires were used as the main data collection method in this study because, since each person (respondent) is asked to respond to the same set of questions, it provides an efficient way of collecting responses from a sample prior to quantitative analysis. The questionnaire was adapted from earlier researches and studies undertaken by Kalkidan Manyazewal, 2019; Addis Mesfin, 2014; Haddush Hintsay, 2016; furthermore, it was designed to answer the questions of the study, meet the study's objectives and it was distributed to a sample of selected respondents across all the active projects undertaken by Elmi at the time of the study.

The questionnaire was composed of questions in Likert-style rating with a five-point rating scale and each respondent was asked how strongly he or she agreed or disagreed with a statement or series of statements. In this case, 1 represented 'strongly disagree' and 5 represented 'strongly agree'.

The questionnaire was designed to consist of 4 sections and was developed in line with the research objectives and questions that are stated in chapter one.
Furthermore, an interview consisting of 8 questions was undertaken on 4 respondents. The interviews were conducted in order to fill the gap in the responses received from the questionnaires.

3.6 Data Analysis

Data collected through questionnaires was analyzed using quantitative descriptive statistics such as percentage, tables and charts with the help of IBM SPSS Amos version 21 statistical computer software.

3.7 Instrument Validity and Reliability

3.7.1 Instrument Validity

Validity refers to the degree to which results obtained from the analysis of the data actually represents the phenomena under study. Validity is a matter of degree and not a specific value. In order to check instrument validity, a pilot study was conducted to refine the methodology and test instrument such as a questionnaire before administering the final phase. Questionnaires were tested on 4 respondents to make the data collection instruments objective, relevant, suitable to the problem and reliable as recommended by John Adams *et al.* (2007:136). Issues that were raised by respondents were corrected and questionnaires were refined. Besides, proper detection and approval by the research advisor was helpful to ensure validity of the instruments. Finally, the improved version of the questionnaires was printed, duplicated and dispatched. Expert opinions and literature search was first analyzed and then used to establish content validity. Triangulation of quantitative and qualitative analysis was made to ensure the consistency of findings corresponding to each research question.

3.7.2 Instrument Reliability

Reliability refers to the extent to which an instrument consistently measures what is supposed to.

The study measured the internal consistency of cross-sectional data collection instrument, i.e., questionnaire, using Cronbach alpha coefficient. The Cronbach alpha coefficient, which is based on the average correlation among items, was calculated for the 3 main Constructs using SPSS Amos version 21 and the result is presented in the following table:

Table 5: Cronbach alpha values for main constructs

Main Constructs	Cronbach alpha	Remarks as per Nunally, 1978; Sreiner and Norman, 2008
Risk Attitude	0.711	Acceptable
Risks in Construction Projects undertaken by Elmi Olindo Contractors Plc	0.760	Excellent
Risks Management System at Elmi Olindo Contractors Plc	0.743	Acceptable

Source: Survey data (2019)

Although, there is no generally agreed cutoff, the higher the alpha is, the more reliable the test is.

A reliability coefficient alpha is excellent if alpha is larger than 0.75; acceptable if alpha is between 0.40 and 0.74 and poor if alpha is less than 0.4 (Nunally, 1978; Sreiner and Norman, 2008). Accordingly, the Cronbach alpha coefficient of 0.711 and 0.743 shown in the above table indicate acceptable internal consistency of the items in the two main constructs, while the Cronbach alpha coefficient of 0.760 indicates excellent internal consistency of the items in one main construct.

3.8 Ethical issues

In conducting this study, the privacy of participants was kept, and it was made known to every participant that the nature of participation was voluntary. The confidentiality of data and the participants' anonymity was maintained. In all cases, names were kept confidential thus collective names like “respondents” or “study participants” were used.

The researcher took into account the issues of feasibility and sufficiency in relation to gaining access to data and the impact of these on the nature and content of the study questions and objectives.

In addition, all sources cited in this study have been appropriately acknowledged.

4. RESULTS AND DISCUSSION

4.1 Introduction

The results and discussion below is devised in four parts in line with the objectives of this research and also the sections of the questionnaire. The divisions can help tackle one objective at a time. The first part tries to analyze the response rate and the profile of the respondents by gender, education level, job title and experience. The second part tries to present the findings of the questions asked to test the risk attitude of project managers and project management team members who have decision making roles in the projects undertaken by Elmi Olindo Contractors Plc. The third part of the results and discussions contains the findings of the questions directed towards the risks present in the Ethiopian construction industry in general as well as risks faced by Elmi Olindo Contractors Plc while undertaking construction projects in different parts of Ethiopia. The fourth part is focused on the risk management systems, practices and processes implemented by Elmi Olindo Contractors Plc both at a project level as well as at a company level.

4.2 Response Rate

The response rate was considered sufficient for the purpose of the study. According to Mugenda and Mugenda (2003), a 50% response rate is adequate, 60% good and above 70% rated very well. The study targeted a population of 36 respondents. All the 36 respondents completed the questionnaires and returned to the researcher but 3 of the questionnaires had missing data and therefore were not considered in the analysis. Consequently, the sample size has been effectively reduced from 36 to 33. Therefore, the response rate is found to be 91.67% which according to Mugenda and Mugenda (2003) is rated “very well”.

Furthermore 4 respondents were successfully interviewed by the researcher in order to fill the gaps in the analysis of the findings from the questionnaires.

4.3 General Profile of Respondents

The following table shows the gender profile of the respondents:

Table 6: Gender profile of respondents

Gender	Number of Respondents	Percentage %
Male	30	90.9
Female	3	9.1
Total	**33**	**100**

Source: Survey data (2019)

It can be observed that close to 91% of the respondents are male and only 9% of the respondents are female. This clearly justifies the remark by Nuanthip and Tanit (2012) that the construction industry is associated with male domination, characterized by physical strength, adaptation to harsh outdoor working conditions and abusive language.

Furthermore, the table also shows that the decision making roles in projects (project manager and project management team members) undertaken by Elmi Olindo contractors Plc is dominated by males.

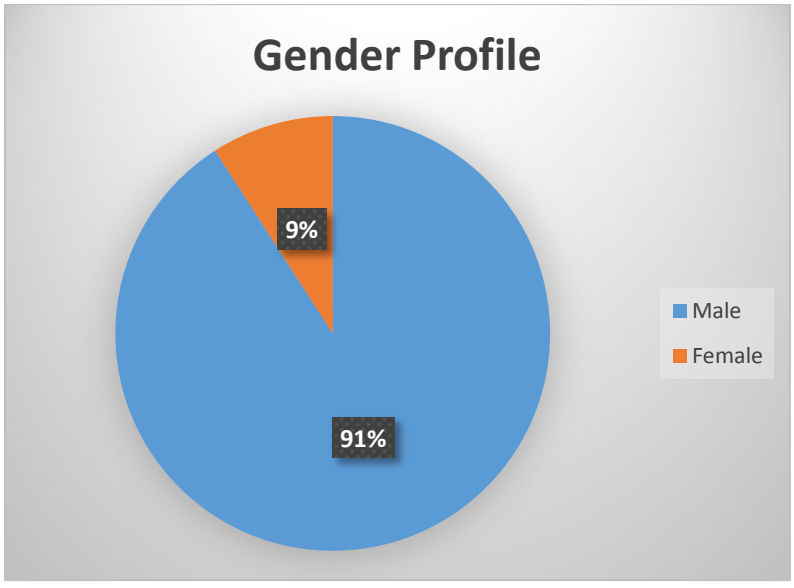


Figure 3: General profile of respondents

With regards to education levels: 81.8% of the respondents have Bsc/BA degrees, 15.2% of the respondents have MSc/MA/MBA degrees and only 3% of the respondents have Diplomas.

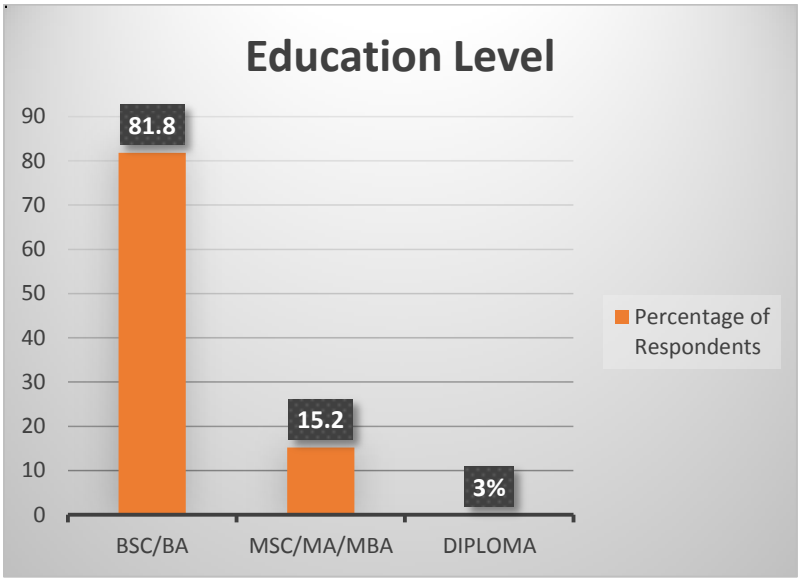


Figure 4: Education level of respondents

When we analyze the job titles of the respondents: 30.3% of the respondents are senior project managers, 24.2% of the respondents are project managers, 9.1% of the respondents are assistant project managers and 36.4% of the respondents have other titles, predominantly site engineer and office engineer title.

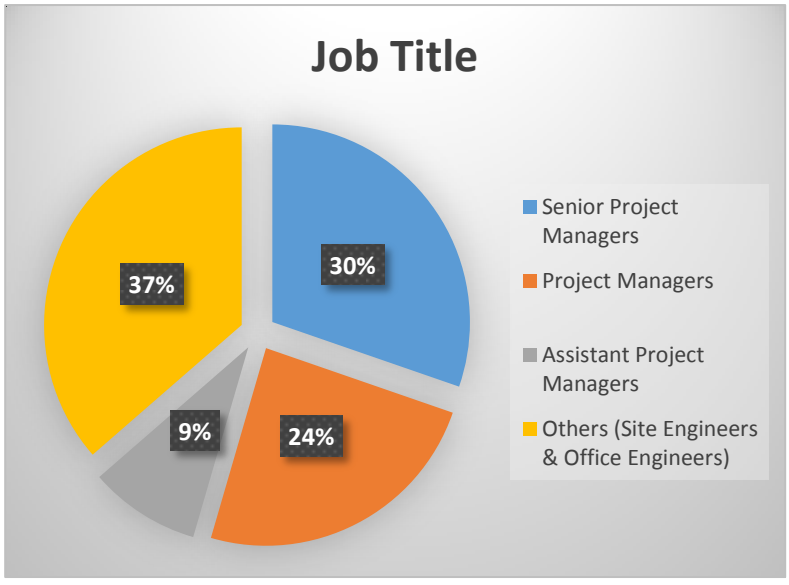


Figure 5: Education level of respondents

The table below gives a highlight of the experience of the respondents in the construction industry as well as at Elmi Olindo Contractors Plc:

Table 7: Cross tabulation of experience by number of years

Type of Experience	Total Number of Respondents	Years			
		< 1	1-5	6-10	>10
Experience in the Industry	33	3	13	5	12
Percentage %		9.1	39.4	15.2	36.4
Experience at Elmi Olindo Contractors Plc	33	4	12	8	9
Percentage %		12.1	36.4	24.2	27.3

Source: Survey data (2019)

