



ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

PROJECT MANAGEMENT PROGRAM

A PROJECT PAPER ON

*"Risk Management Practices, Insurance Utilization, and Accidental Loss Projections in Ethiopian Construction Firms: A Case Study of Sunshine Construction Company and China Communication Construction Company (Ethiopia Branch) LTD"*

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# Addis Ababa University

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This is to certify that this project work prepared by Bruk Semma; *"Risk Management Practices, Insurance Utilization, and Accidental Loss Projections in Ethiopian Construction Firms: A Case Study of Sunshine Construction Company and China Communication Construction Company (Ethiopia Branch) LTD"* which is submitted in partial fulfillment of the requirements for the Degree of Masters in Project Management, complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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## **Declaration**

I, Bruk Semma, declare that this project paper entitled "*Risk Management Practices, Insurance Utilization, and Accidental Loss Projections in Ethiopian Construction Firms: A Case Study of Sunshine Construction Company and China Communication Construction Company (Ethiopia Branch) LTD*" 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.

Bruk Semma

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Bruk Semma

***"Risk Management Practices, Insurance Utilization, and Accidental Loss Projections in Ethiopian Construction Firms: A Case Study of Sunshine Construction Company and China Communication Construction Company (Ethiopia Branch) LTD"***

Bruk Semma

2024

**Abstract**

*This project paper present a comparative assessment of construction project risk management through insurance in case of Sunshine Construction Company and China Communication Construction Company. The study delves into the risk management strategies of these companies in the construction sector, emphasizing the pivotal role of insurance in mitigating project risks. By examining the companies risk management practices, the challenges faced in purchasing insurance policies and forecasting the seasonal trends in accidental losses, the research identifies key difference in their approaches and provided valuable insight for enhancing risk management effectiveness. The forecasted accidental loss for both companies over the next three year is analyzed, revealing potential seasonal patterns and trends in construction project risk. The study recommendation aim to improve risk management practices, address challenges in purchasing insurance policies and predict accidental losses, it offer valuable insight for the construction industry in Ethiopia.*

**Key words:** *Risk, Construction project risk, Insurance Premium, Accidental Loss, Sum Insured*

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## **Acronyms**

AEO:-Africa Economic outlook

BSG:-Bandit and Shifta cover

CCCC:-Chain Communication Construction Company

IRM:-Institute of risk management

GFCF:-Gross fixed capital development

GIT:-Goods in transit

GDP:-Gross Domestic product

KRI:-key risk indicator

OCI:-office of the commissioner of insurance

PMBOK:-Project management body of knowledge

PMI:-Project managing Institution

SWOT:-Strength, Weakness, Opportunities and Threats

UNIC:-United Insurance Company S.C

## CHAPTER ONE

### 1. INTRODUCTION

#### 1.1 BACKGROUND OF THE STUDY

A project is an intricate, non-routine, one-time endeavor with time, money, and resource constraints. It is designed to satisfy client needs and has performance requirements. Over the course of a facility's existence, a construction project is completed by a variety of planned and unplanned activities and interactions with shifting actors and processes in a continuously changing environment. (Cooper, 2005).

Construction sites are inherently dangerous, with frequent and frequently serious accidents occurring. In the construction industry, there are a significant number of fatalities, serious injuries, and property damage each year. In addition to this, building projects need significant financial outlays, particularly for public works. All of these factors raise the risk of the building industry and intensify the need for careful handling of financial matters (Fidic, 2020).

Construction work includes making long-term capital goods. It comes from many things like design, building, money, law, and insurance. These things have lots of risks, and insurance is a big way to handle them.

Ethiopia's rapidly expanding construction sector is one of the instruments for national development. The industry has grown substantially in the last ten to fifteen years. The construction industry is a risky business due to the unique characteristics of construction projects which can attributed to the fact that construction projects involves many stakeholders, is subjected to external environment impacts like weather conditions, it involves a large amount of capital, different site conditions for different projects, is time and quality sensitive, and also different complex problems (Abebe, 2007)

Risk is an unknowable circumstance or occurrence that, if it materializes, might have a favorable or unfavorable impact on a project's goal. Risk is described in the construction business as the

existence of possible real threats or opportunities that affect a project's planning, building, and commissioning objectives, which take the shape of budget, schedule, and quality (Abebe, 2007).

Risk management is a very important management process which helps to achieve projects' objectives. It helps to gain a greater awareness and understanding of the types and nature of risks inherent in the project, and the likelihood of their occurrence. It also helps to assess the potential impact of the risks on the viability of the project and contract and to determine how best to eliminate or control the risks. Szymański (2017) said that contractors typically transfer risk in building projects in three ways: by insurance to insurance firms, by subcontracting to the subcontractor, and by changing the terms and circumstances of the contract to the client or other parties.

The construction industry's stakeholders might trade their uncertainty for certainty by using insurance firms as a tool for risk transfer. A loss might occur, and if so, when it might happen and how severe it would be are all unknowns.

The construction industries stakeholder's look for strategies to manage the financial impact of risk since this unpredictability makes budgeting extremely difficult. The chance to swap this unpredictable loss for a known loss—the insurance premium—is provided by insurance. The insurance company promises to reimburse any damages that come under the policy's conditions in exchange for the contractor agreeing to pay a certain premium (Hickson, 2017).

Due to the possible severity of accidents and their frequent occurrence in Ethiopia, consultants and contractors must safeguard themselves with a range of intricate and costly insurance policies. Contractors and consultants would constantly face the risk of significant, potentially catastrophic financial loss in the absence of proper insurance coverage (Abebe, 2007).

## **1.2 PROBLEM STATEMENT**

Projects are singular, high-profile corporate endeavors that frequently need cutting-edge technology and substantial quantities of money. These projects are by their very nature very risky and closely tied to people and organizations. They also carry a great deal of uncertainty. To optimize the significant financial gains and prospects that result from project success, these risks must be recognized, comprehended, and controlled (Barkley, 2004).

Insurance companies can be utilized by construction stakeholders as a mechanism for transferring risks, during which uncertainty is swapped for certainty. The bill is ultimately footed by clients in the industry and their needs and expectations should be comprehended (Drennan, 2018).

From the viewpoint of clients, the process of risk management should commence from the project's explanation to the users' handover. Clients are the primary party in carrying out the risk management process and engage contractors during the construction phase or at a former stage.

Based on research done by Yimam (2011), the risk management maturity survey indicates that practically there is little or no risk management practices in projects undertaken in Ethiopia. There are also several researches conducted regarding project risk management practices in projects undertaken in Ethiopia ( Getachew, 2014; Frezewud, 2016 and others). All of those studies were mainly focused on practices of project risk management by taking one or two projects as case studies.

On other hand, previous research works conducted on the area of insurance and risk management of projects in the Ethiopia's construction sector (Abebe, 2007; Getachew, 2014; Addis, 2014) indicated that there is a substantial gap in relation to the practice of risk management and the use of insurance in the sector; showing adequate insurance coverage is not being provided by construction firms in Ethiopia.

All of those studies were mainly focused on practices of project risk management by taking one or two projects as case studies. However, there were no researches work has been done focusing on Companywide risk management practices. In addition, previous researches did not integrate the seasonality and trends aspects of accidental loss in relate to construction risk management. Thus, this study will addresses this gap by assessing and comparing the risk management (through insurance) practices and experience of one of international construction Company China Communications Construction Company which had significant experiences in risk management and insurance against Ethiopian base Sunshine construction Company.

### **1.2.1 RESEARCH QUESTION**

- 1 What are the current risk management practices of Sunshine Construction Company and China Communication Construction Company (Ethiopia branch) LTD?

- 2 What is the level of understanding and familiarity on type of construction insurance policies subject to both companies?
- 3 What are the challenges they face to purchase insurance policies?
- 4 Is there seasonality trend in accidental losses that are related to construction risk?
- 5 Is there liner trend in construction project accidental loss?
- 6 What will be the loss magnitude of both companies in next 3 years?

### **1.3 MAIN OBJECTIVE**

This study's general objective is to assess the risk management practice through Insurance in case of Sunshine Construction Company and China Construction Company (Ethiopia branch) LTD

#### **1.3.1 SPECIFIC OBJECTIVE**

1. To assess and compare construction risk management practice of Sunshine Construction Company and China Construction Company (Ethiopia branch) LTD).
2. To examine the level of understanding and degree of familiarity of the type of construction insurance coverage or protection.
3. To identify the challenges faced by both firms to purchase insurance policies.
4. To analysis the trend of accidental loss in both companies.
5. To Compare the accidental loss of past ten years and forecast the loss for both company for next three years.

### **1.4 SIGNIFICANCE OF THE STUDY**

The findings and recommendations of the study will have a great importance to both Companies to improve the risk management practice specifically in related to construction projects. The research paper may also provide information for both Company about the trend and forecast of their accidental loss in construction project. This information will help the Company's management to make informed decision on risk management methods.

Beside this, the research result will help the insurance Company specifically The United Insurance Company S.C to improve its service that reduce the challenges faced by it customer while purchasing insurance policy. In addition to this, the paper also helps the insurance Company to set premium rate as the research will provide a forecast of loss of both Company.

Furthermore, the findings of this research will stimulate other researchers to conduct further research on construction insurances. Since, it is indicated what needs to be done to improve risk management with tool of Insurance policies particularly in the construction industry. Last but not least, the study will serve as a starting point and as a reference for further studies.

## **1.5 SCOPE OF THE STUDY**

The study mainly focused on the Risk Management through Insurance practice of Sunshine Construction Company and China communication Construction Company (Ethiopia branch) LTD and tried to compare the result. In addition, the last ten years accidental loss of both companies are analyzed and the coming next three years loss for both companies are forecasted.

Thus, this study had not considered the role of other success factors for those projects nor it investigated the role of project risk management in other organization or other sectors. When it comes to the methodology for data collection and analysis, the primary data has been collected from the project risk management team in both Company and also secondary data has been collected from the United Insurance Company S.C.

### **1.5.1 BACKGROUND OF THE COMPANIES**

Sunshine Construction Plc was created in 1984, while working as a sole ownership and later on transformed into a privately limited firm in 1993. During the initial years of its foundation, the firm started involving itself in minor constructions and water proof works with not more than ten laborers. At present, the firm has exceeding 3000 workers and the 34-year long-lasting profession of the company enabled it to build a reliable capability and exhibit practical superiority in the construction industry (Sunshine, 2023).

On the other hand, China Communications Building Group Company, Ltd. (CCCC) is a multinational engineering and construction company that is primarily under state control and is publicly traded. Its primary activities involve the planning, building, and management of infrastructure assets, such as highways, bridges, tunnels, trains (especially high-speed rail), subways, airports, oil platforms, and sea harbors. CCCC has participated in several Belt and Road Plan projects as a contractor (CCCC, 2024).

China Communications Building Group Company Limited ("CCCC" or the "Firm") is a prominent worldwide full-service provider of mega infrastructure, commonly participating in the

investment, construction, and operation of transportation infrastructure, equipment production, real estate, and comprehensive urban growth. The firm's earning and value-production capacity is at a guiding position globally. In 2021, CCCC was ranked 61st in the Fortune global 500. China Communications Building Group Company -Global has founded 280 international firms in 123 lands and zones across the globe, and holds trade in 157 nations (CCCC, 2024) and Ethiopia is one segment of this.

## **1.6 LIMITATION OF THE STUDY**

Due to time and budget constraints, the study is limited to only the Risk Management through Insurance practice and accidental loss of two Companies and thus it may be difficult to fully generalize the finding with confidence to countrywide. As well the study will not assess factors affecting the trend of loss ratio of both Companies.

## **1.7 THESIS ORGANIZATION**

The research is organized into five chapters which are summarized as follows;

The first chapter introduces the research problem and the aim of the study is followed by the objectives of the research in achieving the depicted aim, significance of the research and scope and limitations has been discussed. Chapter two is about a literature review from professional journals, books, internet searches and published research works. This chapter is essentially provided a review of the general practice of risk management, construction insurances, and construction risks management through insurance. Chapter three has discussed about the research methodology that has been followed in order to achieve the objectives of the study. In Chapter four the results of the data obtained from the questionnaire survey and secondary source has been presented, discussed and interpreted accordingly. Finally, in Chapter five, conclusions and recommendations are presented based on the major findings of the study.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 INTRODUCTION

This chapter presents the findings from different reviewed literatures. Theoretical concepts associated to projects, project management, project risk management process (risk identification, risk assessment, risk response strategies, risk monitoring) and risk management tools and techniques, insurance, principle of insurance, Construction insurance are presented from the viewpoint of several researchers'. Moreover, the empirical review of literature from the perspective of findings of the research and methods are presented.

#### 2.2 THEORETICAL REVIEWS

##### 2.2.1 AN INTRODUCTION TO PROJECT MANAGEMENT

###### 2.2.1.1 WHAT IS PROJECT?

Projects are always being implemented as a way of reaching an organization's strategic plan. Operations and projects differ significantly in that operations are continuous and repetitive while projects are temporary and one-of-a-kind. A project is a series of finite dependent activities whose successful completion results in delivering the business value that justified doing the project (Wysocki, 2014).

As per the PMBOK® Guide (2021), a project may be described as 'a temporary endeavor attempted to generate a distinctive product or service.' Here, "temporary" doesn't always mean "short"; many projects go on for several years. Rather, it refers to the fact that each project has a unique start and finish. When the project's objectives are fulfilled, it is clear that it will not be possible to meet its aims, or when the project is no longer necessary and can be concluded, the project comes to an end. The term "unique" refers to a product or service that stands out visibly from all others.

A repetitive task is not a project. Though the desired outcomes may have been achieved elsewhere, they are, at the very least, unique to the organization. Projects are undertaken at all stages of the organization. They might involve a singular unit of one organization or may cross

boundaries of organization, as in mingling adventures and partaking. Because projects are unordinary activities, they include a level of uncertainty and a feature of danger (Lewis & James, 2011).

Organizations executing projects will generally divide each project into various project phases to better management control and offer connections to the ongoing operations of the executing organization. These project stages are recognized as the project life cycle. A project handling life cycle (PMLC) is a series of processes that includes Sizing, Planning, Starting off, Inspecting and Managing and end the projects to which it is relevant (Wysocki, 2014).

Each project phase typically includes a group of defined deliverables formed to establish the wanted level of management control (PMBOK® Guide ,2021).

#### 2.2.1.2 PROJECT MANAGEMENT

An PMBOK® Guideline (2000), project managing institution (PMI) formally defines managing projects as "applying of knowledge, skills, tools, and techniques to project activities for meeting project requirements". Wysocki (2014) define managing projects as a set of tools, templates, and processes designed to answer the following six questions:

- \* What business situation is being addressed by the project?
- \* What does the business needs to do?
- \* What will you do?
- \* How will you do it?
- \* How will you know you did it?
- \* How well did you do?