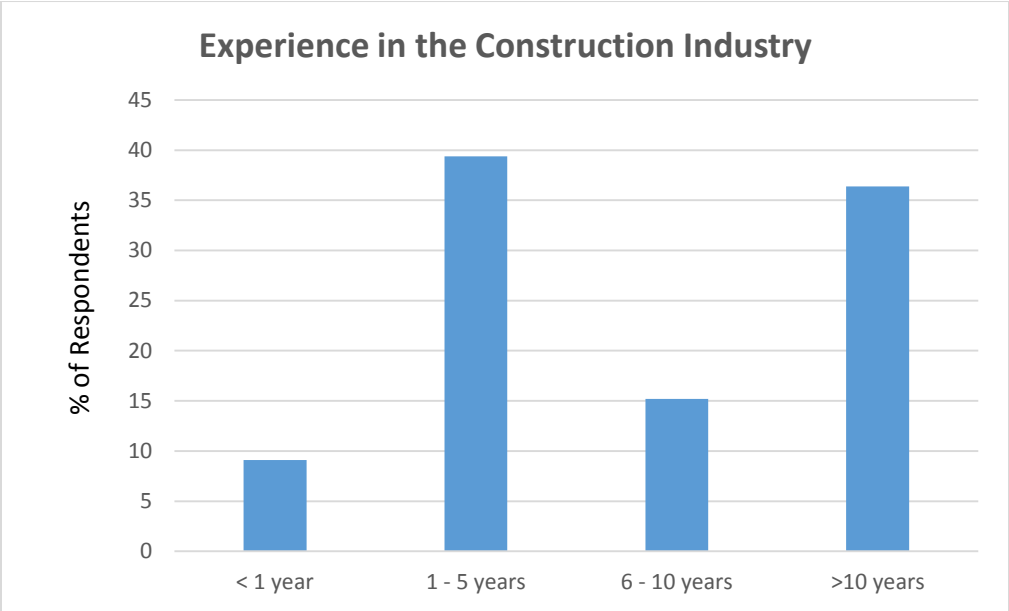


Figure 6: Experience of respondents in the construction industry

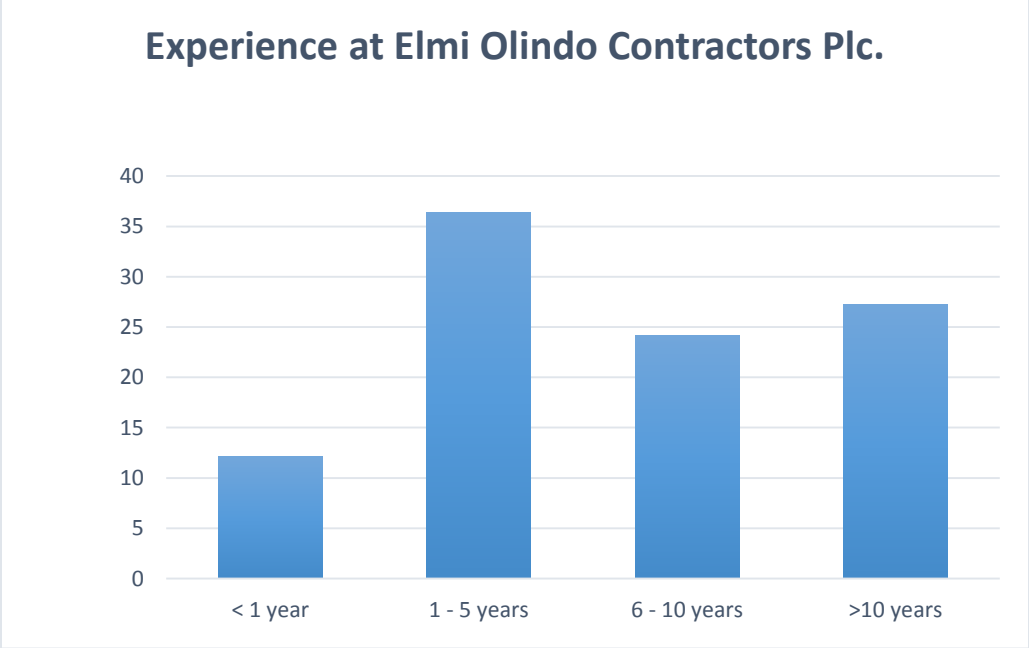


Figure 7: Experience of respondents at Elmi Olindo Contractors Plc

4.4 One sample t test of key study variables

Table 8: One sample t test

One-Sample Test

Description of Items	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
* Definition of risk	30.613	32	.000	3.40404	3.1775	3.6305
* Risk Attitude	43.435	32	.000	3.37879	3.2203	3.5372
* Influence of National Culture on risk attitude and risk taking behavior	25.958	32	.000	4.09091	3.7699	4.4119
* Risk perception based on superstitious beliefs	18.457	32	.000	3.09091	2.7498	3.4320
* Influence of Religious beliefs on risk attitude and risk taking behavior	15.030	32	.000	2.72727	2.3577	3.0969
* Risk in the Ethiopian Construction Industry	32.537	32	.000	4.30303	4.0336	4.5724
* Risks faced by Elmi Olindo Contractors Plc	21.809	32	.000	3.33939	3.0275	3.6513
* Managing project risk at Elmi Olindo Contractor Plc	38.651	32	.000	3.75758	3.5595	3.9556
* Attitude towards risk management during the project life cycle	32.460	32	.000	3.91515	3.6695	4.1608
* Attitude towards the risk management processes	24.283	32	.000	3.65909	3.3522	3.9660
* Risk management system adopted by Elmi Olindo Contractors Plc	20.157	32	.000	2.95152	2.6532	3.2498

The one-sample t-test compares the mean score found in an observed sample to a hypothetically assumed value. Typically, the hypothetically assumed value is the population mean or some other theoretically derived value. The t-test results in Table 8 show that the means of each item were statistically significant (i.e., all calculated p-values were less than 5% significance level). These t-test results show that the difference between the population mean and the hypothesized mean is statistically significant or different from the Test Value = 0.

4.5 Risk Attitude

Risk and attitude are defined in different ways by various researchers as shown in the literature review of this study. Risk is an uncertain event or set of circumstances if they occur would have a positive or negative effect on one or more of the project objectives. Attitude on the other hand is a chosen state of mind, mental view or disposition with regard to a fact or state. Therefore, risk attitude is a chosen state of mind with regard to those uncertainties that could have a positive or negative effect on objectives.

Research has shown that risk attitudes are influenced by many factors such as: personality traits, competence, emotional intelligence and national culture.

Table 9: Mean, median and mode values for the main construct i.e. risk attitude

Risk Attitude

N	Valid	33
	Missing	0
Mean		3.3384
Median		3.3833
Mode		3.38
Std. Deviation		.36840

Source: Survey data (2019)

The above table 9 shows that with regards to risk attitude, which is the main construct, the mean, median and mode of the responses received more or less lie in the range between neutrality and agreement.

The detail analysis of the sub-constructs within risk attitude are shown below:

4.4.1 Definition of Risk

Table 10: Mean, median and mode values for the sub-construct i.e. definition of risk

		Definition of Risk
N	Valid	33
	Missing	0
Mean		3.4040
Median		3.3333
Mode		3.00
Std. Deviation		.63878

Source: Survey data (2019)

As shown in table 10 above the overall mean 3.404 indicates that the responses lie in the range between neutrality and agreement. The most frequently responded item shown by the mode is 3 which indicates neutrality with regards to the respondent's definition of risk. The middle score of the responses arranged in order of magnitude shown by the median 3.333 indicates that 50% of the responses lie in the range between neutrality and agreement.

Table 11: Respondents perception that risk has a negative impact on a project

2.1.1-I believe risk has a negative impact on a project

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	6.1	6.1	6.1
	Disagree	6	18.2	18.2	24.2
	Neutral	4	12.1	12.1	36.4
	Agree	4	12.1	12.1	48.5
	Strongly agree	17	51.5	51.5	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Respectively, about the majority of respondents' (51.5%) strongly agree that risk has a negative impact on project outcomes while each of 12.1% of respondents responded that they were either neutral or agree that risk has a negative impact on a project.

The responses received from the interviews conducted also confirm the view that risk has a potentially disastrous future effect on projects resulting in unknown outcomes with time and cost implications.

Table 12: Respondents belief that risk has a positive impact on a project

2.1.2-I believe risk has a positive impact on a project

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	7	21.2	21.2	21.2
	Disagree	5	15.2	15.2	36.4
	Neutral	9	27.3	27.3	63.6
	Agree	7	21.2	21.2	84.8
	Strongly agree	5	15.2	15.2	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

On the other hand, the above table 12 shows that 21.2% and 15.2% of total respondents agree and strongly agree that risk has a positive impact on a project. Similarly, 15.2% and 21.2% of total respondents disagree and strongly disagree that risk has a positive impact on a project.

Table 13: Respondents belief that risk can have both positive and negative impact on a project

2.1.3-I believe risk can have both positive and negative impact on a project

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	6.1	6.1	6.1
	Disagree	7	21.2	21.2	27.3
	Neutral	7	21.2	21.2	48.5
	Agree	9	27.3	27.3	75.8
	Strongly agree	8	24.2	24.2	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

From Table 13 above, around 27.3% and 24.2% of total respondents agree and strongly agree that risk can have both positive and negative impact on a project.

The coefficient of variation (CV) is a measurement of variation and dispersion of data. Variation (i.e. dispersion of data) is a measure of how far from the mean the data set varies.
The CV is calculated as a ratio of the standard deviation to the mean. It ranges from 0 to 1. The higher the CV, the greater the level of variability and consequently lower accuracy. On the other hand, the lower the CV, the smaller the level of variability and consequently higher accuracy. CV, as a relative measure, is a preferred method compared to mean and standard deviation as it considers variability in relation to the mean values and has also no unit of measurement.
The coefficient of variation of the items were ranked in descending order under Table 14 below:

Table 14: Respondents definition of risk

Description of Items	N	Mean	Standard Deviation (SD)	Coefficient of Variation (CV)	Rank based on CV
I believe Risk has a negative impact on a project	33	3.850	1.395	0.362	**1st**
I believe Risk has a positive impact on a project	33	3.420	1.251	0.366	**2nd**
I believe Risk can have both negative and positive impact on a project	33	2.940	1.368	0.465	**3rd**
Overall Mean value for Definition of Risk		3.404	0.638	0.187	
Valid N (list wise)	33				

Source: Survey data (2019)

From Table 14 above, it can be observed that the overall mean value for definition of risk is 3.404 out of 5 and the coefficient of variation for the respondents' perception about risk is 0.187. Comparison of CVs within items that fall under definition of risk shows that the respondent's perception that risk has a negative impact on projects was ranked first, followed by respondent's perception of risk impacting projects positively ranked second and finally respondent's perception of risk impacting projects both positively and negatively was rated third. This result shows that there is low variability (high accuracy)

with respect to the respondent's perception that risk has a negative impact on a project compared to the respondent's perception about risk has a positive impact on a project.

Table 15: Correlation between risk attitude and influence of national culture on risk attitude and risk taking behavior

Correlations

		Q2.2	Q2.3
Q2.2	Pearson Correlation	1	-.155
	Sig. (2-tailed)		.388
	N	33	33
Q2.3	Pearson Correlation	-.155	1
	Sig. (2-tailed)	.388	
	N	33	33

Source: Survey data (2019)

The results shown on Table 15 above show that there is not enough statistical evidence to uncover the correlation between risk attitude and influence of national culture on risk attitude and risk.

Table 16: Correlation between risk attitude and risk perception based on superstitious or cultural beliefs

Correlations

		Q2.4	Q2.2
Q2.4	Pearson Correlation	1	-.016
	Sig. (2-tailed)		.930
	N	33	33
Q2.2	Pearson Correlation	-.016	1
	Sig. (2-tailed)	.930	
	N	33	33

Source: Survey data (2019)

The results shown on Table 16 above show that there is not enough statistical evidence to uncover the correlation between risk attitude and risk perception based on superstitious or cultural beliefs.