Wysocki (2014) particularly define managing projects as "an organize common-sense approach that make uses of the appropriate client involvement for meeting sponsor needs and deliver expected increment business value". Here, business values are the responsible of the client through their requirement statements. The project manager is responsible for meeting those requirements. Meeting requirements is the cause and incremental business values are the effect.

## 2.2.2 RISK AND RISK MANAGEMENT CONCEPTS

### 2.2.2.1 RISK

The word risk is really fresh; it came into the English speech in the mid 17th century, popping from the French word “risque” and in the secondary quarter of the 18th century the Anglicized spelling started to show up in insurance deals (Flanagan & Norman, 2013).

In malice of the widely negative connotation of risk that dominates today, it needs to be acknowledged that one person's hazard might be another's possibility to gain. It risk as an unsure happening or situation that, if it materializes, has an effect that is favorable or unfavorable on a project's goal (PMBOK® Guide 2021). Regarding insurance, though, for a hazard to be accepted by an insurance Firm, it needs to be a “clean peril” which implies it has the drawback of the impact only (chance for loss only).

### 2.2.2.2 RELATIONSHIP BETWEEN UNCERTAINTY AND RISK

Risk arises because of uncertainty about the future that may arise from the possibility of economic, financial or social loss or gain, physical damage or injury, or delay (Cooper, 2005). In most instances the perception of risk is considered as the management of negative effects also called threats. The term risk is often used for negative outcomes or negative uncertainty but risks may also result in a positive effect – opportunities (Haseeb & Khan, 2014). They further states that rather than a focus on the occurrence or not of an event, condition, or set of circumstances, it is crucial to define uncertainty as simply "lack of certainty" and use it as the foundation for risk management strategies with regard to everything significant.

### 2.2.2.3 RELATIONSHIP BETWEEN UNCERTAINTY, RISK AND OPPORTUNITY

The below table presented the relationship between uncertainty, risk and opportunity.

**Table 1:** Relationship between uncertainty, risk and opportunity

Terms	Definitions and Examples
1. Uncertainty	Two alternative outcomes, such as an opportunity or a risk, are referred to as uncertainties.

	For instance, a good chance or a bad danger.
2. Opportunity	Opportunity is the unpredictability that has favorable results. For instance, ground contamination, where and when this issue can be effectively resolved.
3. Epistemic uncertainty and risk	The absence of knowledge and information on potential events or effects is known as epistemic uncertainty and risk. An illustration of this would be ignorance about ground conditions, such as ground contamination, when purchasing land.
4. Aleatory risk	Aleatory risk is a type of random risk in which the probable outcomes are known, but the probability and degree of the impacts and consequences are uncertain.  For instance, there is a recognized danger of ground contamination, but its effects and repercussions are unclear.
5. Dynamic risk	A risk with both positive and negative consequences is called a dynamic risk.  Examples include variations in the weather and material pricing.
6. Static risk	Pure risk, another name for static risk, is limited to unfavorable events and losses.  Instances include harm, wounds, etc.

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Source: *Haseeb & Khan (2014)*

#### 2.2.2.4 PURE AND SPECULATIVE RISKS

A speculative risk describes a situation in which there are possibilities of losses and chances of gains. Gambling is an excellent example of a theoretical risk. In a risky situation, the risks are deliberately created in the hope of gains.

The terms pure risks, in contrast, are used to design those situations that involve only the chances of losses or no losses. The distinctions between pure and speculative risks are importantly one since only pure risks are insurable. Insurance has nothing to do with shielding people from losses brought on by speculative risks. Considering that speculation has two dimensions—the potential for profit—risks are willingly assumed. Not all pure risks are

insurable, and a further distinction between insurable and uninsurable pure risks may also made (Emmett & vaughan, 2013)

### 2.2.3 RISK MANAGEMENT

Risk Management referring to a culture, processes, and structures that is directed toward effective managing of opportunities and adverse effects (Cooper, 2005). Risk management usually describes as a cycle composed risk analysis, risk response, and risk control, risk management act or practice of dealing with risk. He further stating that project Risk management including planning for risks, identifies risks, analyze risks, develop risk response strategies, and monitor and control risks to determine how they changed.

The art and science of recognizing, evaluating, and responding to risk across the course of a project in order to maximize its chances of success is known as project risk management. Project risk management involved understand potential problems might occur on project and how might impede project success (Barkley, 2004).

Adding the greatest amount of sustainable value to all organizational operations is the primary goal of risk management. It mobilizes knowledge about the possible benefits and drawbacks of every element that might have an impact on a business. Risk management need to be an ongoing, evolving process that is integrated into the organization's strategy and its execution. It ought to carefully consider every risk related to the organization's operations in the past, present, and especially the future (Institute of Risk Management (IRM), 2010).

#### 2.2.3.1 RISK MANAGEMENT SYSTEM /CULTURE/

Any firm must have risk management in place. It entails identifying, evaluating, and prioritizing risks as well as the coordinated use of resources to reduce, track, and control the likelihood or effect of unfavorable occurrences. Building a strong and resilient company requires addressing the interrelated system, culture, and risk management components. According to Madu (2012), the following are indicated as best dimension of having Risk Management System in organization.

### 1. Risk Appetite and Policy:-

In most cases, the strategy process of an organization includes determining the fundamental mission and objectives. Consensus core mission and goals can be viewed as potential cultural elements when they offer solutions that consistently work. He points out that one way to integrate risk into strategy is to declare the organizational risk management initiative in the organization's vision and mission statements.

### 2. Key Risk Indicators

A key risk indicator (KRI) is a measurement for estimating the probability that the consolidated likelihood of an occasion and its ramifications will surpass the association's risk edge and adversely affect an association's capacity to find success. Agreement on the models for data social occasion of an association execution can become focal component of its way of life (Madu, 2012)

Senior management can define critical risk indicators for monitoring reasons as they implement the selected strategic objectives. Additionally, key risk indicators are created in line with each business unit's strategic strategy. They include permissible plan deviations that fit below the organization's overall risk threshold as well as permissible plan deviations for specific business units.

Some of the benefits of KRIs are as follows: early detection of any hazards that might endanger the business; perception of possible weaknesses in a company's systems for monitoring and controlling; and continuous risk monitoring in between risk assessments (Beasley, 2010).

### 3. Accountability

Risk is owned by those closest to its occurrence, typically through bottom-up steps that build on functional capabilities that already exist. However, it should be viewed as complementing and strengthening the top-down approach rather than replacing it. Risk management is the responsibility of everyone in the organization, regardless of whether it is done bottom-up or top-down (Madu, 2012).

#### 4. Incentives

Rewards that encourage people or organizations to take risks are known as risk-taking incentives. These impetuses can be monetary or non-monetary and are intended to rouse individuals to face challenges that they could not in any case take. Workers comprehend their parts in hierarchical risk the executives execution and feels implied in making a typical risk culture when responsibility is clear cut combined with motivating forces. Thusly, key risk markers too as responsibility can be connected to risk-based impetuses, characterized for risk proprietors of every single progressive level (Aureli, 2012)

Top and middle managers may become more involved in decision-making when incentives and risk management are linked to the achievement of an organization's goals. Employees also participate more actively in risk assessment and response when incentives are present. Thus, employees' participation in discussions has the potential to boost risk management efficiency and foster a risk culture (Aureli, 2012)

#### 5. Risk Language

Communicating in like manner language and applied classifications are basic for individuals of an association to settle on what to do, what is significant, etc (Madu, 2012). An organizational risk management mindset and a common risk language create a natural risk habitat and dictate everyone's involvement across the organization. It is significant associations convey through normal risk language (Althonayan, 2011)

Continuous performance improvement with consistent risk information can be shared across business units, creating a stress-free atmosphere (Hallowel et al., 2013). Common risk language can be used to openly communicate risk information, such as a risk threshold or response, allowing everyone to take action to achieve the organization's objectives.

#### 6. Interpersonal relationship

Organizations can develop a risk culture by providing consistency in leadership, employee behavior, and alignment with other processes (Ching, 2020). Organizations can also develop a risk culture by having coordinated relationships between management and employees (Gupta, 2011)

A transparent environment is created through participation in the implementation of organizational risk management and clear and open communication. Top administration support in making no-fault culture can urge representatives to shout out and examine risk issues they were stressed over (Lloyd et al., 2014).

Representatives at various levels can speak with their nearby boss about current and arising takes a chance with that is basic to the association. Building a risk culture can be complemented by holding more social and opinion-sharing meetings as a means of engaging employees and gaining their commitment.

### 2.2.3.2 THE RISK MANAGEMENT PROCESS

In order to accomplish corporate goals, risks are identified, evaluated, and managed systematically through the use of the risk management process. Usually, there are a few essential elements in this procedure that guarantee proper risk management. This is a thorough explanation of the risk management procedure. According to Lewis (2011), there are three steps in the risk management process:

1. Identify risks and threats by asking, “What could go wrong?” or, “What kinds of threats exist?”
2. Quantify threats and risks by assigning them a risk priority number (RPN).
3. Develop contingency plans to deal with risks that cannot be ignored

Then again, PMBOK® Guideline (2000), states that risk is the methodical course of recognizing, investigating, and answering undertaking risk that comprises of six sub processes, these cycles are made sense of as follows.

#### 1. Risk Management planning:-

Making decisions about how to approach and plan a project's risk management activities is known as risk management planning. It is the process of determining the best way to carry out risk management operations (Barkley, 2004). It is vital to make arrangements for the risk board processes that follow to guarantee that the kind, degree, and perceivability of hazard the executives are corresponding with the risk. The project's risk management plan must be started at

the launch meeting to include the technology of the process or product, the project's schedule, the resource base, and a myriad of other risks that the project faces but aren't really identified until the plan starts to take shape (Abebe, 2007).

The critical advantage of this interaction is it guarantees that the degree, type, and perceivability of hazard the board are proportionate with both the dangers and the significance of the venture to the association. It is additionally fundamental to speak with and acquire arrangement and backing from everything partners to guarantee the risk board interaction is upheld and performed successfully over the venture life cycle.

## 2. Risk Identification

It is the method involved with figuring out which dangers might influence the task and reporting their qualities. To ensure that all significant organizational activities have been identified and all risks resulting from these activities have been defined, risk identification should be approached methodically. According to (Institute of Risk Management (IRM), 2010), all associated volatility pertaining to these activities ought to be identified and categorized.

Identifying and evaluating all potential risks is the first step in establishing a process for risk management. From a task chief's point of view, it is the specialty of inspiring dangers from a scope of hierarchical and outer assets as well as the collection of information inside the undertaking group itself that recognizes the viability of one director from another (Wysocki, 2014).

The main advantages of this method are the project team's capacity to foresee occurrences and the documenting of current dangers. Given that new risks may arise or become apparent as a work progresses through its life cycle, risk recognition is an ongoing process. Analyze the Risk

Analyzing a risk is necessary after it has been identified. It is necessary to ascertain the scope of the risk. Understanding the connection between the risk and various organizational factors is also crucial. To decide the seriousness and reality of the risk it is important to perceive the number of business works the risk influences. There are takes a chance with that can carry the entire business to a stop whenever realized, while there are risk with that might be minor burdens in the examination (PMI, 2000).

- Qualitative Risk Assessment:

Subjective risk examination alludes to playing out a subjective investigation of dangers and conditions by evaluating and consolidating their likelihood of event and effect on focus on their effects on project goals. In performing subjective risk examination, different factors, for example, the time period for reaction and the association's risk resistance related with the venture requirements of cost, timetable, extension, and quality will likewise be surveyed (PMI, 2000).

The impact and likelihood of identified risks are evaluated through qualitative risk analysis. It is one method for determining the significance of dealing with particular risks and directing risk responses.

The primary advantage of this method is that it enables project managers to concentrate on high-priority risks and reduce uncertainty. It is also helpful to clarify the assessment of the risk's significance to the project when the quality of the information on project risks that is available is evaluated (Barkley, 2004).

It is typically a quick and practical method for laying out needs for 'plan risk reactions' and establishes the groundwork for Perform 'quantitative risk investigation', whenever required. When qualitative analysis is repeated, trends in the results can suggest whether more or less risk-management action is required.

- Quantitative risk assessment:-

The process of estimating the probability and consequences of risks, as well as their implications for project objectives, is known as quantitative risk analysis. It is the process of calculating the impact that risks have on the project's overall objectives. It is applied to risks that rank high on the "perform qualitative risk analysis" list because they might have a major influence on the project's competing needs (PMI, 2000).

The critical advantage of this cycle is that it produces quantitative risk data to help dynamic to decrease project vulnerability.

### 3. Response to Risk

The process of developing options, procedures, and methods to enhance opportunities and lessen threats to the project's objectives is referred to as risk response planning. It is the process of coming up with options and steps to make opportunities better and threats to project goals less of a threat. The primary advantage of this method is that it prioritizes risk assessment and incorporates resources and activities into the budget, schedule, and project management plan as necessary (PMI, 2000).

Risk solutions have to be reasonable given the project's circumstances, cost-effective in addressing the issue, accepted by all stakeholders, and owned by a responsible party. Selecting the appropriate risk response from a range of possibilities is often important. The effectiveness of response planning will clearly determine whether task risk increases or decreases (PMI, 2000).

Understanding the project and the midstream effects of various corrective actions is necessary for planning a response to risk. You make risk situations and timetable effects. The best guess at what will actually happen is the "expected" scenario, the worst case is the "pessimistic" scenario, and the "best case" is the optimistic one (Barkley, 2004).

There are a number of options for dealing with risks. The system that is probably going to be compelling ought to be utilized for each risk. You can choose between primary and backup strategies. Risk management is treated as a dynamic component of every project by effective project managers.

#### A. Avoidance: -

Hazard evasion is changing the undertaking intend to kill the risk or condition or to safeguard the task targets from its effect. Some risks can be avoided, even though all risks cannot be eliminated (PMI, 2000)

#### B. Acceptance:-

Acknowledgment is the methodology that basically anticipates the risk to happen and makes arrangements for taking care of the expense and timetable effects. This implies that the task has

chosen not to change the venture intend to manage a risk or can't recognize some other reasonable reaction system (Barkley, 2004).

#### C. Mitigation:-

Alleviation tries to decrease the likelihood or potentially results of an unfriendly risk occasion to a satisfactory edge. It is more efficient to act promptly to lessen a risk's likelihood of occurring or affecting the project than to attempt to mitigate its effects after they have occurred (Barkley, 2004).