Table 17: Correlation between risk attitude and influence of Religious beliefs on risk attitude and risk taking behavior

Correlations

		Q2.2	Q2.5
Q2.2	Pearson Correlation	1	-.481**
	Sig. (2-tailed)		.005
	N	33	33
Q2.5	Pearson Correlation	-.481**	1
	Sig. (2-tailed)	.005	
	N	33	33

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

Source: Survey data (2019)

The results shown on Table 17 above show that there is enough statistical evidence to uncover significant correlation between risk attitude and risk perception based on superstitious or cultural beliefs.

Table 18: Correlation between risk attitude and risk in the Ethiopian construction industry

Correlations

		Q2.2	Q3.1
Q2.2	Pearson Correlation	1	-.015
	Sig. (2-tailed)		.934
	N	33	33
Q3.1	Pearson Correlation	-.015	1
	Sig. (2-tailed)	.934	
	N	33	33

Source: Survey data (2019)

The results shown on Table 18 above show that there is not enough statistical evidence to uncover the correlation between risk attitude and risk in the Ethiopian construction industry.

Table 19: Correlation between risk attitude and risks faced by Elmi Olindo Contractors Plc while undertaking construction projects:

Correlations

		Q2.2	Q3.2
Q2.2	Pearson Correlation	1	-.067
	Sig. (2-tailed)		.711
	N	33	33
Q3.2	Pearson Correlation	-.067	1
	Sig. (2-tailed)	.711	
	N	33	33

Source: Survey data (2019)

The results shown on Table 19 above show that there is not enough statistical evidence to uncover the correlation between risk attitude and risks faced by Elmi Olindo Contractors Plc while undertaking construction projects.

4.4.2 Risk Attitude

Table 20: Mean, median and mode values for the sub-construct i.e. risk attitude

		Risk Attitude
N	Valid	33
	Missing	0
Mean		3.3788
Median		3.5000
Mode		3.25[a]
Std. Deviation		.44687

a. Multiple modes exist. The smallest value is shown

Source: Survey data (2019)

As shown in table 20 above the overall mean 3.378 indicates that the responses lie in the range between neutrality and agreement. The most frequently responded item shown by the mode is 3.25 which

indicates neutrality/agreement with regards to the respondent's risk attitude. The middle score of the responses arranged in order of magnitude shown by the median 3.5 indicates that 50% of the responses lie in the range between neutrality and agreement.

Table 21: Respondents view of themselves as a risk averse person

2.2.1-I see myself as a Risk Averse person

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	3.0	3.0	3.0
	Disagree	7	21.2	21.2	24.2
	Neutral	8	24.2	24.2	48.5
	Agree	11	33.3	33.3	81.8
	Strongly agree	6	18.2	18.2	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

From Table 21 above, around 33.3% and 18.2% of total respondents agree and strongly agree that they see themselves as a risk averse person.

Contrary to the above, Table 22 below shows that 21.2% and 6.1% of total respondents agree and strongly agree that they see themselves as a risk seeker person. On the other hand, 21.2% and 27.3% disagree and strongly disagree that they see themselves as a risk seeker person. 24.2% of total respondents remain neutral on this topic.

Table 22: Respondents view of themselves as a risk seeker person

2.2.2-I see myself as a Risk Seeker person

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	9	27.3	27.3	27.3
	Disagree	7	21.2	21.2	48.5
	Neutral	8	24.2	24.2	72.7
	Agree	7	21.2	21.2	93.9
	Strongly agree	2	6.1	6.1	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 23: Respondents view of themselves as a risk neutral person

2.2.3-I see myself as a Risk Neutral person

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	5	15.2	15.2	15.2
	Disagree	9	27.3	27.3	42.4
	Neutral	8	24.2	24.2	66.7
	Agree	8	24.2	24.2	90.9
	Strongly agree	3	9.1	9.1	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 23 above shows that, around 24.2% and 9.1% of total respondents agree and strongly agree that they see themselves as a risk neutral person. On the other hand, 27.3% and 15.2% disagree and strongly disagree that they see themselves as a risk neutral person. Meanwhile 24.2% of the respondents remain neutral on this topic.

From Table 24 below, it can be observed that 27.3% and 69.7% of total respondents agree and strongly agree that they see themselves as a person that examines the situations in order to take calculated risks.

Table 24: Respondents view of themselves as individuals who take calculated risks

2.2.4-I tend to examine the situation and take Calculated Risk

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	1	3.0	3.0	3.0
	Agree	9	27.3	27.3	30.3
	Strongly agree	23	69.7	69.7	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

The coefficient of variation of the items were ranked in descending order under Table 25 below:

Table 25: Respondents risk attitude

Description of Items	N	Mean	Standard Deviation (SD)	Coefficient of Variation (CV)	Rank based on CV
I tend to examine the situation and take Calculated risk: - I estimate and weigh the advantages and disadvantages before taking any action	33	4.670	0.54	0.116	**1st**
I see myself as a *Risk Averse* person: - I am inclined towards certain, as opposed to uncertain events	33	3.420	1.119	0.327	**2nd**
I see myself as a *Risk Neutral* person: - I have an indifferent attitude towards risk	33	2.850	1.228	0.431	**3rd**
I see myself as a *Risk Seeker* person: - I am inclined to take on less-certain activities in lieau of more certain ones	33	2.580	1.275	0.494	**4th**
Overall Mean Value for Risk Attitude		3.378	0.446	0.132	
Valid N (list wise)	33				

Source: Survey data (2019)

From Table 22 above, it can be observed that the overall mean value for risk attitude is 3.378 out of 5 and the coefficient of variation for the respondents' risk attitude is 0.132. Comparison of CVs within items that fall under risk attitude show that respondent's view of themselves as a person that takes calculated risks was ranked first, followed by respondent's view of themselves as a risk averse person ranked second, then respondent's view of themselves as a risk neutral person ranked third and finally respondent's view of themselves as a risk seeker person was ranked fourth. This result shows that there is low variability (high accuracy) with respect to the respondent's view of themselves as a person that takes calculated risks compared to the respondent's view of themselves as a risk seeker person.

4.4.3 Influence of National Culture on risk attitude and risk taking behavior

Table 26: Mean, median and mode values for the sub-construct i.e. influence of national culture on risk attitude and risk taking behavior

		Influence of National Culture on Risk Attitude & Risk Taking Behavior
N	Valid	33
	Missing	0
Mean		4.0909
Median		4.0000
Mode		4.00
Std. Deviation		.90532

Source: Survey data (2019)

As shown in table 26 above the overall mean 4.090 indicates that the responses show agreement. The most frequently responded item shown by the mode is 4 which indicates agreement with regards to the respondent's perception of influence of national culture on risk attitude and risk taking behavior. The middle score of the responses arranged in order of magnitude shown by the median 4 indicates that 50% of the responses show agreement.

It can be deduced from Tables 27 and 28 below that around 60.6% and 30.3% of total respondents agree and strongly agree that national culture influences risk attitude as well as risk taking behavior. The responses received from the interviews conducted also affirm that in general an individual's attitude is affected by national culture, tradition and religious beliefs practiced in the environment that a person grows and lives in. Consequently, risk attitude and risk taking behavior are significantly affected by National culture, traditions and religious beliefs.

Table 27: Respondents belief that national culture influences risk attitude

2.3.1-I believe National Culture influences risk attitude

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	6.1	6.1	6.1
	Disagree	1	3.0	3.0	9.1
	Agree	20	60.6	60.6	69.7
	Strongly agree	10	30.3	30.3	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 28: Respondents belief that national culture influences risk taking behavior

2.3.2-I believe National Culture influences risk taking behavior

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	3.0	3.0	3.0
	Disagree	1	3.0	3.0	6.1
	Neutral	1	3.0	3.0	9.1
	Agree	20	60.6	60.6	69.7
	Strongly agree	10	30.3	30.3	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

The coefficient of variation of the items were ranked in descending order under Table 29 below:

Table 29: Respondents perception of influence of national culture on risk attitude and risk taking behavior

Description of Items	N	Mean	Standard Deviation (SD)	Coefficient of Variation (CV)	Rank based on CV
I believe National Culture influences risk taking behavior	33	4.120	0.857	0.208	**1st**
I believe National Culture influences risk attitude	33	4.060	0.998	0.246	**2nd**
Overall Mean value for influence of National culture on Risk attitude and Risk taking behavior		4.090	0.9053	0.221	
Valid N (list wise)	33				

Source: Survey data (2019)

From Table 29 above, it can be observed that the overall value for influence of national culture on risk attitude and risk taking behavior was 4.09 out of 5 and the coefficient of variation for the respondents' perception of influence of national culture on risk attitude and risk taking behavior is 0.221. Comparison of CVs within items that fall under influence of national culture on risk attitude and risk taking behavior shows that the respondent's perception that national culture influences risk taking behavior was ranked first and respondent's perception that national culture influences risk attitude was ranked second. This result shows that there is low variability (high accuracy) with respect to the respondent's perception that national culture influences risk taking behavior compared to the respondent's perception that national culture influences risk attitude.

4.4.4 Risk perception based on superstitions or cultural beliefs

Table 30: Mean, median and mode values for the sub-construct i.e. risk perception based on superstitious or cultural beliefs

		Risk Perception based on superstitious or cultural beliefs
N	Valid	33
	Missing	0
Mean		3.0909
Median		3.0000
Mode		3.33
Std. Deviation		.96203

Source: Survey data (2019)

As shown in table 30 above the overall mean 3.090 indicates that the responses lie in the range between neutrality and agreement. The most frequently responded item shown by the mode is 3.33 which indicates neutrality/agreement with regards to the respondent's risk perception based on superstitious or cultural beliefs. The middle score of the responses arranged in order of magnitude shown by the median 3 indicates that 50% of the responses show neutrality.

From Table 31 below, around 36.4% and 30.3% of total respondents agree and strongly agree that with regards to risk the future is in the hands of the Creator. On the other hand, 15.2% and 6.1% of total respondents disagree and strongly disagree that with regards to risk the future is in the hands of the Creator. 12.1% of total respondents remain neutral on this topic.

Table 31: Respondents belief that the future is in the hands of the Creator

2.4.1-With regards to Risk i believe the future is in the hands of the Creator

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	6.1	6.1	6.1
	Disagree	5	15.2	15.2	21.2
	Neutral	4	12.1	12.1	33.3
	Agree	12	36.4	36.4	69.7
	Strongly agree	10	30.3	30.3	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 32 below shows that 27.3% and 18.2% of the total respondents disagree and strongly disagree that focusing and foreseeing only on negative things happening in the future has a high probability that those negative things will happen. On the other hand, 24.2% and 9.1% of the total respondents agree and strongly agree that focusing and foreseeing only on negative things happening in the future has a high probability that those negative things will happen. 21.2% of total respondents remain neutral on this topic.

Table 32: Respondents belief that focusing and foreseeing only on negative things happening in the future has a high probability that those negative things will happen

2.4.2-Focusing and foreseeing only negative things happening in the future, then there is a high probability that those negative things will happen

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	18.2	18.2	18.2
	Disagree	9	27.3	27.3	45.5
	Neutral	7	21.2	21.2	66.7
	Agree	8	24.2	24.2	90.9
	Strongly agree	3	9.1	9.1	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Similarly, Table 33 below demonstrates that 39.4% and 12.1% of the total respondents disagree and strongly disagree that talking about negative (bad) things happening in the future is like wishing bad luck to one's self. On the other hand, 18.2% and 12.1% of the total respondents agree and strongly agree that talking about negative (bad) things happening in the future is like wishing bad luck to one's self. 18.2% of total respondents remain neutral on this topic.