#### D. Transference: -

Chance exchange is trying to move the result of a risk to an outsider along with responsibility for reaction. Transferring the risk does not completely eliminate it; rather, it simply transfers management responsibility to another party. In the event that a risk occurs, insurance is one way to safeguard against financial loss (Lewis & James, 2011)

#### 4. Risk Monitoring and Control

Observing and Control is the most common way of carrying out risk reaction plans, following distinguished risks, checking remaining dangers, and recognizing new dangers, executing risk decrease designs, and assessing their viability all through the venture life cycle. Identifying key risk milestones or points in the project schedule where risk decisions must be made is part of risk monitoring. These milestones would indicate whether a key resource or piece of equipment functioned (Barkley, 2004).

#### 2.2.3.3 INTEGRATING PROJECT RISK PLANNING vs. CORPORATE STRATEGIC PLAN

Institutional risk management has evolved from a reactive or panic-driven mode to one that is more predictive and proactive, despite the fact that it may still be an ongoing process overall. Silted approaches are being deserted for additional cooperative, all-encompassing and coordinated appraisals or structures (Deloitte, 2018).

The goal of the risk assessment process is to give decision-makers and other responsible parties a better understanding of risks that could affect achieving goals and the suitability and efficacy of existing controls. An input to the organization's decision-making process is the outcome of the

risk assessment process. Strategic risks, as defined by a Deloitte (2018) study, are those that have an effect on or result from an organization's business strategy and strategic objectives.

An efficient policy under the direction of the organization's most senior management must be used to effectively integrate risk management into the culture. It should make an interpretation of the methodology into strategic and functional targets, doling out liability all through the association with every director and representative liable for the administration of hazard as an aspect of their responsibilities portrayal. It promotes operational efficiency at all levels by supporting accountability, performance measurement, and reward (IRM, 2010).

It is essential to view risk as an issue affecting the entire business. Project risk the board doesn't begin with the task; it begins with the actual business. After all, starting a business is a risk in and of itself, and the entrepreneur finds satisfaction in both success and profit. The ability of the parent company to create conditions for success determines the fate of every project, and project risk is merely a microcosm of the larger business challenge. Risk has been barely treated with regards to activities and venture assignments, yet the wellsprings of chance are all the more fittingly tended to at the business and industry level first (Barkley, 2004).

Risk is not separate from management; it is a part of the business and the project planning process. Risk is the reason we carry on with work and plan project-in the event that there were no risk, there wouldn't be an undertaking. Furthermore, tending to risk just implies that you are continuously checking out you to find things that can turn out badly in characterizing and booking work.

In the early stages of business strategic planning and environmental scanning, many of the primary factors that contribute to project risk are external rather than internal. A considerable lot of the critical variables in the achievement or disappointment of any task are the wide business factors for progress and disappointment and the most common way of choosing the venture in any case (Barkley, 2004)

The SWOT (strengths, weaknesses, opportunities, and threats) analysis and other outputs that support the identification of project risks are produced when risk is applied to a business framework. These dangers incorporate contest, unexpected innovation change, market shifts, business finance, labor force issues, and changes in the client base (Lewis & James, 2011).

## 2.2.4 RISK AND INSURANCE

### 2.2.4.1 INSURABLE RISKS

A risk that is insurance-coverable is said to be insurable. An insurer will only take a risk if it is a "pure risk," meaning that it solely has a potential for loss; speculative risks are not covered by traditional insurance.

In addition, it must be unexpected and unintentional, with data accessible to insurers so they can model historical occurrences and determine a reasonable premium. Even if a risk is insurable, there are still a lot of insurance-related factors to take into account, such as an appropriate limit, cost and premium, insurance period, negotiation and flexibility of the policy, limitations and exclusions, sharing risks with insurers (deductible), insurer ability and honor to indemnify the insured (security), and insurance gaps and overlaps (Liu & Gong, 2013).

#### 2.2.4.1.1 ELEMENTS OF AN INSURABLE RISK

Emmett and Vaughan (2013) state that the following are characteristics of an insurable risk:

- There must be a sufficient number of homogenous exposure units for the losses to be reasonably predictable. The basis of insurance is the law of big numbers. Numerous openness units increase the effectiveness of a security strategy by increasing the accuracy of evaluations of prospective calamities.
- The misfortune delivered by the risk should be distinct and quantifiable. It must be able to be measured financially and must be of a type that is relatively difficult to replicate. To put it another way, we need to know when a loss has occurred and how much of it there is.
- The misfortune should be random or incidental. The misfortune should be the consequence of a possibility; that is, it should be something that could conceivably occur. It cannot possibly occur.
- The misfortune should not be horrendous. It must be unlikely that all of the exposure units would suffer losses simultaneously. The protection rule depends on a thought of sharing misfortunes, and innate in this thought is the presumption that main a little level of the gathering will endure misfortune at any one time. Economic Feasibility some of the time, an extra characteristic is recorded as a prerequisite of an insurable risk that the

protection cost should not be high concerning the conceivable misfortune or that the protection should be monetarily plausible.

#### 2.2.4.1.2 MEASURING INSURABLE RISKS

Measuring insurable risks involves assessing and quantifying risks that can be transferred to an insurance company. This process is crucial for both insurers and policyholders to determine the appropriate coverage and premiums. Drennan (2018) point out the Elements of Pricing for insurable risks

- Frequency
- Severity
- Expenses
- Investment Income (timing)

Drennan (2018) states also the uniqueness of insurance pricing

- Pricing before the fact
- Reliance on the past
- Ultimate cost not known until the future
- Important Statistical Concepts
- The Law of Large Numbers (Accuracy of predictions)

#### 2.2.4.2 INSURANCE

Insurance is a social tool whereby a group of people (referred to as "insured") transfer risk to another party (referred to as the "insurer") in order to pool loss experience. This allows for statistical loss prediction and allows for the payment of losses from funds (premiums) contributed by all members who transferred risk (Pritchett, 2012).

The Commercial Code of Ethiopia (1960) defines insurance legally as stated in Article 654(2);

*An insurance policy is a legal agreement wherein an entity, known as the insurer, agrees to pay a certain amount of money to a named beneficiary in the event that a predetermined risk materializes in exchange for the payment of one or more premiums.*

From the standpoint of a construction contract, construction insurance is a contract in which the insurance provider aims to protect and hold the client or the construction contractor harmless against any potential risk, loss, damage, or liability resulting from the completion of the construction work (Wolff, 2017).

#### 2.2.4.2.1 PRINCIPLES OF INSURANCE

Not all dangers and misfortune openings are insurable. Insurance agencies by and large are reluctant to safeguard strange dangers or those that address a potential for horrendous misfortune. Risk can only be insured if certain conditions are met (Hillson, 2009).

##### 1. Indemnity

Insurance policies are deemed to be contracts of indemnity under this rule, which means that their purpose is to restore an individual's pre-loss financial standing. To put it another way, insurance collection should not be a profitable business. The disposal of gain likewise upholds the possibility that protection is intended to guarantee just unadulterated risk circumstances (Drennan, 2018).

Indemnity, as defined by the Office of the Commissioner of Insurance Hong Kong (2013), refers to a full and fair financial settlement for an insured loss. Reimbursement can't make a difference to a wide range of protection.

There are some kinds of insurance that cover losses that are difficult to precisely quantify in terms of money, specifically Personal Accident Insurance and Life Insurance. Both involve human beings dying or being injured, and the loss of a finger, for instance, cannot be precisely quantified in terms of money. Life and personal accident insurance, according to some, are benefit policies rather than indemnity policies (OCI, 2013).

The policy can only provide a benefit in the amount stipulated by the policy in the event of death or the kind of injury in question because indemnity does not typically apply. According to OCI (2013), life and personal accident insurances generally do not qualify for indemnity because they involve an unlimited insurable interest.

## 2. Insurable Interest

Insurable interest is an individual's legitimately perceived relationship to the topic of protection that gives them the option to impact protection on it. A thief who is in possession of stolen goods does not have the right to insure them because the relationship must be legal (OCI, 2013). An insurance contract is invalid if there is no insurable interest. The principles connecting with return of charges under such an arrangement change as between the various classes of protection. These standards are the overall principles on wrongdoing of agreement. The prerequisite of an insurable interest recognizes protection from betting.

## 3. Utmost Good Faith

It is dependent upon a more severe custom-based regulation guideline of pure intentions, frequently called the rule of most extreme entirely pure intentions. It entails that regardless of whether the other party requests it, each party is obligated to disclose all essential information, or "material facts." For instance, even if there isn't a question about it on the application form, a proposer of fire insurance is required to provide the insurer with the relevant loss record (OCI, 2013). According to OCI (2013), the following is the statutory definition of a material fact: "Everything that might affect an observant insurer's decision to set the premium or decide whether to take on the risk."

## 4. Proximate Cause

The general reason for a misfortune is its viable or prevailing reason. A loss may be the result of multiple factors working together. For the reasons for protection guarantee, one prevailing reason should be singled out for each situation, on the grounds that few out of every odd reason for misfortune will be covered. The reason for misfortune (the risk) should be covered under the safeguarding arrangement of the strategy, and the prevailing reason should not be barred (OCI, 2013).

When looking for a loss's proximate cause, it's often necessary to look at how the various causes interacted throughout the process that led to the loss. The identification of the dangers that is, the factors that led to the loss as well as their nature are crucial to drawing a conclusion from such an

analysis. All hazards are characterized into the accompanying three sorts for the reasons for such an investigation (Zelege, 2007):

- Insured peril: It is uncommon for a policy to cover all possible perils. The insured perils of that policy are those that are covered, such as fire under a fire policy and stranding under a marine policy (Zelege, 2007).
- Excepted (or excluded) peril:- This is a peril that would be covered but would not be covered for its removal from cover by exclusion. For example, fire damage caused by war is not covered by a fire insurance policy because war is an excluded peril (Zelege, 2007).
- Uninsured peril: - This is a risk that is neither safeguarded nor prohibited. Unless an insured peril is to blame for the uninsured peril's occurrence, a loss caused by an uninsured peril cannot be recouped. For instance, the standard fire insurance policy does not cover theft or raining. All types of insurance are subject to the principle of proximate cause. Its commonsense applications might be exceptionally perplexing and some of the time questionable (Zelege, 2007).

## 5. Subrogation

Subrogation is the activity, for one's own advantage, of freedoms or cures moved by one more against outsiders. As a culmination (for example a characteristic result of a laid out rule) of repayment, subrogation permits continues of guarantee against outsider be passed to guarantors, to the degree of their protection installments (Bunni, 2013).

An insurer's subrogation action must be taken in the insured's name under common law. In order to safeguard the fundamental principle of indemnity, subrogation ensures that the insured is not compensated twice for the same loss. After an indemnity has been provided, subrogation rights can only be obtained. Where the guarantor has just given a not as much as reimbursement based on specific strategy constraints, the protected may potentially be qualified for part of - some of the time even the entire of - the subrogation continues, contingent upon what impediments have been applied during the time spent claims changes (OCI, 2013).

## 6. Contribution

According to OCI (2013), the following two ideas are used to explain the contribution principle. Contribution Doctrine is Equitable. This is a cases related convention of value which applies as between guarantors in case of a twofold insurance, a circumstance where at least two contracts have been affected by or for the safeguarded on a similar interest or any part thereof, and the total of the totals protected surpasses the repayment lawfully permitted.

In the absence of any other policies, any insurer is obligated to pay the insured the entire amount for which he would be responsible. Subsequent to making a reimbursement as such, the guarantor is qualified for call upon different back up plans in much the same way (yet not really similarly) at risk to a similar guaranteed to share (or to add to) the expense of the installment (HSB-Engineering, 2014).

Rate capable Extents Where commitment applies. The term "rate able proportion" refers to the final percentage of an insured's loss that an individual insurer is liable for. The fact that the sum of all insurers' rate able proportions equals one, or 100 percent of the insured's loss, is not difficult to comprehend. Only if indemnity applies will contribution apply. Some way says that insurers who have similar responsibilities to the insured contribute to the indemnification (HSB-Engineering, 2014).

### 2.2.4.2.2 TYPES OF INSURANCES FOR THE CONSTRUCTION INDUSTRY

The term "construction insurances" refers to a variety of policies designed to safeguard erection, machinery operation, and construction projects. Generally it is thought to be simply restricted to the development stage. Notwithstanding, the task is an entire life process, which incorporates a plausibility study, a call for delicate and assessment of tenders, an honor of agreement, development and erection stages, a dominate and support period (Liu & Gong, 2013)).

With the improvement of development the board and structural designing, development insurance items and administrations have become progressively particular starting from the main Project workers. Everything Dangers contract was given in 1929 to cover the development of Lambeth Scaffold over the Thames in London. In 1934, Germany instituted a special policy that slowly began to spread (Wassmer, 2008)

Latent defects protection was presented as Decennial Protection by French back up plans during the 1980s. Property insurance and liability insurance are the two primary types of insurance that are typically required as part of a construction project. Delay in Start-up or Advance Loss of Profit are common terms for business interruptions that occur during the construction process (Wassmer, 2008).

Recently, this coverage has been expanded to include these interruptions. Despite the fact that apparently ideal to get one insurance strategy covering a development policy, this is preposterous in light of the fact that the scope of policy chances is immense and safety net providers have practical experience in guaranteeing specific dangers (Levine, 2021)).

Hereunder is the specification of a few normal sorts of development protections from a few writing sources?

1. Contractors' All Risks (CAR)]

CAR insurance, sometimes known as contract works insurance, offers complete protection for building, civil engineering, and construction projects. The purpose of this insurance is to provide coverage for any harm resulting from the complex nature of contract activities during the building process (HSB-Engineering, 2014).

Depending on the needs of the project, the insurance can be set up in the names of the principal, the contractor, or both. It is offered on a single risk or yearly basis. Because there is no such thing as a standard policy and because the scope and caliber of policies offered by various insurance providers varied greatly, builders should exercise extra caution while obtaining construction works insurance.

2. Erection all risks (EAR)

It is often the contractor's or employer's obligation to get insurance during a construction project to cover loss or damage to mechanical and electrical equipment during the erection and installation phase. EAR, Machine installation and repair are covered by insurance, which is offered annually or on a single risk basis. Like CAR, the insurance can be established in the names of the principal, the contractor, or both, depending on the requirements of the project (HSB-Engineering, 2014).

### 3. Professional Indemnity Insurance

As its name suggests, this insurance indemnifies an insured for amounts which the insured becomes legally liable to pay as a result of any actual or alleged negligent act, error or omission in the conduct of its business or profession (Baartz, 2003). Professional indemnity insurance (PII) covers professionals, such as architects, engineers and other consultants, and claims against them arising out of the professional services they provide. Typically the cover includes, and claims may arise from the services involved where they include: A breach of professional duty; Negligence; Bodily injury and property damage arising from service negligence; Fraud/dishonesty other than a company director's dishonesty; Infringement of intellectual property; Breach of duty/confidentiality; Defamation; and Loss of documents (Baartz, 2003).

### 4. Electronic Equipment Insurance

The purpose of "Electronic Equipment Insurance" is to protect identified and specified properties listed in the policy schedule from any physical loss or damage (Wassmer, 2008).

On the basis of all risk coverage, the policy is issued. Computers, microprocessors, word processors, telecommunication equipment, medical equipment, film TV studio equipment, electronic scoreboards, etc. are among the most often insured objects under this coverage.

### 5. Machinery Breakdown Insurance

The goal of the machinery insurance coverage is to cover any loss or damage to different kinds of machinery, plant, and equipment as a result of unexpected, abrupt physical loss or damage that calls for their replacement or repair (Bunni, 2013).

When the machinery is being disassembled for cleaning, inspection, overhauling, or moving to a new location, as well as during operations or a subsequent election, as long as these are carried out on the same premises, the cover provides protection for it (HSB-Engineering, 2014).

Under machinery insurance, any kind of machinery, plant, mechanical equipment, and apparatus, including:-

- Power generating units (boilers, turbines, generators)
- Power distribution plant transformers, high and low tension equipment)

- Production machinery and auxiliary equipment (machine tools, weaving looms, paper machines, pumps, compressors etc)

## 6. Boiler and Pressure Vessel Insurance

According to Bunni (2013), this policy protects pressure vessels against "explosion" and "collapse" hazards, both when they are fired and when they are not, and compensates the insured for

- Damage to the boilers and/or other pressure plant listed in the schedule, excluding fire.
- Damage (excluding fire damage) to the surrounding property of the Insured as listed in the schedule, or to property entrusted to the Insured, held on commission, or for which the Insured is responsible."
- Liability of the Insured at law on account of
  1. Death or bodily injury to any person (other than a person under a contract of service or apprenticeship with the Insured) sustained death or bodily injury which arises out of and in the course of employment with the Insured.
  2. damage to items that are not owned by the insured, kept in trust, or on commission, and for which he is not liable.
- "Boiler" refers to any closed vessel that is ignited or a combined container pipe system that produces steam under pressure.
- "Pressure plant" refers to any closed, unfired container that is subject to fluid or steam pressure.
- "Explosion" refers to the sudden and violent rupture or tearing apart of the permanent structure of a boiler or pressure plant, or any of its parts, due to internal steam, gas, or fluid pressure. This results in the physical displacement of the structure and the forcible expulsion of its contents.
- "Collapse" refers to the sudden and hazardous distortion, such as bending or crushing, of any part of a boiler or pressure plant caused by steam, gas, or fluid pressure, whether or not accompanied by rupture. It does not include gradual deformation due to any cause.
- "Flue Gas Explosion" refers to the explosion of ignited gases within the furnace or flues of boilers, economizers, and super heaters.

- "Chemical Explosion" refers to an explosion resulting from a chemical reaction within any plant.

#### 7. Automobile Insurance

There are two broad categories of risk involved when a contractor operates automobiles. First, there is loss or damage to the contractor's own vehicles caused by collision, fire, theft, vandalism, or other hazards. Second, there is liability for bodily injury to third parties or damage to their property caused in some way by the operation of the contractor's licensed vehicles (HSB-Engineering, 2014).

Automobile liability coverage will cover any vehicle fitting into one of three categories--owned automobiles, hired or rented automobiles, and non-owned automobiles such as employees' personal automobiles used in conjunction with official business. The coverage will provide for legal defense and payment of damages resulting from damage to persons or property due to the operation of vehicles fitting into one of the categories listed above (Wolff, 2017).

#### 8. Worker's Compensation Insurance

Worker's Compensation insurance provides medical care and other benefits for the contractor's employees in the event that they are injured on the job. The principle behind worker's compensation is that on-the-job injury or death of a worker is a cost of doing business and should be borne by the industry (Emmett & vaughan, 2013).

The fundamental objective is for injured workers to receive prompt medical attention and monetary assistance. Another principle behind worker's compensation is that of strict liability of the employer, regardless of any fault by the employee. Contributory negligence of the employee will not affect the employer's liability, except in cases where the worker was under the influence of drugs or alcohol (Emmett & vaughan, 2013).

#### 9. Contractors Professional Liability

Contractor's professional liability insurance is liability coverage designed for contractors and building professionals to protect against construction errors. Also known as CPL insurance, it is purchased by contractors who offer design and building services. This insurance covers mistakes

made by the contractor as well as errors committed by third parties hired by the contractor, including engineers, architects, and other vendors (Emmett & vaughan, 2013).

#### 10. Bid bonds

Bonds for bids guarantee that contractors can follow through on contracts and complete their work at the agreed-upon rates. The majority of public construction contracts mandate that contractors bind their bids with bonds, offering the client financial and legal security. A bid bond guarantees compensation to the bond owner if the bidder fails to commence the project. These bonds are commonly used for construction jobs or other projects that involve a bid-based selection process (Bunni, 2013).

The purpose of the bid bond is to give the project owner assurance that, should their offer be chosen, the selected bidder would finish the job. The owner is reassured by the bid bond's presence that the bidder can afford to take the project at the price specified in the bid. Project owners wouldn't be able to ensure that the bidder they choose for a project would be able to finish the task correctly without bid bonds. For instance, a bidder with inadequate funding may experience cash flow issues during the process. Additionally, bid bonds save clients time when evaluating and selecting contractors by assisting them in avoiding pointless bids (Gupta, 2011).

#### 11. Performance bonds

When a bid is approved and the contractor starts working on the project, the bid bond is changed to a performance bond shields a customer against the unreliability of a contractor. A performance bond shields a customer against a contractor's noncompliance with the terms of the contract. The project owner may file a claim against the performance bond in the event that a contractor performs subpar or faulty work. The bond covers the expense of having the work redone or corrected (HSB-Engineering, 2014).

The contractor and the surety are held jointly and severally accountable for the bond in the event that the contractor breaches the terms of the bid bond. Typically, a customer will choose the lowest bidder since it will result in lower expenses for the business. The customer will be compelled to give the contract to the second-lowest bidder and pay extra if a contractor wins the offer but chooses not to carry out the project for whatever reason (OCI, 2013).

The project owner may assert a claim in this case against the whole or a portion of the bid bond. Therefore, a bid bond serves as an indemnity bond that shields a client in the event that the

successful bidder defaults on the contract or fails to furnish the necessary performance guarantees.

## 12. Goods in transit and Marine Insurance

An item in Transit Insurance, or GIT Insurance, gives you peace of mind about your delivery services while safeguarding your items against theft, loss, or damage while they are in transit. Insure the goods that your company transports from one place to another, knowing that you have backup in case something goes wrong with your cargo. (Baartz, 2003).

Either the owner of the goods or the haulage company transporting them may get insurance. By providing indemnity against the risks of "theft and/or fire and/or damage directly caused by overturning, collision, or derailment of the carrying conveyance or collapse of bridges and embankments," this insurance aims to protect the insured's interest. The cost of this coverage varies based on the kind of products, their value and packaging, the boundaries of the territory, etc (Zelege, 2007).

If the goods stay at the port area longer than anticipated, only fire and/or theft (burglary) insurance can be arranged at an additional premium for a specific period. It is extremely important that extension arrangement be made on or before the expiry date of the Inland Transit Insurance. Insured must be advised to make a strict follow-up so that he may not be left without any insurance coverage (Zelege, 2007).

B.S. Cover could also be provided as an extension for the Inland Transit cover by charging additional premium. Extension of B.S.C provides covers loss, damage or expense due to acts of Bandits and Shiftas in respect of land transits within boundaries of Ethiopia.

### 2.2.4.2.3 LOSS RATIO

A loss proportion is a speedy method for assessing the monetary wellbeing and benefit of an insurance agency and on opposite end use as chance pointer for client. The estimation is utilized by the two guarantors and by outer gatherings, for example, controllers, moneylenders and buyer supporters to screen and survey execution (HSB-Engineering, 2014).

The ratio of total premiums paid to actual losses sustained over a given time frame is referred to as the loss ratio. It demonstrates how much an insurance company spent in relation to the premium it received on claims and other expenses (Wolff, 2017).

When it exceeds 100 percent, the insured is in a good position while the insurance company is in a bad position. It implies that the insurance agency is losing cash on its approaches and safeguarded is remunerated more than the top notch they paid (Wolff, 2017).

At the point when it is equivalent to 100 percent; it implies that the aggregate sum of charges gathered rises to the aggregate sum of cases and costs. It has no financial gain or loss as a result of its policies (Wolff, 2017).

If it is less than or equal to 100%, this indicates that after claims are paid, the insurance company keeps some of the premium. This is an indication of productivity for insurance Agency. On other hand, it is pointer for client to re survey the risk, settle on choice use insurance agency or self safeguarded (Wolff, 2017).

## 2.3 EMPIRICAL REVIEW

### 2.3.1 CONSTRUCTION PROJECTS

Simply put, a construction is the process of building something by humans for one or more purposes. It very well might be a street, span, a dam, a confidential home, an air terminal, a business building, and so forth. Moavenzdadeh (1976) defines construction as the recruitment and utilization of capital, specialized personnel, materials, and equipment on a specific site in accordance with client-prepared drawings, specifications, and contract documents.

It plays a significant role in meeting basic physical and social needs, such as the production of housing, infrastructure, and consumer goods, and it also contributes to the economic development of any nation by achieving some of the fundamental development goals of output generation, employment creation, and income generation and distribution. According to (PMI, 2000), a project is a short-term endeavor undertaken to produce a one-of-a-kind product, service, or outcome.

Hillson (2009) states that there are two reasons why projects become risky. The first reason is that every project has the same set of characteristics that always bring about uncertainty. Projects are unique, complex, involve assumptions and constraints, are carried out by people, and involve transition from a known present to an unknown future are among the common characteristics.

The second reason is that every project is started with a specific goal in mind. The final reason is that the external environment in which projects operate has an effect on them all. Any nation cannot function without its construction industry.

In developing nations like Ethiopia, it makes a significant contribution to the expansion and development of the economy (Moavenzadeh & Rossow , 2017). These studies indicate that the construction industry plays a significant role in developing nations due to its significant contribution to GDP and employment; at least three-quarters of all construction workers worldwide are employed in less developed nations. Even though the construction industry in developed nations has improved its project risk management practices, construction projects in developing nations continue to suffer from poorly defined scope, poor design, and poor management and as a consequence of this, there are obvious gaps in terms of quality, cost, and time in the projects (Yimam, 2011)

### 2.3.2 CONSTRUCTION IN ETHIOPIA

The construction industry makes significant contributions to a nation's socioeconomic development. The known importance parts, similar to instruction, wellbeing, water, horticulture, fabricating, the travel industry, mining, energy, development, land and great Administration works on the openness of steady, strong and suitable native building area. This, in turn, is adept at providing participants with superior services (Abebe, 2007).

The development of indigenous construction firms (contractors, consultants, and informal sectors)' capabilities and effectiveness is one of the primary goals of the building sector strategy. In sync with the report of The Development Business in Ethiopia (2018), an outsized scope of miniature business visionaries describes the Ethiopian development: the huge level of which works inside the country's casual economy.

There are both indigenous and foreign technology and construction companies operating in Ethiopia's formal construction sector. Public and individual consumption on foundation and different development works has filled in as an impetus for Ethiopia's quick monetary turn of events. The nation has deliberately put more noteworthy than 30% of Gross domestic product into Gross Fixed Capital Development (GFCF) consumption starting around 2010 (In the same place).

In view of the Service of Metropolitan Turn of events and Development industry strategy (2012) the extent portion of the improvement area to Gross domestic product at steady worth has expanded from 4.5% in 2000/01 to 5.8% by 2009/10. In a similar vein, the development industry is anticipated to be worth more than \$7 billion. During the 2015–16 fiscal year, construction activities in Ethiopia accounted for 15.9% of GDP at current costs, according to the (OECD, 2017) report.

A small number of studies showed that Ethiopian construction project risk management practices are generally inadequate. For instance, Yimam (2014) found in his study that the casual development maturity stage is typically where the maturity of the development aspect of construction project management is identified, with a particular preference for Ethiopian contractors.

### 2.3.3 INSURANCE IN ETHIOPIA

Foreign insurance businesses and expatriates have a significant role in the development of the insurance industry in Ethiopia. Before 1951, a sizable number of international insurance companies were using agents to do insurance business in Ethiopia. Imperial Insurance Company of Ethiopia Ltd., the first domestic insurance provider, was founded in 1951. After then, Ethiopia was home to one local insurance company and many international insurance firms represented by agents, all of which operated there until 1960 (Zelege, 2007).

Following the 1994 insurance proclamation, which brought to an end to the monopoly of the insurance business by the state owned insurer for 19 years, the private sector once again got an opportunity to engage in insurance business and a number of private insurance companies established. The first to be established in August 1994 was Universal Insurance, which was later closed down as a result of supervisory measures. Lion Insurance Company, which was established in October 1998, was merged with UNIC (United Insurance Company) in October 2000 (Zelege, 2007)

In the Ethiopian insurance industry, all local insurance companies are transacting with foreign reinsurance companies, thus transferring part of the risk they undertake against payment of part of the premium originally charged (Bunni, 2013). The reinsurance transaction can be both a one-off arrangement, known as facultative reinsurance, or an automatic arrangement with an agreed

pattern for a specific branch of insurance under a contract between the insurer and reinsurers usually referred to as a reinsurance treaty (Bunni, 2013)

In the case of the relationship between the reinsurer and the insured, it is important to note the fact that insurance company buys reinsurance gives no rights to the insured so that if the insurer fails or refuses to perform his obligations to his insured, the insured has no right of action against the reinsurer (Bunni, 2013). In this regard, establishment of reinsurers in the country is advantages to the policyholder and the country in saving the foreign currency that is being paid by insurance companies for the transaction of reinsurance service and the performance of the insurance business.

#### 2.3.4 REGULATION AND SUPERVISION OF INSURANCE INDUSTRY IN ETHIOPIA

Insurance supervision also refers to the ongoing observation of insurance companies to make sure they are operating in compliance with the insurance proclamation and regulations issued. Insurance regulation refers to the legal framework and statutes within which insurance companies operate in a country (Yilma, 2014).

Though both domestic and foreign insurance companies had been undertaking insurance business in Ethiopia prior to 1960, there were no insurance laws put in place until the issuance of the Commercial Code and the Maritime Code in 1960. Following that various regulations were issued to regulate the insurance business in the country. In line with Proclamation No. 746/2012 (Insurance Business Proclamation), the National Bank of Ethiopia has the powers and duties as stated in the proclamation including:

- Licensing insurance companies and insurance auxiliaries ;
- Conducting continual on-site and off-site supervision and monitoring;
- Taking intervention measures, depending on the findings of supervision and monitoring;
- Ensuring the existence of sound and stable insurance industry ;and
- Protection of the interests of policyholders

## 2.4 SUMMARY

The most obvious benefit of purchasing insurance is the fact that it can protect in the event of human error or accident. This protection is primarily financial, whether an employee is injured throughout the course of their work or there are complications with regards to specific projects. So long as careful attention is paid to the individual needs of each project and invest in comprehensive coverage that covers these, a contractor or a consultant can create a safety net that protects their investment and business reputation.