Table 33: Respondents belief that talking about negative (bad) things happening in the future is like wishing bad luck to one's self

2.4.3-Talking about negative (bad) things happening in the future is like wishing bad luck to one's self

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	12.1	12.1	12.1
	Disagree	13	39.4	39.4	51.5
	Neutral	6	18.2	18.2	69.7
	Agree	6	18.2	18.2	87.9
	Strongly agree	4	12.1	12.1	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

The coefficient of variation of the items were ranked in descending order under Table 34 below:

Table 34: Respondents perception of risk based on superstitions or cultural beliefs

Description of Items	N	Mean	Standard Deviation (SD)	Coefficient of Variation (CV)	Rank based on CV
With regards to Risk I believe the future is in the hands of the Creator	33	3.700	1.237	0.334	**1st**
Talking about negative (bad) things happening in the future is like whishing bad luck to one's self	33	2.790	1.244	0.446	**2nd**
I feel that focusing and foreseeing only negative things happening in the future, then there is a high probability that those negative things will happen to you	33	2.790	1.269	0.455	**3rd**
Overall Mean Value for perception of risk based on superstitions or cultural beliefs		3.090	0.962	0.311	
Valid N (list wise)	33				

Source: Survey data (2019)

From Table 34 above, it can be observed that the overall mean value for perception of risk based on superstitions or cultural beliefs is 3.09 out of 5 and the coefficient of variation for the respondents' perception of risk based on superstitious or cultural beliefs is 0.311. Comparison of CVs within items that fall under perception of risk based on superstitions or cultural beliefs shows that the respondent's perception that with regards to risk the future is in the hands of the Creator is ranked first, followed by respondent's perception that talking about negative (bad) things happening in the future is like whishing bad luck to one's self ranked second, and finally respondent's perception that focusing and foreseeing only negative things happening in the future, then there is a high probability that those negative things will happen to one's self ranked third. This result shows that there is low variability (high accuracy) with respect to the respondent's perception that with regards to risk the future is in the hands of the Creator compared to the respondent's perception that focusing and foreseeing only negative things happening in the future, then there is a high probability that those negative things will happen to one's self.

4.4.5 Influence of religious beliefs on risk attitude and risk taking behavior

Table 35: Mean, median and mode values for the sub-construct i.e. influence of religious beliefs on risk attitude and risk taking behavior

		Influence of Religious Beliefs on Risk Attitude & Risk Taking Behavior
N	Valid	33
	Missing	0
Mean		2.7273
Median		2.3333
Mode		2.00[a]
Std. Deviation		1.04235

a. Multiple modes exist. The smallest value is shown

Source: Survey data (2019)

As shown in table 35 above the overall mean 2.727 indicates that the responses lie in the range between disagreement and neutrality. The most frequently responded item shown by the mode is 2 which indicates disagreement with regards to the respondent's perception of influence of religious beliefs on risk attitude and risk taking behavior. The middle score of the responses arranged in order of magnitude shown by the median 2.333 indicates that 50% of the responses lie between disagreement and neutrality.

As shown in Table 36 below, 42.4% and 9.1% of the total respondents disagree and strongly disagree that religious beliefs influence risk attitude. On the other hand, 30.3% and 9.1% of the total respondents agree and strongly agree that religious beliefs influence risk attitude. Meanwhile 9.1% of the total respondents is neutral on this subject.

The responses received from the interviews conducted affirm that in general an individual's attitude is affected by national culture, tradition and religious beliefs practiced in the environment that a person grows and lives in. Consequently, risk attitude and risk taking behavior are significantly affected by national culture, traditions and religious beliefs.

Table 36: Respondents view that religious beliefs influence risk attitude

2.5.1-I believe Religious beliefs influence risk attitude

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	9.1	9.1	9.1
	Disagree	14	42.4	42.4	51.5
	Neutral	3	9.1	9.1	60.6
	Agree	10	30.3	30.3	90.9
	Strongly agree	3	9.1	9.1	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Similarly, Table 37 below shows that 39.4 and 12.1% of the total respondents disagree and strongly disagree that religious beliefs influence risk taking behavior. On the other hand, 39.4% and 3% of the total respondents agree and strongly agree that religious beliefs influence risk taking behavior. Meanwhile 6.1% of the total respondents is neutral on this subject.

Table 37: Respondents feeling that religious beliefs influence risk taking behavior

2.5.2-I feel that Religious beliefs influence risk taking behavior

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	12.1	12.1	12.1
	Disagree	13	39.4	39.4	51.5
	Neutral	2	6.1	6.1	57.6
	Agree	13	39.4	39.4	97.0
	Strongly agree	1	3.0	3.0	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Furthermore, as shown in the Table 38 below, 42.4% and 18.2% of the total respondents disagree and strongly disagree that a person with strong religious beliefs will show a low risk taking behavior. 15.2% and 6.1% of the total respondents agree and strongly agree on this matter and 18.2% of the total respondents remain neutral.

Table 38: Respondents feeling that a person with strong religious beliefs will show a low risk taking behavior and vice versa

2.5.3-I think that a person with strong religious beliefs will show a low risk taking behavior and vice versa

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	18.2	18.2	18.2
	Disagree	14	42.4	42.4	60.6
	Neutral	6	18.2	18.2	78.8
	Agree	5	15.2	15.2	93.9
	Strongly agree	2	6.1	6.1	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

The coefficient of variation of the items were ranked in descending order under Table 39 below:

Table 39: Respondents view about the influence of religious beliefs on risk attitude and risk taking behavior

Description of Items	N	Mean	Standard Deviation (SD)	Coefficient of Variation (CV)	Rank based on CV
I feel that Religious beliefs influence risk taking behavior	33	2.820	1.185	0.420	**1st**
I believe Religious beliefs influence risk attitude	33	2.880	1.219	0.423	**2nd**
I think that a person with strong religious beliefs will show a low risk taking behavior and viceversa	33	2.480	1.149	0.463	**3rd**
Overall Mean Value influence of religious beliefs on risk attitude and risk taking behavior		2.720	1.042	0.383	
Valid N (list wise)	33				

Source: Survey data (2019)

From Table 39 above, it can be observed that the overall mean for influence of religious beliefs on risk attitude and risk taking behavior is 2.72 out of 5 and the coefficient of variation for the respondents'

view on the influence of religious beliefs on risk attitude and risk taking behavior is 0.383. Comparison of CVs among items that fall under influence of religious beliefs on risk attitude and risk taking behavior shows that the respondent's view that religious beliefs influence risk taking behavior was ranked first, followed by respondent's view that religious beliefs influence risk attitude ranked second, and finally respondent's view that a person with strong religious beliefs will show a low risk taking behavior and vice versa ranked third. This shows that there is low variability (high accuracy) with respect to the respondent's view that religious beliefs influence risk taking behavior compared to the respondent's view that a person with strong religious beliefs will show a low risk taking behavior and vice versa.

4.6 Risks in construction projects undertaken by Elmi Olindo Contractors Plc

Table 40: Mean, median and mode values for the main construct i.e. risks in construction projects undertaken by Elmi Olindo Contractors Plc.

Risks in construction projects undertaken by Elmi Olindo Contractors Plc.

N	Valid	33
	Missing	0
Mean		3.8212
Median		3.8500
Mode		4.30
Std. Deviation		.64007

Source: Survey data (2019)

The Above table 40 shows that with regards to risks in construction projects undertaken by Elmi Olindo Contractors Plc, which is the main construct, the mean and the median of the responses received more or less lie in the range between neutrality and agreement, meanwhile the mode lies in the range between agreement and strong agreement.

The detail analysis of the sub constructs within risks in construction projects undertaken by Elmi Olindo Contractors Plc, are shown below:

4.5.1 Risks in the Ethiopian construction industry

According to Tadesse *et al.* (2016) the construction industry in Ethiopia, like in other developing countries, faces many challenges in its practice. Some of these challenges are project overruns, poor quality, inappropriate procurement systems, and a failure to cope with project requirements and the inability to adopt best practices.

Table 41: Mean, median and mode values for the sub-construct i.e. risks in the Ethiopian construction industry

		Risks in the Ethiopian Construction Industry
N	Valid	33
	Missing	0
Mean		4.3030
Median		4.5000
Mode		5.00
Std. Deviation		.75972

Source: Survey data (2019)

As shown in table 41 above the overall mean 4.303 indicates that the responses lie in the range between agreement and strong agreement. The most frequently responded item shown by the mode is 5 which indicates strong agreement with regards to the respondent's view of risks in the Ethiopian construction industry. The middle score of the responses arranged in order of magnitude shown by the median 4.5 indicates that 50% of the responses lie between agreement and strong agreement.

The results obtained from this study with regards to risks in the Ethiopian construction industry are in strict alignment with the affirmations of Tadesse *et al.* (2016). From Tables 43 and 43 below, 24.2% and 57.6% of the total respondents agree and strongly agree that the Ethiopian construction sector is extremely volatile and showing high levels of risk. Furthermore, 36.4% and 51.5% of the total respondents agree and strongly agree that most of the construction projects are facing many challenges like time delays, cost overruns and quality compliance issues.

Furthermore the responses received from the interviews conducted also confirm that the Ethiopian construction industry is seriously affected by lack of available budget, poor scheduling and construction methodologies, political instability, lack of foreign currency, lack of skilled labor, poor contract management skills, poor quality, cost overruns, inadequate health and safety policy schemes on the contractors' side, absence or loosely enforced government regulations related to health and safety and environmental issues.

Table 42: Respondents view of the Ethiopian construction industry as extremely volatile and showing high levels of risk

3.1.1-I think that the Ethiopian Construction Sector is extremely volatile and showing high levels of risk

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	15.2	15.2	15.2
	Neutral	1	3.0	3.0	18.2
	Agree	8	24.2	24.2	42.4
	Strongly agree	19	57.6	57.6	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 43: Respondents awareness that most of the projects are facing many challenges: - time delays, cost overruns and quality compliance issues

3.1.2-I know that most of the construction projects are facing many challenges: - time delays, cost overruns and quality compliance issues

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	3.0	3.0	3.0
	Neutral	3	9.1	9.1	12.1
	Agree	12	36.4	36.4	48.5
	Strongly agree	17	51.5	51.5	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

The coefficient of variation of the items were ranked in descending order under Table 44 below:

Table 44: Respondents view of risks in the Ethiopian construction industry

Description of Items	N	Mean	Standard Deviation (SD)	Coefficient of Variation (CV)	Rank based on CV
I know that most of the projects are facing many challenges: - time delays, cost overruns and quality compliance issues	33	4.360	0.783	0.180	**1st**
I think that the Ethiopian construction sector is extremely volatile and showing High levels of risk	33	4.240	1.091	0.257	**2nd**
Overall Mean Value for Risks in the Ethiopian Construction Industry		4.303	0.759	0.176	
Valid N (list wise)	33				

Source: Survey data (2019)

From Table 44 above, it can be observed that the overall mean for risks in the Ethiopian construction industry is 4.303 out of 5 and the coefficient of variation for the respondents' view of risks in the Ethiopian construction industry is 0.176. Comparison of CVs within items that fall under risks in the Ethiopian construction industry shows that the respondent's view that most of the projects in Ethiopia are facing many challenges: - time delays, cost overruns and quality compliance issues was ranked first and respondent's view that the Ethiopian construction sector is extremely volatile and showing high levels of risk ranked second. This result shows that there is low variability (high accuracy) with respect to the respondent's view that most of the projects in Ethiopia are facing many challenges: - time delays, cost overruns and quality compliance issues compared to the respondent's view that the Ethiopian construction sector is extremely volatile and showing high levels of risk.

4.5.2 Risks faced by Elmi Olindo Contractors Plc while undertaking construction projects

According to Hailemeskel (2013) the key challenges identified within the Ethiopian construction industry are: shortage of skilled and unskilled manpower, machineries and tools, absence of appropriate standards and guidelines, lack of strong institutional capacity to oversee the construction industry, lack of construction project management and control skills and many others. These challenges have contributed to poor performance level of the industry indicated by delay, cost overrun, poor quality delivery.