One essential instrument for risk management is insurance. The conditions that must be included in the contract and the coverage's that each party provides must be carefully considered. Given the diversity and distinct nature of the construction sector, approaching projects with a broader mindset may result in misunderstandings and issues.

As a result, it's critical to identify the risks that should be insured against, ascertain whether coverage is available, and establish suitable limits throughout the planning phases of building projects. Reviewing the suggested specifications, coverage's, and limits should involve insurance advisors for the contractor as well as the owner.

## CHAPTER THREE

### RESEARCH METHODOLOGY

#### 3.1 Introduction

The purpose of this research is to study Construction risk management practice through insurance in case of Sunshine Construction Company and China Communication Construction Company. To achieve this objective, this chapter presents the approaches, methods, instruments, techniques, and procedures, etc. that used to collect and analyze data. It includes research design, sources of data, sample size, and sampling technique, instruments of data collection, procedures of data collection, methods of data analysis, and ethical considerations.

#### 3.2 RESEARCH DESIGN

The research design is the over-all blueprint of how the researcher will go about responding the research question (s). It will comprise clear objectives resulting from the research question(s), lay down the bases from which the researcher be going to gather data, plan how to gather and evaluate these, and talk over ethical subjects and the limitations that it will certainly come across (Saunders, et al. 2016).

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

This study; using mixed method approach, tried generally to identify, study, and explore the construction risk management practice, the role of insurance in risk management and also it tried to identifies patterns, like trends, cycles, or seasonal variation in accidental loss in case of both subjected companies.

#### 3.3 DATA COLLECTION METHOD AND INSTRUMENTS

To satisfy the first three specific objectives, questionnaire has been developed following the research questions. Part of the interview questions has been adopted and a bit modified in a way that it has fitted to the organizations under the study. Interviews are conducted to get detail and supporting information in addition to the questionnaire responses. On other hand, secondary data

from insurance Company, published & unpublished articles, office documents& information form internet is used.

In consideration of the nature of the research question, qualitative and quantitative research method will be used.

- ✓ Data sources: - The study has used both primary and secondary sources of data
- ✓ Primary data collection methods employed: - by the use of questionnaires, interviews.
- ✓ The secondary sources of data have been collected from insurance where the subjected companies are insured, in addition annual report, office documents& information has been used.

### 3.4 SAMPLING PROCEDURE

The sampling design that is employed for this study is a non-probability sampling. A non-probability sampling provides with an information-rich case study in which it enables to explore the research question and gain theoretical insight (Saunders, 2009).

Purposive sampling is best fit for this study, as the sample size is relatively small. Purposive / judgmental sampling is often used when working with small population and enables us to select cases that best fit to answer the research questions and meet objectives (Saunders, 2009).

Purposive sampling involves selecting participants who are particularly knowledgeable or experienced with the research topic. Accordingly the research has selected the respondent based on the following criteria.

**Risk Management Team:** Individuals directly involved in assessing and managing risks within the company.

**Finance Department:** Representatives responsible for budgeting and financial planning, as insurance costs are integral to financial planning.

**Procurement Department:** Personnel involved in selecting insurance providers and negotiating contracts.

**Compliance Officers:** Personnel responsible for ensuring that the company's risk management practices align with industry regulations and standards.

Insurance officer: who handle insurance cases on behalf of the company and can provide insights into past claim experiences.

A project coordinator: who plays a crucial role in managing and coordinating various projects, including those related to risk management.

A Contract Administrator:-who plays a vital role in managing contracts within an organization, ensuring that all agreements comply with legal and regulatory standards and mitigating risks associated with contractual obligations.

Human Resource (HR) department: - who involved in aspects related to risk management and insurance within a project on the following aspect:-

- Policy Development: Collaborate with project teams to develop HR policies and procedures that comply with legal and regulatory requirements related to risk management and insurance.
- Training and Education: Provide training and educational programs to employees on risk management practices, safety protocols, and insurance coverage relevant to their roles.

Hence, the research has addressed 24 respondents (11 respondents from Sunshine Construction and 13 respondents from China Communication Company) who are familiar with risk management and their job positions are directly related to risk management.

### 3.5 DATA ANALYSIS METHOD

In the beginning same information about risk management practice of both Companies was collected informally. Then the questionnaires were distributed and collected in person. After gathering the completed questionnaires, interviews were conducted to incorporate the respondents' suggestions into the interview questions posed to the authorities.

The collected data was then tabulated to summarize the information. The responses to each question were analyzed using percentages, which are easier to interpret and provide a clear picture of the findings. Descriptive statistics were used to present the actual numbers. The findings were displayed in tables, and when necessary, bar diagrams and pie charts were utilized to facilitate easy understanding.

In addition to the primary data collection through questionnaires and interviews, secondary data was also gathered. This secondary data included information on insurance premiums paid and compensation collected for construction projects accidental losses over ten years period. Using this data, a time series analysis was conducted to identify trends, patterns, and potential correlations over time.

Furthermore, based on the historical data and identified trends, forecasting accidental losses for the next three years were also performed. This forecasting aimed to predict the expected compensation amounts for accidental losses, helping to anticipate future financial impacts and plan accordingly.

This analysis provided insights into the trends and fluctuations in compensation amounts, as well as projections for future periods. The findings from the time series analysis and the forecasts were then integrated with the primary data to present a comprehensive overview.

The results of both the primary and secondary data analyses were summarized in tables and illustrated using bar diagrams, pie charts, and histograms when necessary. This comprehensive approach ensured a thorough understanding of the data, facilitating clear and actionable conclusions.

### 3.6 VALIDITY, RELIABILITY AND MODEL VALIDATION TEST

Validity describes how effectively the information gathered addresses the specific topic under study (Glass & Hopkins, 1984). Questionnaire and interview questions are adopted from (Potts & Ankrah, 2013; International Organization for Standardization, 2018) and prepared in a way that is closely related to research questions.

The Cronbach Alpha coefficient is the internal consistency metric that is most frequently utilized. When using Likert scales, it is thought to be the most acceptable metric of dependability (Gliem, 2003). And accordingly, it is applied to measure the internal consistency or reliability of identified scale.

In addition, Box Jenkins model is one of the model classes to select the methodical method for determining the appropriate model form ( Jenkins & Reinsel, 1994). To test and choose the best fit model, the Box Jenkins model is used.

### 3.7 ETHICAL ISSUES

In conducting research, obtaining informed consent remains paramount. This involves individuals purposefully and knowingly giving their assent in a clear and reasonable manner. Throughout the process, respondents are treated with the utmost respect. The distribution of questionnaires and the conduct of interviews were undertaken with the full willingness of participants, ensuring their voluntary involvement.

Moreover, a key ethical consideration involves maintaining confidentiality, which allows individuals to share information as they choose. The researcher took extra care to uphold confidentiality, going beyond standard levels of loyalty, thereby safeguarding respondents from potential risks.

Additionally, prior to utilizing secondary data, the researcher obtained the necessary permissions. This step underscores the commitment to ethical principles, ensuring that all data sources are accessed in a responsible and lawful manner. Finally, the purpose of the study was clearly communicated to all participants, fostering understanding and informed decision-making.

## CHAPTER FOUR

### RESULT AND DISCUSSION

#### 4.1 INTRODUCTION

This chapter covers the analysis and interpretation of the data collected from the questionnaire respondents, the response of interviews and secondary data. In order to analyze the data collected, SPSS 23 software is used. Descriptive analysis is made based on the data collected from the questionnaires and the interview. Descriptive analysis of the data is presented in the forms of percentage. Whereas, Time series analysis of accidental loss has been made which based on collected secondary data. The analysis and interpretation of the collected data is presented below.

#### 4.2 DESCRIPTIVE ANALYSIS

##### 4.2.1 BASIC INFORMATION OF THE RESPONDENTS

Understanding the basic characteristics of respondents is fundamental in research as it provides valuable insights into the demographic composition of the sample population. This section aims to outline the basic information collected from the respondents, which includes demographic details such as age, gender, educational background, occupation, and any other pertinent information relevant to the study objectives. By delving into these aspects, we can gain a comprehensive understanding of the profile of the participants involved in the research, facilitating nuanced analysis and interpretation of the findings.

**Table 2** : Gender of the respondents

Gender	CCCC		Sunshine	
	Number	percentage	Number	percentage
<b>Male</b>	12	92.3%	8	72.7%
<b>Female</b>	1	7.7%	3	27.3%
<b>Total</b>	13	100%	11	100%

Source: own survey, 2024

This table shows that in the CCCC group, there are 12 males and 1 female, making up 92.3% and 7.7% of the group, respectively. In the Sunshine group, there are 8 males and 3 females, making up 72.7% and 27.3% of the group, respectively. The total number of participants is 13 for the CCCC group and 11 for the Sunshine group.

The data suggests a strong male predominance in both categories, especially in the CCCC category. There is a slightly better representation of females in the Sunshine category, though males still represent the majority. This disparity indicates potential gender imbalance in these groups, with CCCC showing a more pronounced male dominance than Sunshine.

**Table 3 :** *Age of respondent -CCCC group*

Age	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-30 years	5	38.5	38.5
	31 -40 year	7	53.8	92.3
	41-50	1	7.7	100.0
	Total	13	100.0	100.0

Source: own survey, 2024

The data reveals that the sample population of CCCC group are predominantly young, with the majority (53.8%, 7 individuals) aged between 31-40 years, followed by a substantial portion (38.5%, 5 individuals) aged between 20-30 years. Only a small fraction (7.7%, 1 individual) falls within the 41-50 years age group. Consequently, 92.3% of the sample (12 individuals) consists of people aged 20-40, indicating a youthful demographic with minimal representation from older age groups.

**Table 4 :** *Age of respondent -Sunshine group*

Age	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-30 years	2	18.2	18.2
	31 -40 year	8	72.7	90.9
	41-50	1	9.1	100.0
	Total	11	100.0	100.0

Source: own survey, 2024

The data reveals that the sample population is predominantly aged between 31-40 years, with this group making up 72.7% (8 individuals) of the total. The 20-30 years age group comprises 18.2% (2 individuals), and the 41-50 years age group accounts for 9.1% (1 individual). Consequently, 90.9% of the sample (10 individuals) consists of people aged 20-40, indicating a youthful demographic with minimal representation from the 41-50 years age group.

This indicate that both companies Risk management department work force are typically have gained valuable experience in their field, possibly have a stable work history, and may have developed leadership or specialized skills.

**Table 5:** Level of Education -CCCC

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Degree	6	46.2	46.2	46.2
	Postgraduate	7	53.8	53.8	100.0
	Total	13	100.0	100.0	

Source: own survey, 2024

The data indicates that the sample population is fairly evenly split between those with a degree and those with a postgraduate qualification. Specifically, 46.2% (6 individuals) have a degree, while 53.8% (7 individuals) have a postgraduate qualification.

**Table 6 :** Level of Education -Sunshine Group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma	1	9.1	9.1	9.1
	Degree	6	54.5	54.5	63.6
	Postgraduate	4	36.4	36.4	100.0
	Total	11	100.0	100.0	

Source: own survey, 2024

The data indicates that within the sample population, the majority hold a degree, constituting 54.5% (6 individuals). This is followed by those with a postgraduate qualification at 36.4% (4 individuals), and a small fraction hold a diploma at 9.1% (1 individual). Overall, 90.9% of the sample (10 individuals) have either a degree or a postgraduate qualification, reflecting a highly educated demographic with a minor representation from the diploma holders.

Overall, these statistics paint a picture of a group with relatively high levels of educational attainment, including a significant proportion with advanced degrees, indicating a well-educated and potentially skilled workforce or population.

**Table 7:** Job Experience

Experience		CCCC		Sunshine	
		Frequency	percentage	Frequency	percentage
<b>Experience in the construction industry</b>	3-7 years	2	15.4%	1	9.1%
	8-12 years	6	46.2%	5	45.5%
	13-17 years	5	38.5%	5	45.5%
	total	13	100%	11	
<b>Experience in your /current/ Company</b>	3-7 years	7	53.8%	5	45.5%
	8-12 years	6	46.2%	6	54.5%
	Total	13	100%	11	
<b>Experience in your current position</b>	Below 3 years	4	30.8%	1	9.1%
	3-7 years	7	53.8%	5	45.5%
	8-12 years	2	15.4%	4	36.4%
	Total	13	100%	11	100%

Source: own survey, 2024

In analyzing the frequency and percentage, it's evident that in both categories, individuals tend to have substantial experience in the construction industry, primarily with 8-12 years of experience. Within their current companies, there's a balance between those with 3-7 years and 8-12 years of experience.

However, in their current positions, there's a notable difference, with CCCC having a higher proportion of individuals with below 3 years of experience compared to Sunshine. Overall, the data suggests a diverse range of experience levels within both categories, with significant representation in the mid-level experience range (8-12 years) across all aspects.

**Table 8:** Type of work

Type of work usually undertaken	CCCC		Sunshine	
	Frequency	percentage	Frequency	percentage
<b>Commercial/industrial building</b>	7	53.8%	6	54.5%
<b>Public/ community building</b>	6	46.2%	5	45.5%
<b>Total</b>	13	100%	11	100%

Source: own survey, 2024

The data reveals that both categories, "CCCC" and "Sunshine," exhibit a nearly equal distribution between individuals engaged in commercial/industrial building projects and those involved in public/community building projects.

Specifically, in CCCC, 53.8% of individuals (7 individuals) usually undertake commercial/industrial building work, while 46.2% (6 individuals) engage in public/community building work. In Sunshine, 54.5% of individuals (6 individuals) are involved in commercial/industrial building projects, and 45.5% (5 individuals) are involved in public/community building projects.

This balanced distribution of work types within both groups suggests a diverse range of project involvements and expertise across the construction industry spectrum.

#### 4.2.2 DESCRIPTIVE STATISTICS: GENERAL RISK MANAGEMENT PRACTICES

##### 4.2.2.1 DESCRIPTIVE STATISTICS: PROJECT RISK MANAGEMENT SYSTEM

The second part of the questioners directly related risk management. The preliminary questions focus on general issues regarding risk management system of the Company under study.

Five point Liker scale choices were given where (1) =Strongly Disagree, (2) = Disagree (3) =uncertain, (4) =Agree and (5) = Strongly Agree, for the respondents to express their thoughts about the risk management system of their Company.