Table 45: Mean, median and mode values for the sub-construct i.e. risks faced by Elmi Olindo Contractors Plc while undertaking construction projects

		Risks faced by Elmi Olindo Contractors Plc while undertaking construction projects
N	Valid	33
	Missing	0
Mean		3.3394
Median		3.4000
Mode		2.40[a]
Std. Deviation		.87961

a. Multiple modes exist. The smallest value is shown

Source: Survey data (2019)

As shown in table 45 above the overall mean 3.339 indicates that the responses lie in the range between neutrality and agreement. The most frequently responded item shown by the mode is 2.4 which indicates disagreement/neutrality with regards to the respondent's view of risks faced by Elmi Olindo Contractors Plc while undertaking construction projects. The middle score of the responses arranged in order of magnitude shown by the median 3.4 indicates that 50% of the responses lie between neutrality and agreement.

The following Tables 46,47,48,49 and 50 show that with regards to the risks faced by Elmi Olindo Contractors Plc while undertaking projects:

- 42.4% and 24.2% of the total respondents agree and strongly agree that the company faces technical risks (uncertainty of resources and availability of materials inadequate site investigations or incomplete designs, substandard quality, inadequate Health & Safety practices etc…)
- 45.5% and 15.2% of the total respondents agree and strongly agree that the company faces management related risks (uncertain productivity of resources)
- 42.4% and 9.1% of the total respondents agree and strongly agree that the company faces socio-political risks (customs and import restrictions and difficulties disposing off equipment)
- 36.4% and 12.1% of the total respondents agree and strongly agree that the company faces financial risks (inflation, local taxes, availability and fluctuation in foreign exchange etc…)
- 27.3% and 15.2% of the total respondents agree and strongly agree that the company faces environmental risks (natural disasters, weather and seasonal implications etc…)

Table 46: Respondents view that Elmi Olindo Contractors Plc faces Technical Risks

3.2.1-I think that EO faces Technical Risks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	3.0	3.0	3.0
	Disagree	8	24.2	24.2	27.3
	Neutral	2	6.1	6.1	33.3
	Agree	14	42.4	42.4	75.8
	Strongly agree	8	24.2	24.2	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 47: Respondents view that Elmi Olindo Contractors Plc faces Environmental Risks

3.2.2-I think that EO faces Environmental Risks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	9.1	9.1	9.1
	Disagree	10	30.3	30.3	39.4
	Neutral	6	18.2	18.2	57.6
	Agree	9	27.3	27.3	84.8
	Strongly agree	5	15.2	15.2	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 48: Respondents view that Elmi Olindo Contractors Plc faces Management related Risks

3.2.3-I think that EO faces Management related Risks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	6.1	6.1	6.1
	Disagree	6	18.2	18.2	24.2
	Neutral	5	15.2	15.2	39.4
	Agree	15	45.5	45.5	84.8
	Strongly agree	5	15.2	15.2	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 49: Respondents view that Elmi Olindo Contractors Plc faces Financial Risks

3.2.4-I think that EO faces Financial Risks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	6.1	6.1	6.1
	Disagree	8	24.2	24.2	30.3
	Neutral	7	21.2	21.2	51.5
	Agree	12	36.4	36.4	87.9
	Strongly agree	4	12.1	12.1	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 50: Respondents view that Elmi Olindo Contractors Plc faces Socio-political Risks

3.2.5-I think that EO faces Socio-political Risks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	3.0	3.0	3.0
	Disagree	8	24.2	24.2	27.3
	Neutral	7	21.2	21.2	48.5
	Agree	14	42.4	42.4	90.9
	Strongly agree	3	9.1	9.1	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

The coefficient of variation of the items were ranked in descending order under Table 451 below:

Table 51: Respondents view on the types of risks faced by Elmi Olindo Contractors Plc while undertaking construction projects

Description of Items	N	Mean	Standard Deviation (SD)	Coefficient of Variation (CV)	Rank based on CV
I think that Elmi faces Socio-political risks: Customs and import restrictions and difficulties disposing of equipment etc…	33	3.300	1.045	0.317	**1st**
I think that Elmi faces Technical risks: This can include uncertainty of resources and availability of materials, inadequate site investigation, or incomplete design etc... Quality, Health & Safety	33	3.610	1.197	0.332	**2nd**
I think that Elmi faces Management related risks: include uncertain productivity of resources.	33	3.450	1.148	0.333	**3rd**
I think that Elmi faces Financial risks: Inflation, local taxes, and availability and fluctuation in foreign exchange etc…	33	3.240	1.146	0.354	**4th**
I think that Elmi faces Environmental risks: include natural disasters, weather, and seasonal implications etc….	33	3.090	1.259	0.407	**5th**
Overall Mean Value for the types of risks faced by Elmi Olindo Contractors Plc while undertaking construction projects		3.339	0.879	0.263	
Valid N (list wise)	33				

Source: Survey data (2019)

From Table 51 above, it can be observed that the overall mean value for the types of risks faced by Elmi Olindo Contractors Plc while undertaking construction projects is 3.339 out of 5 and the coefficient of variation for the respondents' view on the types of risks faced by Elmi Olindo Contractors Plc while undertaking construction projects is 0.263. Comparison of CVs within items that fall under types of risks faced by Elmi Olindo Contractors Plc while undertaking construction projects

shows that the respondent's view that Elmi faces Socio-political risks was ranked first, followed by respondent's view that Elmi faces Technical risks ranked second, then respondent's view that Elmi faces Management related risks ranked third, respondent's view that Elmi faces Financial risks was ranked fourth and finally respondent's view that Elmi faces Environmental risks was ranked fifth. This shows that there is low variability (high accuracy) with respect to the respondent's view that Elmi faces Socio-political risks compared to the respondent's view that Elmi faces Environmental risks.

4.7 Risks Management Systems and Processes implemented by Elmi Olindo Contractors Plc

According to esub.com, construction risk management is an important facet of construction planning. Without understanding where risk can come from projects are open to cost overruns and other issues. When project managers don't mitigate risks they might put projects in dire straits because of personnel, environmental, safety, and other types of risks. With the wide variety of project management and other construction and subcontractor software solutions, mitigating risk is easier for project managers than ever before. Software only gets people so far, so project managers and superintendents need to know the basics of construction risk management and what to look out for.

Table 52: Mean, median and mode values for the main construct i.e. risk management systems and processes implemented by Elmi Olindo Contractors Plc.

Risks Management Systems and Processes implemented by Elmi Olindo Contractors Plc

N	Valid	33
	Missing	0
Mean		3.5708
Median		3.6000
Mode		3.35[a]
Std. Deviation		.47009

a. Multiple modes exist. The smallest value is shown

Source: Survey data (2019)

The Above table 52 shows that with regards to risks management systems and processes implemented by Elmi Olindo Contractors Plc, which is the main construct, the mean, median and mode of the responses received more or less lie in the range between neutrality and agreement.
The detail analysis of the sub constructs within risks management systems and processes implemented by Elmi Olindo Contractors Plc, are shown below:

4.6.1 Managing project risk at Elmi Olindo Contractors Plc

Table 53: Mean, median and mode values for the sub-construct i.e. managing project risk at Elmi Olindo Contractors Plc.

		Managing project risk at Elmi Olindo Contractors Plc
N	Valid	33
	Missing	0
Mean		3.7576
Median		3.6000
Mode		3.60
Std. Deviation		.55847

Source: Survey data (2019)

As shown in table 53 above the overall mean 3.757 indicates that the responses lie in the range between neutrality and agreement. The most frequently responded item shown by the mode is 3.6 which indicates neutrality/agreement with regards to the respondent's perception of managing project risk at Elmi Olindo Contractors Plc. The middle score of the responses arranged in order of magnitude shown by the median 3.6 indicates that 50% of the responses lie between neutrality and agreement.

From Table 54 and 55 below it can be observed that around 42.4% and 48.5% of the total respondents agree and strongly agree that the project manager is responsible for managing risk. Furthermore, 36.4% and 54.5% of the total respondents agree and strongly agree that the project management team is responsible for managing project risks at Elmi Olindo Contractors Plc.

The responses received from the interviews conducted also confirm that the project manager and the project management team composed of senior project managers, project managers, assistant project managers, site engineers, office engineers etc… are responsible for managing risks during the execution of projects. Furthermore, the Client also shares this responsibility specifically with regards to the finance/budget of the project. The consultant and the design team are also responsible to manage risks related to design modifications and specifications.

A study conducted by Shahid et al (2014) on risk management in construction projects in Pakistan states that the contractor's project manager is responsible for management of most risks occurring at sites during the implementation phase, such as issues related to subcontractors, labor, machinery, availability of materials and quality.

Table 54: Respondents understanding that the project manager is responsible for managing risk

4.1.1-The Project Manager is responsible for managing risk

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	3.0	3.0	3.0
	Neutral	2	6.1	6.1	9.1
	Agree	14	42.4	42.4	51.5
	Strongly agree	16	48.5	48.5	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 55: Respondents understanding that the project management team is responsible for managing risk

4.1.2-The Project Management Team is responsible for managing risk

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	3.0	3.0	3.0
	Disagree	1	3.0	3.0	6.1
	Neutral	1	3.0	3.0	9.1
	Agree	12	36.4	36.4	45.5
	Strongly agree	18	54.5	54.5	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

From table 56 below, 42.4% and 3% of the total respondents agree and strongly agree that the client is responsible for managing risk in construction projects undertaken by Elmi Olindo Contractors Plc. According to Shahid et al (2014) the client is responsible for project risks such as financial issues, issues related to design documents, changes in codes and regulations, and scope of work.

Table 56: Respondents understanding that the client is responsible for managing risk

4.1.3-The Client is responsible for managing risk

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	3.0	3.0	3.0
	Disagree	10	30.3	30.3	33.3
	Neutral	7	21.2	21.2	54.5
	Agree	14	42.4	42.4	97.0
	Strongly agree	1	3.0	3.0	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 57 below shows that, 51.5% and 12.1% of the total respondents agree and strongly agree that the consultant is responsible for managing risk in construction projects undertaken by Elmi Olindo Contractors Plc.

Table 57: Respondents understanding that the consultant is responsible for managing risk

4.1.4-The Consultant is responsible for managing risk

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	3.0	3.0	3.0
	Disagree	7	21.2	21.2	24.2
	Neutral	4	12.1	12.1	36.4
	Agree	17	51.5	51.5	87.9
	Strongly agree	4	12.1	12.1	100.0
	Total	33	100.0	100.0	

Source:Survey data (2019)

Table 58 below shows that, 24.2% and 21.2% of the total respondents agree and strongly agree that a specialized risk management team is responsible for managing risk in construction projects undertaken by Elmi Olindo Contractors Plc. On the other hand, 18.2% and 15.2% of the total respondents disagree and strongly disagree that a specialized risk management team is responsible for managing risk in construction projects undertaken by Elmi Olindo Contractors Plc. 21.2% of the total respondents remain neutral on this matter.

Based on the responses received from the interviews conducted the concept of a specialized risk management team is quite vague and unknown.

Table 58: Respondents understanding that a specialized risk management team is responsible for managing risk

4.1.5-A Specialized Risk Management Team is responsible for managing risk

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	5	15.2	15.2	15.2
	Disagree	6	18.2	18.2	33.3
	Neutral	7	21.2	21.2	54.5
	Agree	8	24.2	24.2	78.8
	Strongly agree	7	21.2	21.2	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

The coefficient of variation of the items were ranked in descending order under Table 59 below:

Table 59: Respondents understanding of the responsibility of managing project risks at Elmi Olindo Contractors Plc

Description of Items	N	Mean	Standard Deviation (SD)	Coefficient of Variation (CV)	Rank based on CV
The Project Management team is responsible for managing risk and is a shared responsibility	33	4.360	0.929	0.213	**1st**
The Project Manager is responsible for managing risk	33	4.640	1.295	0.279	**2nd**
The Consultant is responsible for managing risk	33	3.480	1.064	0.306	**3rd**
The Client is responsible for managing risk	33	3.120	0.992	0.318	**4th**
A specialized Risk Management Team is responsible for managing risk	33	3.180	1.380	0.434	**5th**
Overall mean Value for responsibility of managing project risks at Elmi Olindo Contractors Plc		3.757	0.558	0.149	
Valid N (list wise)	33				

Source: Survey data (2019)

From Table 59 above, it can be observed that the overall mean value for responsibility of managing project risks at Elmi Olindo Contractors Plc was 3.757 out of 5 and the coefficient of variation for the respondents' understanding of the responsibility of managing project risks at Elmi Olindo Contractors Plc while undertaking construction projects is 0.149. Comparison of CVs within items that fall under responsibility of managing project risks at Elmi Olindo Contractors Plc shows that the respondent's

understanding that the project management team is responsible for managing risk at Elmi was ranked first, followed by respondent's understanding that the project manager is responsible for managing risk at Elmi ranked second, then respondent's understanding that the consultant is responsible for managing risk ranked third, respondent's understanding that the client is responsible for managing risk ranked fourth and finally respondent's understanding that a specialized risk management team is responsible for managing risk was ranked fifth. This shows that there is low variability (high accuracy) with respect to the respondent's understanding that the project management team is responsible for managing risk at Elmi compared to the respondent's understanding that a specialized risk management team is responsible for managing risk.

4.6.2 Attitude towards risk management during the project life cycle at Elmi Olindo Contractors Plc

According to a study conducted by Kundan and Alvin (2016) on risk management during project life cycle (research conducted on general contractors and project management of construction companies in India) risk management is essential during the project life cycle (PLC) in minimizing losses and enhancing profitability. Risk during PLC (construction risk) is generally perceived as event that influence project object of cost, time and quality. Risk is present at every phase of PLC and by studying it one can be alert and provide good remedy to come over, for the success of project. Furthermore, risk analysis and management during PLC depends mainly on intuition, judgement and experience and formal risk analysis and management techniques are rarely used due to lack of knowledge and to doubt on the suitability of these techniques for construction industries activity.

It is possible to identify potential risks by applying a simple method to detect the possibility of risk having highest impact on time, cost and quality during PLC and those risks should be eliminated or mitigated by taking an appropriate action. Nevertheless, the lack of knowledge of risk management method and application of method during PLC is needed to be facilitated in construction sector because there are risks which are characteristic for each project phase.

Table 60: Mean, median and mode values for the sub-construct i.e. attitude towards risk management during the project life cycle at Elmi Olindo Contractors Plc.

		Attitude towards risk management during the project life cycle at Elmi Olindo Contractors Plc.
N	Valid	33
	Missing	0
Mean		3.9152
Median		3.8000
Mode		3.60[a]
Std. Deviation		.69287

a. Multiple modes exist. The smallest value is shown

Source: Survey data (2019)

As shown in table 60 above the overall mean 3.915 indicates that the responses lie in the range between neutrality and agreement. The most frequently responded item shown by the mode is 3.6 which indicates neutrality/agreement with regards to the respondent's attitude towards risk management during the project life cycle at Elmi Olindo Contractors Plc. The middle score of the responses arranged in order of magnitude shown by the median 3.8 indicates that 50% of the responses lie between neutrality and agreement.

The following Tables 61,62,63,64 and 65 show that with regards to risk management during the life cycle of projects undertaken by Elmi Olindo Contractors Plc:

- 15.2% and 75.8% of the total respondents agree and strongly agree that risk management should be applied at all project life cycle stages
- 42.4% and 39.4% of the total respondents agree and strongly agree that risk management should be applied at planning stage
- 33.3% and 42.4% of the total respondents agree and strongly agree that risk management should be applied at conceptual stage
- 39.4% and 36.4% of the total respondents agree and strongly agree that risk management should be applied at implementation stage

- On the other hand, 24.2% and 18.2% of the total respondents disagree and strongly disagree that risk management should be applied at closure stage

Table 61: Respondents belief that risk management should be applied at conceptual stage

4.2.1-I believe risk management should be applied at Conceptual Stage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	6	18.2	18.2	18.2
	Neutral	2	6.1	6.1	24.2
	Agree	11	33.3	33.3	57.6
	Strongly agree	14	42.4	42.4	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 62: Respondents belief that risk management should be applied at planning stage

4.2.2-I believe risk management should be applied at Planning Stage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	3.0	3.0	3.0
	Disagree	2	6.1	6.1	9.1
	Neutral	3	9.1	9.1	18.2
	Agree	14	42.4	42.4	60.6
	Strongly agree	13	39.4	39.4	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 63: Respondents belief that risk management should be applied at implementation stage

4.2.3-I believe risk management should be applied at Implementation Stage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	6	18.2	18.2	18.2
	Neutral	2	6.1	6.1	24.2
	Agree	13	39.4	39.4	63.6
	Strongly agree	12	36.4	36.4	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 64: Respondents belief that risk management should be applied at closure stage

4.2.4-I believe risk management should be applied at Closure Stage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	18.2	18.2	18.2
	Disagree	11	33.3	33.3	51.5
	Neutral	2	6.1	6.1	57.6
	Agree	8	24.2	24.2	81.8
	Strongly agree	6	18.2	18.2	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 65: Respondents belief that risk management should be applied at all project life cycle stages

4.2.5-I believe risk management should be applied at All Project Life cycle stages

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	3.0	3.0	3.0
	Neutral	2	6.1	6.1	9.1
	Agree	5	15.2	15.2	24.2
	Strongly agree	25	75.8	75.8	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

The coefficient of variation of the items were ranked in descending order under Table 66 below:

Table 66: Respondents attitude towards risk management during the project life cycle at Elmi Olindo Contractors Plc

Description of Items	N	Mean	Standard Deviation (SD)	Coefficient of Variation (CV)	Rank based on CV
I believe risk management should be at all project life cycle stages	33	4.640	0.742	0.160	**1st**
I understand risk management is applied at Planning stage of the project	33	4.090	1.011	0.247	**2nd**
I believe risk management should be applied at Implementation stage of the project	33	3.940	1.088	0.276	**3rd**
I believe risk management should be applied at Conceptual stage of the project	33	4.000	1.118	0.280	**4th**
I believe risk management should be at Closure stage of the project	33	2.910	1.444	0.496	**5th**
Overall Mean Value for attitude towards risk management during the project life cycle at Elmi Olindo Contractors Plc		3.915	0.692	0.177	
Valid N (list wise)	33				

Source: Survey data (2019)

From Table 66 above, it can be observed that the overall mean value for the attitude towards risk management during the project life cycle at Elmi Olindo Contractors Plc was 3.915 out of 5 and the coefficient of variation for the respondents' attitude towards risk management during the project life cycle at Elmi Olindo Contractors Plc is 0.177. Comparison of CVs within items that fall under attitude towards risk management during the project life cycle at Elmi Olindo Contractors Plc shows that the

respondent's view that risk management is applied at all project life cycle stages was ranked first, followed by respondent's view that risk management is applied at planning stage of the project ranked second, then respondent's view that risk management is applied at implementation stage of the project ranked third, respondent's view that risk management is applied at conceptual stage of the project ranked fourth and finally respondent's view that risk management is applied at closure stage of the project was ranked fifth. This shows that there is low variability (high accuracy) with respect to the respondent's view that risk management is applied at all project life cycle stages compared to the respondent's view that risk management is applied at closure stage of the project.

4.6.3 Attitude towards the risk management processes at Elmi Olindo Contractors Plc

Table 67: Mean, median and mode values for the sub-construct i.e. attitude towards the risk management processes at Elmi Olindo Contractors Plc.

		Attitude towards the risk management processes at Elmi Olindo Contractors Plc.
N	Valid	33
	Missing	0
Mean		3.6591
Median		4.0000
Mode		4.00
Std. Deviation		.86562

Source: Survey data (2019)

As shown in table 67 above the overall mean 3.659 indicates that the responses lie in the range between neutrality and agreement. The most frequently responded item shown by the mode is 4 which indicates agreement with regards to the respondent's attitude towards the risk management processes at Elmi Olindo Contractors Plc. The middle score of the responses arranged in order of magnitude shown by the median is also 4 which indicates that 50% of the responses are found in agreement.

The following Tables 68, 69, 70 and 71 show that with regards to risk management processes at Elmi Olindo Contractors Plc:

- 63.6% and 9.1% of the total respondents agree and strongly agree that risk identification process is undertaken
- 57.6% and 12.1% of the total respondents agree and strongly agree that risk assessment process is undertaken
- 57.6% and 15.2% of the total respondents agree and strongly agree that risk response process is undertaken
- 48.5% and 12.1% of the total respondents agree and strongly agree that risk monitoring and control process is undertaken

As per the responses received from the interviews conducted the risk management processes implemented in the projects relies heavily on the experience of the project manager who has the ultimate responsibility for the project. On the other hand, analysis of company data shows that the majority of Elmi's clients (international organizations and embassies) like Heineken, Soufflet, Coca Cola, Boortmalt, Indian Embassy, British Embassy (Foreign & Commonwealth Office) and others are enforcing in their projects stringent requirements with regards to risk management processes (risk prevention, insurance, risk identification, risk assessment and monitoring/control) and Elmi's project management team is contractually obliged to adhere to.

Table 68: Respondents understanding that risk identification process is undertaken

4.3.1-Risk Identification process is undertaken

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	3.0	3.0	3.0
	Disagree	2	6.1	6.1	9.1
	Neutral	6	18.2	18.2	27.3
	Agree	21	63.6	63.6	90.9
	Strongly agree	3	9.1	9.1	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 69: Respondents understanding that risk assessment process is undertaken

4.3.2-Risk Assessment process is undertaken

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	3.0	3.0	3.0
	Disagree	3	9.1	9.1	12.1
	Neutral	6	18.2	18.2	30.3
	Agree	19	57.6	57.6	87.9
	Strongly agree	4	12.1	12.1	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 70: Respondents understanding that risk response process is undertaken

4.3.3-Risk Response process is undertaken

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	3.0	3.0	3.0
	Disagree	3	9.1	9.1	12.1
	Neutral	5	15.2	15.2	27.3
	Agree	19	57.6	57.6	84.8
	Strongly agree	5	15.2	15.2	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 71: Respondents understanding that risk monitoring and control process is undertaken

4.3.4-Risk Monitoring & Control process is undertaken

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	3.0	3.0	3.0
	Disagree	4	12.1	12.1	15.2
	Neutral	8	24.2	24.2	39.4
	Agree	16	48.5	48.5	87.9
	Strongly agree	4	12.1	12.1	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

The coefficient of variation of the items were ranked in descending order under Table 72 below:

Table 72: Respondents attitude towards the risk management processes at Elmi Olindo Contractors Plc

Description of Items	N	Mean	Standard Deviation (SD)	Coefficient of Variation (CV)	Rank based on CV
Risk Identification process is undertaken	33	3.700	0.847	0.229	**1st**
Risk Assessment process is undertaken	33	3.670	0.924	0.252	**2nd**
Risk Response process is undertaken	33	3.730	0.944	0.253	**3rd**
Risk Monitoring & Control process is undertaken	33	3.550	0.971	0.274	**4th**
Overall Mean Value for attitude towards the risk management processes at Elmi Olindo Contractors Plc		3.659	0.866	0.237	
Valid N (list wise)	33				

Source: Survey data (2019)

From Table 72 above, it can be observed that the overall mean value for attitude towards the risk management processes at Elmi Olindo Contractors Plc was 3.659 out of 5 and the coefficient of variation for the respondents' attitude towards risk management processes at at Elmi Olindo Contractors Plc is 0.237. Comparison of CVs within items that fall under attitude towards the risk management processes at Elmi Olindo Contractors Plc shows that the respondent's view that risk identification process is undertaken at Elmi was ranked first, followed by respondent's view that risk assessment process is undertaken at Elmi ranked second, then respondent's view that risk response process is undertaken at Elmi ranked third, and finally respondent's view that risk monitoring & control process is undertaken at Elmi ranked fourth. This result shows that there is low variability (high accuracy) with respect to the respondent's view that risk identification process is undertaken at Elmi compared to the respondent's view that risk monitoring & control process is undertaken at Elmi.