**table 9-** Project risk management system - CCCC

No	Question/ Statements/	CCCC							Cumulative mean
		N	1	2	3	4	5	$\bar{x}$	

			In percent									
1.	Risk related policies and procedures	RMS1	13	0	0	7.7	69.2	23.1	4.15	.555	3.98	
2.		RMS2	11	0	0	23.1	53.8	7.7	3.82	.603		
3.	Identified key risk indicators:	RMS3	13	15.4	0%	7.7	69.2	7.7	3.54	1.198	3.54	
4.	Accountability	RMS4	13	0	0	0	92.3	7.7	4.08	.277	4.08	
5.		RMS5	13	0	0	7.7	76.9	15.4	4.08	.494		
6.	Incentives	RMS6	13	0	0	53.8	38.5	7.7	3.54	.660	3.31	
7.		RMS7	13	0	38.5	23.1	30.8	7.7	3.08	1.038		
8.	Risk Language/Communication	RMS8	13	30.8	53.8	15.4	0	0	1.85	.689	2.54	
9.		RMS9	13	46.2	23.1	30.8	0	0	1.85	.899		
10.		RMS10	13	0	0	23.2	61.5	15.4	3.92	.641		
11.	Internal Relationship/ “No blame culture”	RMS11	13	38.5	30.8	30.8	0	0	1.92	.862	1.88	
12.		RMS12	13	38.5	38.5	23.1	0	0	1.85	.801		
13.	Risk response	RMS13	13	15.4	46.2	30.8	7.7	0	3.15	1.144	3.53	
14.		RMS14	13	0	0	15.4	76.9	7.7	3.92	.494		
	Grand mean									3.26	3.26	

Source: own survey, 2024

**Risk Related Policies and Procedures:** The cumulative mean for this statement is 3.98, with 69.2% strongly agreeing. This indicates a strong consensus among respondents regarding the effectiveness of the company's risk-related policies and procedures.

**Identified Key Risk Indicators:** Respondents generally agree (cumulative mean of 3.54), with 69.2% agreeing, that the company has successfully identified key risk indicators. This suggests proactive risk management practices while RMS3 has the highest variance (1.198), suggesting greater variability in responses for this question.

**Accountability:** With a high cumulative mean of 4.08, 92.3% strongly agree that project managers are held responsible for outcomes related to risk management. This reflects a robust culture of accountability within the organization.

**Incentives:** The cumulative mean for incentives is 3.31, indicating a moderate level of agreement. 53.8% agree, suggesting room for improvement in incentivizing risk management

efforts while RMS7 has the highest variance (1.038), suggesting greater variability in responses for this question.

Risk Language/Communication: Respondents express mixed opinions (cumulative mean of 2.54), with 30.8% agreeing. This suggests that while some agree, there may be opportunities to enhance communication practices related to risk management.

Internal Relationship/"No Blame Culture": There's relatively less agreement (cumulative mean of 1.88), with 38.5% agreeing, regarding the presence of an internal relationship or "no blame culture" within the organization. This implies challenges in fostering open communication and learning from mistakes.

Risk Response: Respondents moderately agree (cumulative mean of 3.53), with 46.2% agreeing, regarding the effectiveness of the company's risk response strategies. This indicates a generally positive perception, with room for refinement while RMS13 has the highest variance (1.114), suggesting greater variability in responses for this question.

Overall, the grand mean of 3.26 suggests an overall positive perception of the CCCC company's risk management practices, with specific areas highlighted for improvement based on respondents' feedback and percentages.

**Table 10 :-** Project risk management system - Sunshine

No	Question/ Statements/	Sunshine Construction									Cumulative mean
		N	1	2	3	4	5	$\bar{x}$	$\sigma$		
			In percent								
1.	Risk related policies and procedures	RMS1	11	0	0	9.1	63.6	27.3	4.18	.603	4.04
2.		RMS2	10	0	0	18.2	63.6	9.1	3.90	.568	
3.	Identified key risk indicators:	RMS3	11	9.1	0	9.1	72.1	9.1	3.73	1.009	3.73
4.	Accountability	RMS4	11	0	0	0	90.9	9.1	4.09	.302	4.09
5.		RMS5	11	0	0	9.1	72.7	18.2	4.09	.539	
6.	Incentives	RMS6	11	0	0	54.5	36.4	9.1	3.55	.688	3.36
7.		RMS7	11	0	36.4	18.2	36.4	9.1	3.18	1.079	

8.	Risk Language/Communication	RMS8	11	0	9.1	9.1	54.5	27.3	4.00	.894	3.91
9.		RMS9	11	0	0	27.3	63.6	9.1	3.82	.603	
10.		RMS10	11	0	0	9.1	90.9	0	3.91	.302	
11.	Internal Relationship/ “No blame culture”	RMS11	11	0	9.1	18.2	72.7	0	3.64	.674	3.59
12.		RMS12	11	0	0	54.5	36.4	9.1	3.55	.688	
13.	Risk response	RMS13	11	9.1	0	45.5	36.4	9.1	3.36	1.027	3.68
14.		RMS14	11	0	0	9.1	81.8	9.1	4.00	.447	
Grand mean									3.78		3.78

Source: own survey, 2024

**Risk-related policies and procedures:** The cumulative mean score is 4.18, indicating that respondents generally agree (closer to "Agree" than "Strongly Agree") that the company has adequate risk-related policies and procedures in place.

**Identified key risk indicators:** With a cumulative mean of 3.73, respondents seem to agree that the company has identified key risk indicators, though the agreement is not as strong as with the policies and procedures.

**Accountability:** This aspect received a high cumulative mean of 4.09, suggesting a strong agreement among respondents regarding the accountability within the company concerning risk management.

**Incentives:** The cumulative mean of 3.55 indicates a moderate level of agreement regarding the effectiveness of incentives in managing risks while RMS7 has the highest variance (1.079), suggesting greater variability in responses for this question.

**Risk Language/Communication:** With a cumulative mean of 4.00, respondents generally agree that there is effective communication regarding risk within the company.

**Internal Relationship/“No blame culture”:** This received a cumulative mean of 3.64, suggesting a moderate level of agreement regarding the presence of a "no blame culture" within the company in managing risks.

**Risk response:** The cumulative mean of 3.36 suggests a moderate level of agreement regarding the effectiveness of the company's risk response strategies while RMS13 has the highest variance (1.027), suggesting greater variability in responses for this question.

Overall, the grand mean of 3.78 indicates a generally positive perception of the risk management system within Sunshine Construction. However, there are areas where improvements could be made, such as in the effectiveness of incentives and risk response strategies.

In comparison, the grand mean for Sunshine Construction is 3.78, compared to 3.26 for CCCC. This indicates that, on average, respondents at Sunshine Construction expressed a slightly more positive perception or agreement with the risk management system compared to respondents at CCCC. When comparing the mean scores for individual statements, most of the statements show higher mean scores for Sunshine Construction. This suggests that respondents at Sunshine Construction tended to agree more strongly with statements regarding various aspects of the risk management system compared to respondents at CCCC.

**Table 11** : Mean score of risk management system

ANOVA					
mean score of risk management system					
	Sum of Squares	df	Mean Square	F	Sig.
<b>Between Groups</b>	.431	1	.431	4.028	.032
<b>Within Groups</b>	2.372	22	.107		
<b>Total</b>	2.803	23			

Since the p-value (0.032) is less than the common significance level (0.05), we reject the null hypothesis. This means there is a statistically significant difference in the mean scores of the risk management system between the groups.

For instance, statements related to the presence of policies and procedures, the importance of risk analysis, identification of key risk indicators, proactive measures for risk mitigation, and accountability of project managers received higher mean scores at Sunshine Construction.

While there were a few statements where mean scores were similar between the two companies or even higher for CCCC in some cases, the overall trend leans towards Sunshine Construction having slightly more positive perceptions across the majority of statements.

#### 4.2.2.2 DESCRIPTIVE STATISTICS: PROJECT RISK MANAGEMENT PROCESS

The third part of the questioners directly related risk management process. The questions focus on general issues regarding risk management process that has been followed by both Companies under study.

Five point Liker scale choices were given where (1)=Strongly Disagree, (2)= Disagree (3)=uncertain, (4)=Agree and (5)= Strongly Agree, for the respondents to express their thoughts about the risk management process of their Company.

**Table 12:** Risk management process -CCCC

No	Question/Statements		CCCC						$\bar{x}$	$\sigma$	Cumulative mean
			N	(1)	(2)	(3)	(4)	(5)			
1.	RISK IDENTIFICATION	RMP1	13	0	0	30.8	61.5	7.7	3.77	.599	2.92
2.		RMP2	13	7.7	76.9	15.4	0	0	2.08	.494	
3.		RMP3	13	15.4	7.7	53.8	15.4	7.7	2.92	1.115	
4.	RISK ANALYSIS	RMP4	13	0	38.5	53.8	7.7	0	2.69	.630	3.34
5.		RMP5	13	0	0	15.4	69.2	15.4	4.00	.577	
6.	RISK RESPONSE	RMP6	13	0	30.8	38.5	23.1	7.7	3.08	.954	3.08
7.	RISK MONITOR AND CONTROL	RMP7	13	0	7.7	15.4	69.2	7.7	3.77	.725	3.77
8.		RMP8	13	0	0	30.8	61.5	7.7	3.77	.599	
9.	Grand Mean								3.28		3.28

Source: own survey, 2024

Risk identification: The findings underscore a robust consensus among respondents regarding the early identification of risks (RMP1), with an impressive cumulative mean of 3.77 and 69.2% expressing agreement. This suggests a proactive approach within CCCC to risk management, aligning with organizational objectives to mitigate potential threats at the project's outset.

Conversely, there is a clear divergence in opinion regarding the assertion of a lack of professionals for early risk identification (RMP2), as evidenced by the lower mean score of 2.08 and only 7.7% agreement. This highlights a perceived strength in the CCCC' capacity to deploy skilled professionals for risk identification.

When examining the utilization of structured and formal risk identification methods (RMP3), the data reveals a more nuanced perspective, with a mean score of 2.92 and 53.8% expressing uncertainty. This indicates a need for clarification or enhancement of processes to ensure consistency and efficacy in risk identification methodologies.

Risk analysis:-In terms of risk analysis, while a majority of respondents acknowledge the presence of a measurement system - RMP4 (mean score: 2.69), the agreement percentage of 61.5% suggests room for improvement in communicating and standardizing analytical practices across projects. The average response score for RMP5 is 4.00, which suggests that, on average, respondents agree that project documents are updated after assessing the risks that might occur.

Risk response:-Similarly, while respondents generally perceive the existence of a well-developed strategy for risk response, RMP6 (mean score: 3.08), the percentage agreement of 61.6% implies variability in perceptions, signaling an opportunity for clearer articulation and implementation of response protocols.

Risk monitor and control:-However, respondents demonstrate a strong vote of confidence in the risk monitoring and control processes (RMP7), with a high cumulative mean of 3.77 and 76.9% agreement. This reflects positively on the companies' ability to oversee and regulate risk management activities to ensure adherence to established standards and procedures.

Furthermore, the data highlights a robust alignment between risk control measures and project goals and objectives (RMP 8), with a mean score of 3.77 and 69.2% agreement. This suggests a cohesive approach to risk management that prioritizes the overarching objectives of the projects.

In summary, while the data indicates overall satisfaction with several aspects of risk management processes, it also identifies areas for refinement, particularly in standardizing methodologies, enhancing communication, and ensuring consistency in practices across projects. These insights can inform strategic initiatives aimed at optimizing risk management effectiveness and ultimately enhancing project outcomes within the studied companies.

**Table 13:** Risk management process –Sunshine Construction

No	Question/Statements	Sunshine					$\bar{x}$	$\sigma$	Cumulative mean
		N	(1)	(2)	(3)	(4)			

1.	RISK IDENTIFICATION	RMP1	11	0	0	27.3	63.6	9.1	3.82	.603	3.0
2.		RMP2	11	9.1	72.7	182.7	0	0	2.09	.539	
3.		RMP3	11	9.1	9.1	54.5	18.2	9.1	3.09	1.044	
4.	RISK ANALYSIS	RMP4	11	0	36.4	54.5	9.1	0	2.73	.647	3.36
5.		RMP5	11	0	0	18.2	63.6	18.2	4.00	.632	
6.	RISK RESPONSE	RMP6	11	0	27.3	36.4	27.3	9.1	3.18	.982	3.18
7.	RISK MONITOR AND CONTROL	RMP7	11	0	9.1	18.2	63.6	9.1	3.73	.786	3.77
8.		RMP8	11	0	0	27.3	63.6	9.1	3.82	.603	
9.	Grand Mean								3.32		3.32

Source: own survey, 2024

Risk identification:-Respondents strongly endorse the early identification of risks (RMP1), as evidenced by the high cumulative mean score of 3.82, with an agreement percentage of 63.6%. This suggests a proactive approach within Sunshine Company to identify and address potential threats at the onset of projects, aligning with industry best practices.

Conversely, there is a notable disagreement among respondents regarding the presence of a lack of professionals for early risk identification (RMP2), with a low mean score of 2.09 and only 9.1% agreement. This indicates a high level of confidence in the company's workforce and their ability to effectively identify risks, despite perceptions of potential resource constraints.

While respondents express moderate agreement (mean score: 3.09) that a structured and formal risk identification method (RMP3) is utilized, the agreement percentage of 54.5% suggests some uncertainty or variability in perceptions regarding the clarity and effectiveness of this method.

Risk analysis:-Similarly, while there is general agreement (mean score: 2.73) that there is a measurement system in place to analyze risks (RMP4), the agreement percentage of 54.5% indicates potential opportunities to enhance the effectiveness or clarity of this measurement system.

On a positive note, there is strong consensus (mean score: 4.00) that project documents are updated after assessing potential risks (RMP5), with an agreement percentage of 63.6%. This

reflects a thorough and systematic approach to risk management documentation and communication within Sunshine Company.

Risk response: - However, respondents express only moderate agreement (mean score: 3.18) regarding the existence of a well-developed strategy to respond to risks within projects (RMP6), with an agreement percentage of 36.4%. This suggests potential areas for improvement in the development or communication of risk response strategies.

Risk monitor and control:- Furthermore, respondents strongly endorse the company's risk monitoring and control processes (RMP7), as reflected by the high mean score of 3.73 and an agreement percentage of 63.6%. This indicates confidence in the company's ability to oversee and regulate risk management activities effectively.

Overall, while Sunshine Company's risk management process demonstrates strengths in areas such as risk identification and monitoring/control, there are also opportunities for improvement, particularly in refining risk response strategies and enhancing the clarity and effectiveness of risk identification and analysis methodologies. These insights can inform strategic initiatives aimed at optimizing risk management effectiveness and ultimately enhancing project outcomes within Sunshine Company.