4.6.4 Risk management system adopted by Elmi Olindo Contractors Plc

According to a study conducted by Kyungmo *et al*. (2017) on Construction Management Risk System for Construction Management Firms in Korea, after the global financial crisis of 2008, the need for risk management arose because it was necessary to minimize the losses in construction management (CM) firms. This was caused by a decreased amount of orders in the Korean CM market, which intensified order competition between companies. However, research results revealed that risks were not being systematically managed owing to the absence of risk management systems. Thus, it was concluded that it was necessary to develop standard operating systems and implement risk management systems in order to manage risks effectively.

Table 73: Mean, median and mode values for the sub-construct i.e. risk management system adopted by Elmi Olindo Contractors Plc.

		Risk management system adopted by Elmi Olindo Contractors Plc
N	Valid	33
	Missing	0
Mean		2.9515
Median		3.0000
Mode		2.60[a]
Std. Deviation		.84118

a. Multiple modes exist. The smallest value is shown

Source: Survey data (2019)

As shown in table 73 above the overall mean 2.951 indicates that the responses lie in the range between disagreement and neutrality. The most frequently responded item shown by the mode is 2.6 which indicates disagreement/neutrality with regards to the respondent's perception of the risk management system adopted by Elmi Olindo Contractors Plc. The middle score of the responses arranged in order of magnitude shown by the median is 3 which indicates that 50% of the responses are found in neutrality.

As per the results shown on Table 74 below, 42.4% and 18.2% of the total respondents agree and strongly agree that there is a systematic approach or careful planning done to perform risk management in the projects undertaken by Elmi Olindo Contractors Plc.

The responses received from the interviews conducted show that there is no standardized and systematic risk management process adopted at a company level. Analysis of company data shows that recent international clients and embassies like Heineken, Soufflet, Coca Cola, Boortmalt, Indian Embassy, British Embassy (Foreign & Commonwealth Office) and others are enforcing in their projects stringent requirements with regards to risk management, health and safety management, quality management, environmental protection which Elmi's project management team is contractually obliged to adhere to.

Table 74: Respondents belief that there is a systematic approach or careful planning done to perform risk management in the project

4.4.1-I believe there is a systematic approach or careful planning done to perform risk management in the project

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	3.0	3.0	3.0
	Disagree	5	15.2	15.2	18.2
	Neutral	7	21.2	21.2	39.4
	Agree	14	42.4	42.4	81.8
	Strongly agree	6	18.2	18.2	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

According to Table 75 below, 36.4% and 6.1% of the total respondents agree and strongly agree that relevant stakeholders are involved in the planning and managing risk. 27.3% and 3% of the total respondents disagree and strongly disagree that relevant stakeholders are involved in the planning and managing risk. On the other hand, 27.3% of the respondents remain neutral on this subject.

Table 75: Respondents belief that the relevant stakeholders are involved in the planning and managing risk

4.4.2-I believe relevant stakeholders are involved in the planning and managing risk

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	3.0	3.0	3.0
	Disagree	9	27.3	27.3	30.3
	Neutral	9	27.3	27.3	57.6
	Agree	12	36.4	36.4	93.9
	Strongly agree	2	6.1	6.1	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

Table 76 below indicates that only 36.4% and 9.1% of the total respondents agree and strongly agree that as a member of the project management team they have received training or believe they have enough knowledge about how to handle risks and uncertainties. On the other hand, 21.2% and 18.2% of the total respondents disagree and strongly disagree that as a member of the project management team they have received training or believe they have enough knowledge about how to handle risks and uncertainties. Meanwhile 15.2% of the total respondents remain neutral on this subject.

As per the responses received from the interviews conducted there is no training given at a company level to develop the knowledge and awareness of risk and its management. The project manager and the project management team members rely solely on their experience and eventual academic courses taken.

Table 76: Respondents confirmation that as a member of the project management team they have received training or believe they have enough knowledge about how to handle risks and uncertainties

4.4.3-As a member of the PM Team i have received training or have enough knowledge about how to handle risks and uncertainties

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	18.2	18.2	18.2
	Disagree	7	21.2	21.2	39.4
	Neutral	5	15.2	15.2	54.5
	Agree	12	36.4	36.4	90.9
	Strongly agree	3	9.1	9.1	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

As per Table 77 below, 45.5% and 30.3% of the total respondents disagree and strongly disagree that the company has regularly organized trainings and workshops on risk management planning, implementation and monitoring

Table 77: Respondents confirmation that the company has regularly organized trainings and workshops on risk management planning, implementation and monitoring

4.4.4-I know that the company has regularly organized trainings and workshops on risk management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	10	30.3	30.3	30.3
	Disagree	15	45.5	45.5	75.8
	Neutral	3	9.1	9.1	84.8
	Agree	5	15.2	15.2	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

From Table 78 below, it can be observed that 24.2% and 15.2% of the total respondents disagree and strongly disagree that risk management plan is incorporated with the project plan. On the other hand, 33.3% and 9.1% of the total respondents agree and strongly agree that risk management plan is

incorporated with the project plan. Meanwhile 18.2% of the total respondents remain neutral on this subject.

Table 78: Respondents confirmation that risk management plan is incorporated with the project plan

4.4.5-I know that risk management plan is incorporated with the project plan

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	5	15.2	15.2	15.2
	Disagree	8	24.2	24.2	39.4
	Neutral	6	18.2	18.2	57.6
	Agree	11	33.3	33.3	90.9
	Strongly agree	3	9.1	9.1	100.0
	Total	33	100.0	100.0	

Source: Survey data (2019)

The coefficient of variation of the items were ranked in descending order under Table 79 below:

Table 79: Respondents knowledge of the risk management system adopted by Elmi Olindo Contractors Plc

Description of Items	N	Mean	Standard Deviation (SD)	Coefficient of Variation (CV)	Rank based on CV
I believe there is systematic approach or careful planning done to perform risk management in the project.	33	3.580	1.062	0.297	**1st**
I believe relevant stakeholders are involved in the planning and managing risk.	33	3.150	1.004	0.319	**2nd**
I know that risk management plan is incorporated with the project plan.	33	2.970	1.262	0.425	**3rd**
As a member of the Project management team I have received training or have enough knowledge about how to handle risks and uncertainties.	33	2.970	1.311	0.441	**4th**
I know that the company has regularly organized trainings and workshops on risk management planning, implementation and monitoring	33	2.090	1.011	0.484	**5th**
Overall Mean Value for risk management system adopted by Elmi Olindo Contractors		2.951	0.841	0.285	
Valid N (list wise)	33				

Source: Survey data (2019)

From Table 79 above, it can be observed that the overall mean value for risk management system adopted by Elmi Olindo Contractors was 2.951 out of 5 and the coefficient of variation for the respondents' knowledge of the risk management system adopted by Elmi Olindo Contractors Plc is 0.285. Comparison of CVs within items that fall under risk management system adopted by Elmi Olindo Contractors shows that the respondent's view that there is systematic approach or careful planning done to perform risk management in the project was ranked first, followed by respondent's view that relevant stakeholders are involved in the planning and managing risk ranked second, then respondent's view that risk management plan is incorporated with the project plan ranked third, respondent's view that as a member of the project management team they have received training or have enough knowledge about how to handle risks and uncertainties ranked fourth and finally respondent's view that that the company has regularly organized trainings and workshops on risk management planning, implementation and monitoring ranked fifth. This shows that there is low variability (high accuracy) with respect to the respondent's view that there is systematic approach or careful planning done to perform risk management in the project compared to the respondent's view that the company has regularly organized trainings and workshops on risk management planning.

Table 80: Correlation between managing project risk at Elmi Olindo Contractors Plc and risk management system adopted by Elmi Olindo Contractors Plc:

Correlations

		Q4.1	Q4.4
Q4.1	Pearson Correlation	1	.419*
	Sig. (2-tailed)		.015
	N	33	33
Q4.4	Pearson Correlation	.419*	1
	Sig. (2-tailed)	.015	
	N	33	33

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

Source: Survey data (2019)

The results shown on Table 80 above show that there is enough statistical evidence to uncover significant correlation between managing project risk at Elmi Olindo Contractors Plc and risk management system adopted by Elmi Olindo Contractors Plc:

5. CONCLUSION AND RECOMMENDATION

5.1 Introduction

The study set out with the objective of assessing and examining the risk attitude and management in construction projects – evidence from Elmi Olindo Contractors Plc with the specific objectives of:

1. To identify the risk attitude and perception among project managers and project management team in construction projects undertaken by Elmi Olindo Contractors Plc
2. To identify the risks present in the Ethiopian construction industry in general as well as risks faced by Elmi Olindo Contractors Plc while undertaking construction projects in different parts of Ethiopia
3. To identify the risk management systems, practices and processes implemented by Elmi Olindo Contractors Plc both at a project level as well as at a company level.

In an effort to achieve these objectives an examination into the literature of the subject matter has been undertaken. The background of Elmi Olindo Contractors Plc and the construction projects being implemented in different parts of Ethiopia, at the time of the study were analyzed. Detailed views and perceptions with regards to risk attitude have been outlined from decision makers i.e. project managers and project management team members. Furthermore, risks in construction and specifically in the Ethiopian construction industry have been examined and the need for an integrated and systematic risk management has been identified.

A survey was conducted by the researcher to assess risk attitudes of project managers and project management team members and the risk management practices employed at a company level as well as in the construction projects undertaken by Elmi Olindo Contractors Plc. Primary data collected through questionnaire survey and interviews was analyzed and the results were presented in the previous chapter. This section will present the conclusions and recommendations of the study.

5.2 Conclusion

In an effort to achieve the study's objectives, the conclusions drawn are presented as follows:

1. The general profile of the respondents shows that almost all of the respondents to the questionnaires and interviews of this study were male. Consequently, this shows that the decision making roles in projects (project managers and project management team members) at Elmi Olindo Contractors Plc are predominantly taken by male professionals and this confirms the view of Nuanthip and Tanit (2012) that the construction industry is associated with male domination.
2. The majority of the project managers and project management team members of Elmi Olindo Contractors Plc have a negative attitude towards risk and perceive risks have damaging future effects on projects and they are destined to obstacle the achievement of their objectives. Most project managers and project management team members tend to examine situations in order to take calculated risks. Furthermore, in their view national culture and religious beliefs were perceived to be affecting to a certain degree an individual's perception of risk and consequently their risk taking behavior.
3. Most of the project managers and project management team members of Elmi Olindo Contractors Plc perceive the Ethiopian construction industry is extremely volatile that shows high levels of risk and most of the construction projects are facing many challenges like time delays, cost overruns and quality compliance issues. Furthermore, the industry is also affected by lack of available budget, poor scheduling and construction methodologies, political instability, lack of foreign currency, lack of skilled labor, poor contract management skills, poor quality, cost overruns, inadequate health and safety policy schemes on the contractors' side, absence or loosely enforced government regulations related to health and safety and environmental issues.

   The project managers and project management team members believe that the risks faced by Elmi Olindo Contractors Plc while undertaking construction projects in different parts of Ethiopia are:

   - Technical risks (uncertainty of resources and availability of materials inadequate site investigations or incomplete designs, substandard quality, inadequate Health & Safety practices etc…)
   - Management related risks (uncertain productivity of resources)

- Socio-political risks (customs and import restrictions and difficulties disposing off equipment)
- Financial risks (inflation, local taxes, availability and fluctuation in foreign exchange etc…)
- Environmental risks (natural disasters, weather and seasonal implications etc…)

The project manager and the project management team of Elmi Olindo contractors Plc composed of senior project managers, project managers, assistant project managers, site engineers, office engineers etc… are responsible for managing risks during the execution/implementation of projects. Furthermore, the client also shares the responsibility specifically with regards to the finance/budget of the project. The consultant and the design team are responsible to manage risks related to design modifications and specifications. There is also ample consensus among the project managers and project management team members that risk management should be applied at all project life cycle stages.

4. The majority of the project managers and project management team members at Elmi Olindo Contractors Plc believe that there is a systematic risk management and appropriate risk management processes (i.e. risk identification, risk assessment, risk response, risk monitoring and control) are being undertaken in their projects. This is due to the fact that Elmi's international clients and embassies like Heineken, Soufflet, Coca Cola, Boortmalt, Indian Embassy, British Embassy (Foreign & Commonwealth Office), New Zealand Embassy, Tikur Anbessa Specialized Hospital New Cardiac Center (Contract with Philips), BGI New Headquarters Building are enforcing in their projects stringent requirements with regards to risk management, health and safety management, quality management, environmental protection which Elmi's project managers and project management team are contractually obliged to adhere to. Based on the analysis of company data out of 15 construction projects being undertaken at the time of this study 10 of these projects have international clients. Furthermore, risk management processes implemented in these projects rely heavily on the experience of the project manager who has the ultimate responsibility for the project.
   On the other hand, there is ample consensus among the project managers and project management team members that the company doesn't have a standard risk management system at a company level and has rarely organized trainings and workshops on risk management planning, implementation and monitoring. The project manager and the project management

team rely solely on their experience and eventual academic courses taken in order to develop their knowledge and awareness of risk and its management.

5.3 Recommendation

Based on the findings and conclusions of the study, recommendations are forwarded.

Elmi Olindo Contractors Plc should organize workshops, trainings and experience sharing platforms in order to understand and shape risk attitudes (with regards to risk identification, analysis/assessment and response etc…) and perceptions of decision makers of projects (i.e. senior project managers, project managers and project team members) as well as improve their knowledge and awareness of risk management processes and practices.

Furthermore, Elmi should combine its extensive experience in the industry as well as its exposure to international standards and best practices through its international clients in order to develop a risk management system (manual, guideline, assessment/audits) that is duly acknowledged by senior management, enforced and implemented in all of its construction projects. In addition to the above staff ownership should be promoted and also rewarded.

5.4 Limitations of the study and areas of future research

As the scope of the study focuses only on one construction company and the sample size is quite limited there is a difficulty in generalizing the findings to all contractors and professionals operating in the Ethiopian construction sector.

For the purpose of this study only cross sectional data was taken. Nevertheless, longitudinal data and continuous assessment can give a better insight on the subject matter. Furthermore, the study implemented only subjective measures that can be combined with objective measures for assessing risk attitudes and risk management systems in the construction sector and other sectors.

The scope of this study is limited to the ongoing construction projects undertaken by Elmi Olindo Contractors Plc, and did not consider past completed projects. Therefore, a more extensive study on past completed projects will bring additional detailed insights on the subject matter.

Furthermore, the study was conducted with a focus on project managers and project management team members of Elmi Olindo Contractors Plc. This study was conducted with the assumption that the ultimate responsibility of managing risks in order to achieve project objectives rests on the decision makers (i.e. project managers and project management team members). Nevertheless, risk management as well as the achievement of project objectives is a shared and collective responsibility. Therefore, there is a need for a more participatory and comprehensive study in this area.

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6. APPENDIX

6.1 Questionnaire

Dear sir/Madam

My name is Benny Bahata and I am currently doing my MA. in Project Management at Addis Ababa University, School of Commerce. I have finished my course work and now I am doing my MA. thesis entitled: Risk Attitude and Management in construction projects- the Case of Elmi Olindo Contractors Plc.

I believe your experience and educational background will greatly contribute to the success of my research which is aimed at contributing to ELMI and also the Construction industry at large. So it's with great respect that I ask you to fill this questionnaire. I guarantee that your identity will be kept confidential and the information you provide will only be used for academic purposes. I will be happy to share the findings of this research when it's completed.

Thank you in advance for taking your precious time to fill this questionnaire. Please try to answer all the questions openly, as your answers will have an influence on the outcome of the research. Your 15 minutes or less will greatly contribute to the growth and advancement of knowledge in the company as well as the Ethiopian construction industry.

If you have any questions or comments, please don't hesitate to contact me. You can reach me by;

- Mobile: +251914-316530
- E-mail: ben.bahata@gmail.com

With Regards,

Benny Bahata

This study entitled "***Risk Attitude and Management in Construction projects – Evidence from Elmi Olindo Contractors Plc***" is designed to identify risk attitudes and management among project managers and project management team members who are the decision makers and are responsible for construction projects undertaken by Elmi Olindo Contractors Plc. The information you provide will be used purely for academic purpose and will be kept confidential. Participation in this study is absolutely voluntary. Please answer with HONESTY & SINCERITY.

1. SECTION ONE: GENERAL PROFILE OF THE RESPONDENT

1.1. Gender: _____
1 = Male 2 = Female

1.2. Age: _____
1 = 20-25 3 = 31-40
2 = 26-30 4 = 41-50

1.3. Highest educational level: _____
1 = Diploma
2 = BSc/BA
3 = MSc/MA/MBA
4 = Others: _____

1.4. Project name: _____Location: _____

1.5. Job title: _____
1 = Senior Project Manager
2 = Project Manager
3 = Assistant Project Manager
4 = Others: _____

1.6. Years of experience:
a) In the construction industry: _____
1= < 1 year 2= 1-5 years
3= 6-10 years 4= >10 years

b) At Elmi Olindo Contractors Plc: _____
1= < 1 year 2= 1-5 years
3= 6-10 years 4= >10 years

2. SECTION TWO: RISK ATTITUDE

Please indicate your opinion by ticking on the appropriate box for the five-point scale questions:

STRONGLY AGREE 5 AGREE 4 NEUTRAL 3 DISAGREE 2 STRONGLY DISAGREE 1

2.1.Definition of Risk

No.	Description	5	4	3	2	1
1	I believe Risk has a negative impact on a project					
2	I believe Risk has a positive impact on a project					
3	I believe Risk can have both negative and positive impact on a project					

2.2.Risk attitude

No.	Description	5	4	3	2	1
1	I see myself as a *Risk Averse* person: - I am inclined towards certain, as opposed to uncertain events					
2	I see myself as a *Risk Seeker* person: - I am inclined to take on less-certain activities in lieau of more certain ones					
3	I see myself as a *Risk Neutral* person: - I have an indifferent attitude towards risk					
4	I tend to examine the situation and take Calculated risk: - I estimate and weigh the advantages and disadvantages before taking any action					

2.3.Influence of National Culture on risk attitude and risk taking behavior

No.	Description	5	4	3	2	1
1	I believe National Culture influences risk attitude					
2	I believe National Culture influences risk taking behavior					

2.4. Risk perception based on superstitious or cultural beliefs

No.	Description	5	4	3	2	1
1	With regards to Risk I believe the future is in the hands of the Creator					
2	I feel that focusing and foreseeing only negative things happening in the future, then there is a high probability that those negative things will happen to you					
3	Talking about negative (bad) things happening in the future is like whishing bad luck to one's self					

2.5.Influence of Religious beliefs on risk attitude and risk taking behavior

No.	Description	5	4	3	2	1
1	I believe Religious beliefs influence risk attitude					
2	I feel that Religious beliefs influence risk taking behavior					
3	I think that a person with strong religious beliefs will show a low risk taking behavior and viceversa					

3. SECTION THREE: RISKS IN CONSTRUCTION PROJECTS UNDERTAKEN BY ELMI OLINDO CONTRACTORS PLC

Please indicate your opinion by ticking on the appropriate box for the five-point scale questions:

STRONGLY AGREE 5 AGREE 4 NEUTRAL 3 DISAGREE 2 STRONGLY DISAGREE 1

3.1.Risk in the Ethiopian Construction Industry

No.	Description	5	4	3	2	1
1	I think that the Ethiopian construction sector is extremely volatile and showing High levels of risk					
2	I know that most of the projects are facing many challenges: - time delays, cost overruns and quality compliance issues					

3.2.The following are the types of Risks faced by Elmi Olindo Contractors Plc while undertaking construction projects:

No.	Description	5	4	3	2	1
1	I think that Elmi faces *Technical risks*: This can include uncertainty of resources and availability of materials, inadequate site investigation, or incomplete design etc... Quality, HSE					
2	I think that Elmi faces *Environmental risks*: include natural disasters, weather, and seasonal implications etc….					
3	I think that Elmi faces *Management related risks*: include uncertain productivity of resources.					
4	I think that Elmi faces *Financial risks*: Inflation, local taxes, and availability and fluctuation in foreign exchange etc...					
5	I think that Elmi faces *Socio-political risks*: Customs and import restrictions and difficulties disposing of equipment etc…					

4. SECTION FOUR: RISK MANAGEMENT SYSTEM AT ELMI OLINDO CONTRACTORS PLC

Please indicate your opinion by ticking on the appropriate box for the five-point scale questions:

STRONGLY AGREE 5 | AGREE 4 | NEUTRAL 3 | DISAGREE 2 | STRONGLY DISAGREE 1

4.1. Managing project risk at Elmi Olindo Contractors Plc:

No.	Description	5	4	3	2	1
1	The Project Manager is responsible for managing risk					
2	The Project Management team is responsible for managing risk and is a shared responsibility					
3	The Client is responsible for managing risk					
4	The Consultant is responsible for managing risk					
5	A specialized Risk Management Team is responsible for managing risk					

4.2. Attitude towards risk management during the project life cycle at Elmi Olindo Contractors Plc

No.	Description	5	4	3	2	1
1	I believe risk management should be applied at Conceptual stage of the project					
2	I understand risk management is applied at Planning stage of the project					
3	I believe risk management should be applied at Implementation stage of the project					
4	I believe risk management should be at Closure stage of the project					
5	I believe risk management should be at all project life cycle stages					

4.3. Attitude towards the risk management processes at Elmi Olindo Contractors Plc

No.	Description	5	4	3	2	1
1	Risk Identification process is undertaken					
2	Risk Assessment process is undertaken					
3	Risk Response process is undertaken					
4	Risk Monitoring & Control process is undertaken					

4.4.Risk Management System adopted by Elmi Olindo Contractors Plc?

No.	Description	5	4	3	2	1
1	I believe there is systematic approach or careful planning done to perform risk management in the project.					
2	I believe relevant stakeholders are involved in the planning and managing risk.					
3	As a member of the Project management team I have received training or have enough knowledge about how to handle risks and uncertainties.					
	I know that the company has regularly organized trainings and workshops on risk management planning, implementation and monitoring					
4	I know that risk management plan is incorporated with the project plan.					
5	I believe risk management relies mainly on the experience of the project manager					

Thanks for your time.

6.2 Interview

Interview questions

1. What is your view of risk? How do you describe your risk attitude?
2. What are the risks faced by construction projects in Ethiopia?
3. Do you think that risk attitude is impacted by national culture, tradition and religious beliefs? How?
4. What is your level of awareness and knowledge of risk management systems and practices? (Risk identification, assessment, response, monitoring & control)
5. How do you personally identify risks?
6. Can you please brief me on the project's risk management practice? How do you manage risks in your project?
7. Is there a standard risk management process which is being followed with in the projects or formal documented process on how to manage risks at a company level and at a project level?
8. Who is responsible for managing risks during the execution of projects?
9. Are team members within the project aware of the major risks that the project might face and the ways to handle them? Are they given any kind of activities or trainings to develop their knowledge and awareness on risk and its management?