Based on the comparison of their risk management processes, Sunshine appears to be in a slightly better position than CCCC. Sunshine demonstrates higher levels of agreement across various aspects of risk management, including risk identification, analysis, response strategy, and monitoring/control. This suggests a stronger consensus among respondents regarding the effectiveness and efficiency of Sunshine 's risk management practices.

**Table 14 :** Mean score of risk management process

ANOVA					
mean score of risk management process					
	Sum of Squares	df	Mean Square	F	Sig.
<b>Between Groups</b>	.009	1	.009	.320	.028
<b>Within Groups</b>	6.256	22	.28		
<b>Total</b>	6.265	23			

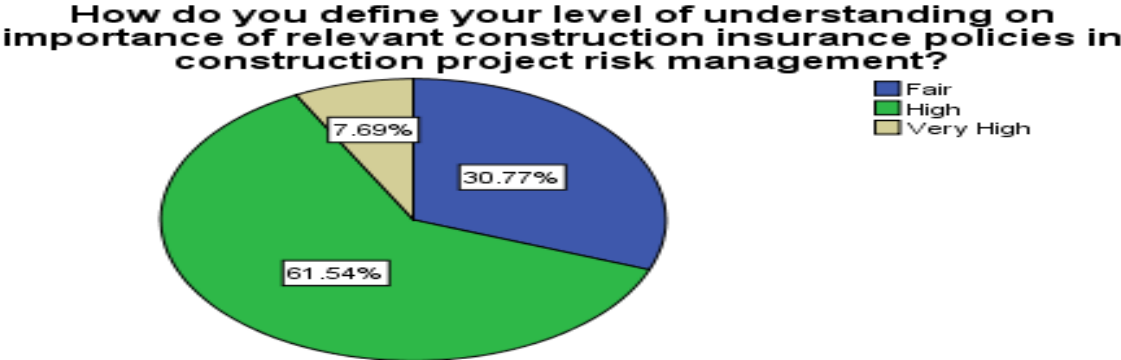
Since the p-value (0.028) is less than the common significance level (0.05), we reject the null hypothesis. This means there is a statistically significant difference in the mean scores of the risk management process between the groups.

Overall, while both companies exhibit strengths in certain areas, Sunshine 's risk management processes appear to be more robust and aligned with industry best practices, positioning it in a favorable stance in terms of risk management effectiveness.

**4.2.2.3 DESCRIPTIVE STATISTICS: PERCEPTION ABOUT CONSTRUCTION INSURANCE**

**A. Level of understanding about importance of construction insurance policies on risk management**

The blow pie chart illustrates the respondents' self-assessed level of understanding regarding the importance of relevant construction insurance policies in construction project risk management. The responses are categorized into three levels: Fair, High, and Very High.



**Figure 1:** Level of understanding regarding importunacy of insurance policies in risk management -CCCC

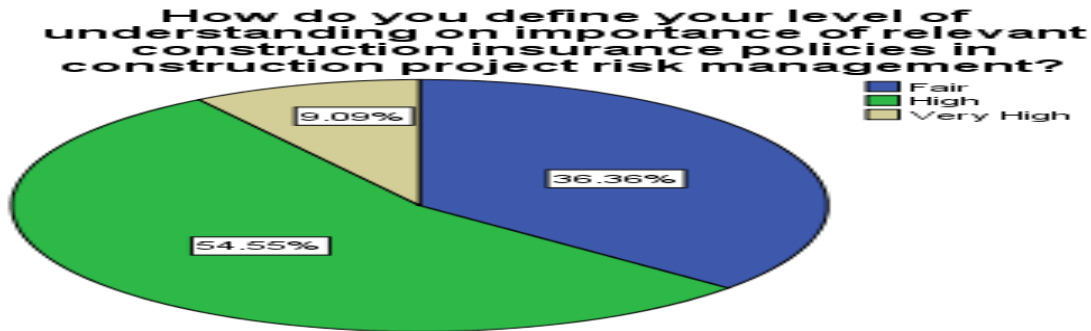
Source: own survey, 2024

Respondents from CCCC showed high awareness. The combined percentage of respondents who rate their understanding as High or Very High is 69.23%, indicating a generally strong awareness and understanding of the role of construction insurance policies in project risk management among the respondents.

Even though there is still a room for improvement, with 30.77% rating their understanding as Fair, it indicate that still a notable portion of respondents who could benefit from additional

training or resources to enhance their knowledge and understanding of construction insurance policies in risk management.

In summary while the majority of respondents feel confident in their understanding of construction insurance policies' importance in risk management, there remains a significant group that may need further education or support to reach a higher level of comprehension.



**Figure 2:** Level of understanding regarding importunacy of insurance policies in risk management –Sunshine Construction

Source: own survey, 2024

Similarly, in sunshine Construction Company the respondent showed high awareness about insurance. The combined percentage of respondents who rate their understanding as High or Very High is 63.64%, indicating a generally strong awareness and understanding of the role of construction insurance policies in project risk management among the respondents.

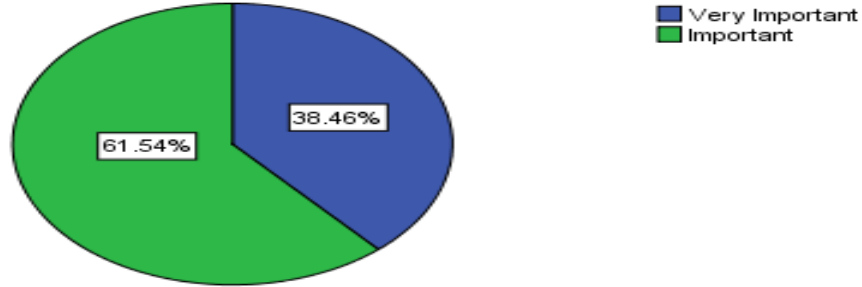
But, there is still room for improvement: With 36.36% rating their understanding as fair, a significant portion of respondents could benefit from additional training or resources to enhance their knowledge and understanding of construction insurance policies in risk management.

In conclusion, while the majority of respondents feel confident in their understanding of construction insurance policies' importance in risk management, there remains a substantial group that may need further education or support to reach a higher level of comprehension.

#### B. Perception about insurance as risk transfer methods

Referring blow pie chart it can be notice that combining both categories of CCCC, 100% of respondents acknowledges the importance of insurance in risk management for construction projects.

**How do you measure the importance of insurance as risk transferring tool in building construction projects?**



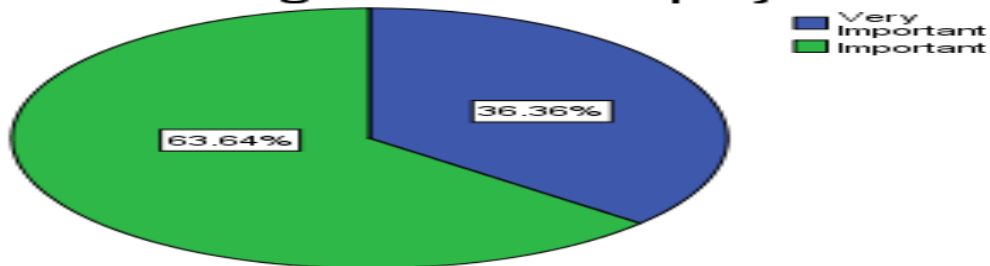
**Figure 3 :** Perception on insurance as risk transfer method –CCCC

Source: own survey, 2024

This shows unanimous agreement on the value of insurance, though opinions vary on the degree of its importance. For construction companies, this data underscores the need to maintain robust insurance policies as part of their risk management strategies. Given the high percentage of respondents valuing insurance, companies should ensure comprehensive coverage to protect against potential risks.

Similarly blow pie chart showed that the combined data of Sunshine Construction showed that 100% of respondents acknowledge the importance of insurance in construction project risk management, either as important or very important.

**How do you measure the importance of insurance as risk transferring tool in building construction projects?**



**Figure 4 :** Perception on insurance as risk transfer method –Sunshine Construction

Source: own survey, 2024

This reflects a unanimous recognition of insurance as a vital component in the risk management framework. While there is a consensus on the importance, a larger percentage of respondents (61.54%) view it as important rather than very important. This could suggest that while insurance

is seen as essential, there might be other risk management tools or strategies that are also highly valued.

#### 4.2.2.4 DESCRIPTIVE STATISTICS: CHALLENGES FACED WHILE PURCHASING INSURANCE POLICY.

Below provided table are comparing various challenges faced for being insured among respondents, with different groups labeled "CCCC" and "Sunshine," and their responses categorized into "Yes" and "No" for each challenge.

**Table 15:** Challenges Faced While Purchasing Insurance Policies

Which one is the greatest challenge you face for being insured?	N	CCCC			N	Sunshine	
		yes	No			yes	No
• Lack of awareness	13	69.2%	30.8%		11	63.6%	36.4%
• Complex insurance language	13	53.8%	46.20%		11	54.5%	45.5%
• High insurance premium	13	23.10%	76.9%		11	27.3%	72.7%
• Lack of claim responding ability by insurer	13	61.50%	38.5%		11	63.6%	36.4%
• Poor interaction with insurer	13	0%	100%		11	0%	100%

Source: own survey, 2024

Both groups recognize lack of awareness as a significant challenge, although slightly more respondents in the "CCCC" group perceive it as such. Plus, in regard to Complex Insurance Language, there is a relatively equal perception between the two groups, indicating that understanding insurance terminology is a common challenge.

A significant portion of both CCCC groups acknowledge high insurance premiums as a challenge, a larger percentage of respondents in the "Sunshine" group also perceive it as such. Furthermore, Lack of Claim Responding Ability by Insurer is identified by both groups as a

considerable challenge, with slightly more respondents in the "Sunshine" group expressing concern about insurers' responsiveness to claims.

Interestingly, all respondents in the "CCCC" group indicated Poor interaction with insurer is not a challenge, meaning they didn't perceive poor interaction with the insurer as a significant challenge. Similarly, all respondents in the "Sunshine" group indicated suggesting that they do not see poor interaction as a challenge.

#### 4.2.2.5 DESCRIPTIVE STATISTICS: FAMILIARITY OF THE INSURANCE POLICY

This table presents respondents' familiarity levels with various insurance policies, categorized by the level of familiarity from "Not at all familiar (1)" to "Extremely familiar (5)", for two groups labeled "CCCC" and "Sunshine".

**Table 16** : Familiarity levels with various insurance policies - CCCC

S/N	Name of Insurance policy	CCCC							
		N	(1)	(2)	(3)	(4)	(5)	$\bar{x}$	$\sigma$
			In percent						
1.	<i>Contractors' all risks (CAR)</i>	13	0	7.7	7.7	7.7	76.9	4.54	0.97
2.	<i>Erection all risks (EAR)</i>	13	15.4	7.7	15.4	53.8	7.7	3.31	1.25
3.	<i>Electronic Equipment Insurance</i>	13	46.2	30.8	7.7	15.4	0	1.92	1.12
4.	<i>Machinery Breakdown Insurance</i>	13	38.5	30.8	23.1	0	7.7	2.08	1.19
5.	<i>Boiler and Pressure Vessel Insurance</i>	13	53.8	23.1	15.4	0	7.7	1.85	1.21
6.	<i>Professional Indemnity Insurance</i>	13	0	7.7	15.4	7.7	69.2	4.38	1.04
7.	<i>Automobile Insurance</i>	13	0	0	15.4	53.8	30.8	4.15	0.69
8.	<i>Worker's Compensation Insurance</i>	13	0	0	15.4	61.5	23.1	4.08	0.64
9.	<i>Contractors Professional Liability</i>	13	38.5	30.8	7.7	7.7	15.4	2.31	1.49
10.	<i>Bid bonds</i>	13	0	7.7	7.7	23.1	61.5	4.38	0.96
11.	<i>Performance bonds</i>	13	0	7.7	7.7	15.4	69.2	4.46	0.97
12.	<i>Goods in transit and Marine Insurance</i>	13	7.7	69.2	0	0	23.1	2.62	1.39

13.	<i>Grand mean</i>	3.08
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Source: own survey, 2024

The familiarity levels of respondents from the group labeled "CCCC" with various insurance policies reveal distinct trends. Respondents exhibit high familiarity with Contractors' All Risks (CAR) insurance, Professional Indemnity Insurance, Performance Bonds, and Bid Bonds. For CAR insurance, 76.9% of respondents rated their familiarity at the highest level (5), resulting in a mean score of 4.54. Similarly, 69.2% of respondents rated their familiarity at level 5 for Professional Indemnity Insurance and Performance Bonds, with mean scores of 4.38 and 4.46, respectively. Bid Bonds also show high familiarity, with 61.5% of respondents rating their familiarity at level 5, leading to a mean score of 4.38.

Moderate familiarity is observed with Automobile Insurance and Worker's Compensation Insurance. For Automobile Insurance, 53.8% of respondents rated their familiarity at level 4, and 30.8% rated it at level 5, resulting in a mean score of 4.15. Worker's Compensation Insurance has 61.5% of respondents rating their familiarity at level 4 and 23.1% at level 5, leading to a mean score of 4.08. Erection All Risks (EAR) insurance shows a moderate level of familiarity, with 53.8% of respondents rating it at level 4 and a mean score of 3.31.

In contrast, there is significant unfamiliarity with Electronic Equipment Insurance, Machinery Breakdown Insurance, Boiler and Pressure Vessel Insurance, and Goods in Transit and Marine Insurance. For Electronic Equipment Insurance, 46.2% of respondents rated their familiarity at level 1, resulting in a mean score of 1.92. Similarly, Machinery Breakdown Insurance and Boiler and Pressure Vessel Insurance have 38.5% and 53.8% of respondents, respectively, rating their familiarity at level 1, with mean scores of 2.08 and 1.85. Goods in Transit and Marine Insurance has 69.2% of respondents rating their familiarity at level 2, leading to a mean score of 2.62.

Contractors' Professional Liability Insurance has mixed familiarity levels, with 38.5% of respondents rating their familiarity at level 1 and 30.8% at level 2, resulting in a mean score of 2.31.

Overall, the grand mean familiarity score for all insurance policies is 3.08, indicating a moderate level of familiarity on average. The data highlights areas where respondents have substantial

knowledge and areas where there is a notable lack of familiarity, suggesting potential targets for further education or awareness initiatives.

**Table 17 :** Familiarity levels with various insurance policies –Sunshine Construction

S/N	Name of Insurance policy	Sunshine							
		N	(1)	(2)	(3)	(4)	(5)	$\bar{x}$	$\sigma$
			In percent						
1.	<i>Contractors' all risks (CAR)</i>	11	0	9.1	9.1	36.4	45.5	4.18	0.98
2.	<i>Erection all risks (EAR)</i>	11	0	27.3	27.3	45.5	0	3.18	0.87
3.	<i>Electronic Equipment Insurance</i>	11	45.5	27.3	18.2	9.1	0	1.91	1.04
4.	<i>Machinery Breakdown Insurance</i>	11	0	9.1	18.2	36.4	36.4	2.27	1.10
5.	<i>Boiler and Pressure Vessel Insurance</i>	11	36.4	45.5	9.1	9.1	0	1.91	0.94
6.	<i>Professional Indemnity Insurance</i>	11	0	9.1	18.2	36.4	36.4	4.00	1.00
7.	<i>Automobile Insurance</i>	11	0	0	36.4	54.5	9.1	3.73	0.65
8.	<i>Worker's Compensation Insurance</i>	11	0	0	27.3	63.6	9.1	3.82	0.60
9.	<i>Contractors Professional Liability</i>	11	27.3	45.5	9.1	18.2	0	2.18	1.08
10.	<i>Bid bonds</i>	11	0	9.1	9.1	54.5	27.3	4.00	0.89
11.	<i>Performance bonds</i>	11	0	0	18.2	54.5	27.3	4.09	0.70
12.	<i>Goods in transit and Marine Insurance</i>	11	9.1	54.5	27.3	9.1	0	2.36	0.81
13.	<i>Grand mean</i>							3.42	

Source: own survey, 2024

The familiarity levels of respondents from the group labeled "Sunshine" with various insurance policies also show notable trends. Respondents exhibit high familiarity with Contractors' All

Risks (CAR) insurance, Professional Indemnity Insurance, Performance Bonds, and Bid Bonds. For CAR insurance, 45.5% of respondents rated their familiarity at the highest level (5), and 36.4% rated it at level 4, resulting in a mean score of 4.18. Professional Indemnity Insurance also shows high familiarity, with 36.4% of respondents rating their familiarity at level 5 and another 36.4% at level 4, leading to a mean score of 4.00. Performance Bonds have 27.3% of respondents rating their familiarity at level 5 and 54.5% at level 4, with a mean score of 4.09. Similarly, Bid Bonds have 27.3% of respondents rating their familiarity at level 5 and 54.5% at level 4, leading to a mean score of 4.00.

Moderate familiarity is observed with Automobile Insurance and Worker's Compensation Insurance. For Automobile Insurance, 54.5% of respondents rated their familiarity at level 4, and 9.1% rated it at level 5, resulting in a mean score of 3.73. Worker's Compensation Insurance has 63.6% of respondents rating their familiarity at level 4 and 9.1% at level 5, leading to a mean score of 3.82. Erection All Risks (EAR) insurance shows a moderate level of familiarity, with 45.5% of respondents rating it at level 4 and a mean score of 3.18.

In contrast, there is significant unfamiliarity with Electronic Equipment Insurance, Machinery Breakdown Insurance, Boiler and Pressure Vessel Insurance, and Goods in Transit and Marine Insurance. For Electronic Equipment Insurance, 45.5% of respondents rated their familiarity at level 1, resulting in a mean score of 1.91. Similarly, Boiler and Pressure Vessel Insurance has 36.4% of respondents rating their familiarity at level 1, leading to a mean score of 1.91. Goods in Transit and Marine Insurance has 54.5% of respondents rating their familiarity at level 2, leading to a mean score of 2.36. Machinery Breakdown Insurance shows varied familiarity levels, with 36.4% of respondents rating their familiarity at level 4 and level 5 each, resulting in a mean score of 2.27.

Contractors' Professional Liability Insurance has mixed familiarity levels, with 27.3% of respondents rating their familiarity at level 1 and 45.5% at level 2, resulting in a mean score of 2.18.

Overall, the grand mean familiarity score for all insurance policies is 3.42, indicating a moderate level of familiarity on average. The data highlights areas where respondents have substantial

knowledge and areas where there is a notable lack of familiarity, suggesting potential targets for further education or awareness initiatives.

When comparing the familiarity levels of respondents from the groups "CCCC" and "Sunshine" with various insurance policies, distinct patterns emerge.

**Table 18** : Mean Score of Familiarity levels with various insurance policies

ANOVA					
Mean Score of Familiarity levels with various insurance policies					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.107	1	.107	.105	.748
Within Groups	22.415	22	1.019		
Total	22.522	23			

- With a p-value of 0.748, which is greater than the typical significance level of 0.05, we fail to reject the null hypothesis.

Since the p-value is not less than 0.05, we do not have sufficient evidence to conclude that there is a significant difference in familiarity levels across different insurance policies.

#### 4.2.3 TEST FOR RELIABILITY

As it can be referred from the table below, the reliability of the Likert scale Questionnaire was tested for three variables using Cronbach's alpha

**Table 19** : Reliability test

Reliability Test - PROJECT RISK MANAGEMENT SYSTEM			
Reliability Statistics- CCCC		Reliability Statistics - Sunshine Construction	
Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items
.761	14	.822	14
Reliability Test - PROJECT RISK MANAGEMENT PROCESS			
Reliability Statistics - CCCC		Reliability Statistics –Sunshine	

Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items
.800	8	.792	8
<b><i>RELIABILITY TEST - FAMILIARITY OF INSURANCE POLICE</i></b>			
Reliability Statistics - CCCC		Reliability Statistics – Sunshine	
Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items
.901	12	.817	12

Source: own survey, 2024

The reliability statistics for the Project Risk Management System, Process, and Familiarity with Insurance Policy reveal that the instruments used are reliable across both CCCC and Sunshine Construction. For the Project Risk Management System, Cronbach's Alpha values are 0.761 for CCCC and 0.822 for Sunshine, indicating good internal consistency, with Sunshine performing slightly better. For the Project Risk Management Process, both organizations show good reliability with Cronbach's Alpha values of 0.800 (CCCC) and 0.792 (Sunshine). Regarding Familiarity with Insurance Policy, CCCC exhibits excellent reliability at 0.901, while Sunshine has good reliability at 0.817. These values suggest that the scales used are consistent and reliable for measuring the respective constructs across both groups.

**4.3 TIME SERIES ANALYSIS - ASSESSING THE ACCIDENTAL LOSS**

Sunshine Construction Company and China Communication Construction Company have different type of Insurance coverage starting before 2014. From that different type of insurance coverage, this study mainly focused on the insurance coverage’s that are only related to construction projects.

For China Communication Construction Company Contractor All Risk, Performance Bond, Professional Indemnity, Contractor Plant Machinery and Workmen’s Insurance policies are considered. Similarly for Sunshine Construction Company; Contractor All Risk, Performance Bond, Professional Indemnity, Contractor Plant Machinery, public liability and Workmen’s has considered.

The following table has presented the Sum insured amount, Premium amount and accidental loss magnitude that has been happened between start of 2014 to end of 2023.

**Table 20 : Sum insured amount and Premium amount**

S.N	Year	CCCC		Sunshine	
		Cumulative insured amount in birr	sum in premium in birr	Cumulative insured amount in birr	sum in premium in birr
1.	2014.	340,440,000.00	1,117,096.00	316,324,477.50	1,043,570.81
2.	2015.	770,376,406.09	2,553,465.63	316,324,477.50	1,043,570.81
3.	2016.	770,547,947.29	2,522,169.03	512,238,298.07	2,104,411.12
4.	2017.	778,181,681.52	2,622,169.03	697,560,440.61	2,404,201.88
5.	2018.	2,736,198,949.97	7,150,040.80	522,477,952.58	2,228,328.48
6.	2019.	1,254,290,025.61	6,666,964.00	494,819,900.88	1,634,357.68
7.	2020.	363,106,578.73	1,256,619.29	532,406,981.82	2,675,302.32
8.	2021.	503,899,773.00	1,882,490.50	490,861,280.60	1,977,236.05
9.	2022.	400,973,694.00	1,278,998.14	496,035,291.38	1,993,105.22
10.	2023.	435,368,599.79	1,547,382.19	797,484,638.64	2,735,254.59
<b>Total</b>		8,353,383,656	28,597,394.61	5,176,533,739.58	19,839,338.96

Source: (United, 2024)

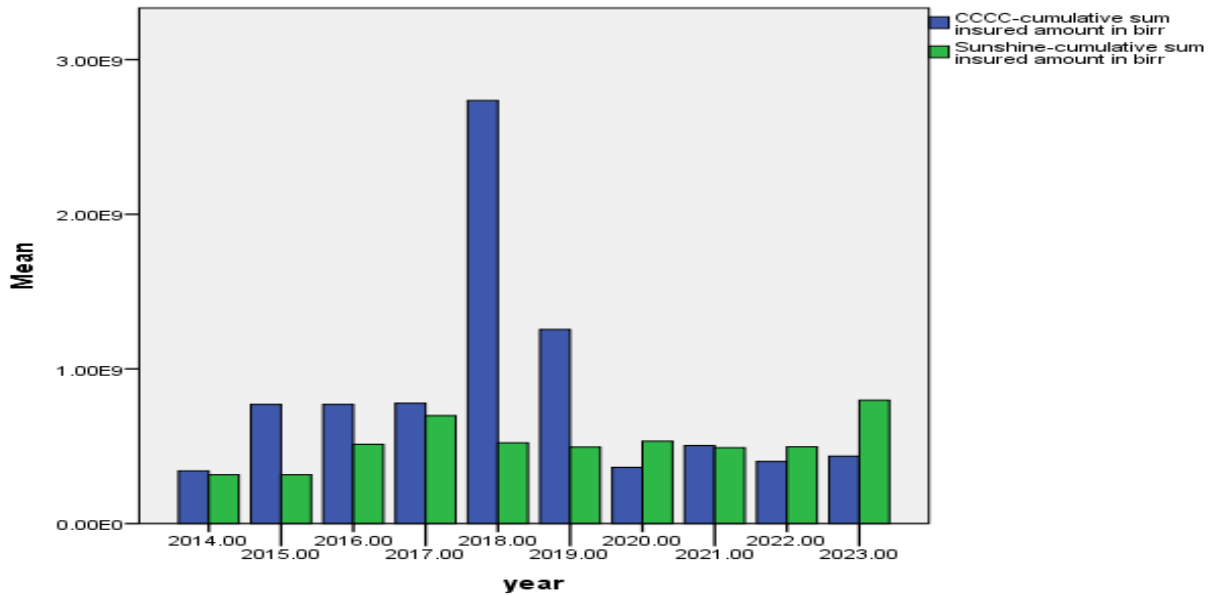


Figure 5: Sum insured amount from start of 2014 to end of 2023

Both entities generally show an increasing trend in cumulative sum insured amounts over the years. CCCC experiences more significant fluctuations, with a peak in 2018 followed by a decline and relative stability afterward.

Sunshine's trend is more consistent, with steady growth interrupted by occasional fluctuations. These trends could be influenced by various factors such as changes in business operations, market conditions, regulatory requirements, and risk assessments.

#### 4.3.1 ANALYSIS OF ACCIDENTAL LOSS

The below table provides a summary of the cumulative accidental loss magnitude of construction risk for each year for both CCCC and Sunshine, as well as the total cumulative loss magnitude for each entity over the period of 2014 to 2023.

Table 21 : Cumulative loss magnitude in birr

S.N	Year	CCCC	Sunshine
		Cumulative accidental loss magnitude birr	Cumulative accidental loss magnitude birr
5.	2014.	1,707,213.20	251,435.20

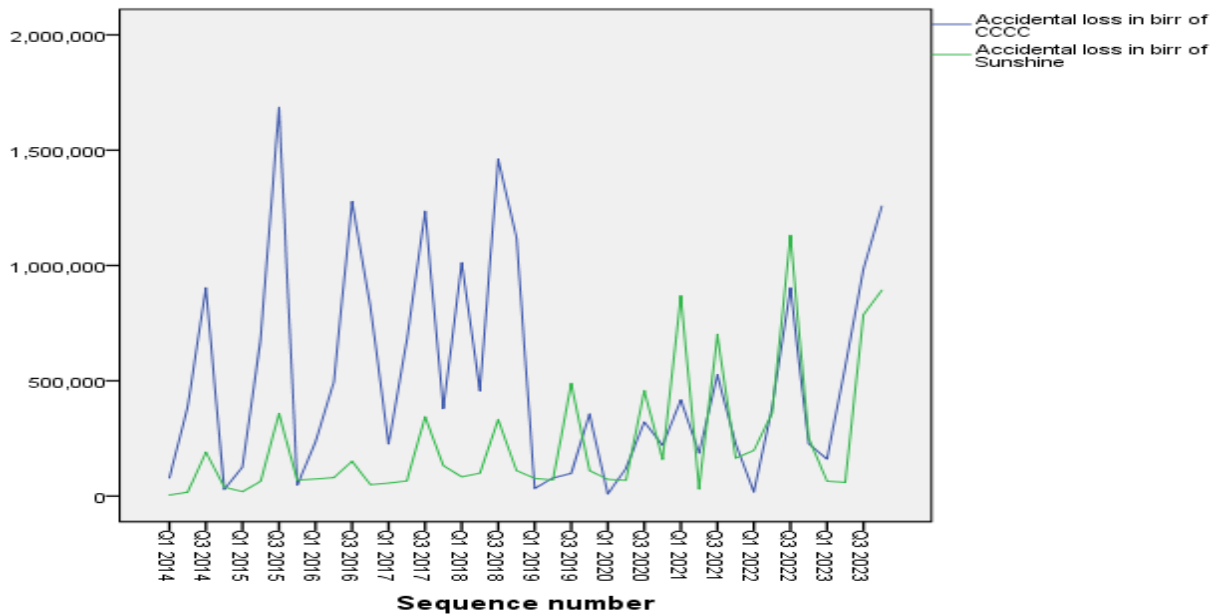
<b>6.</b>	2015.	2,786,248.10	511,058.79
<b>7.</b>	2016.	2,494,642.35	386,544.95
<b>8.</b>	2017.	2,565,873.74	557,029.73
<b>9.</b>	2018.	3,012,270.17	626,436.28
<b>10.</b>	2019.	891,038.46	738,360.40
<b>11.</b>	2020.	759,505.00	768,386.27
<b>12.</b>	2021.	1,451,520.58	1,765,378.13
<b>13.</b>	2022.	1,904,746.30	1,942,025.54
<b>14.</b>	2023.	3,509,815.56	1,803,871.29
<b>Total</b>		21,082,873.46	9,350,526.58

Source: (United, 2024)

### 1.3.1.1 TIME PLOTS

Time plots, also known as time series plots, are fundamental visualizations used in time-series analysis. They display the evolution of a variable over time, with time represented on the x-axis and the variable of interest on the y-axis. Time plots are essential tools for exploring, understanding, and interpreting time-series data. Here's a detailed overview of time plots in time-series analysis ( Jenkins & Reinsel, 1994):

Plotting the data versus time is the first, and most crucial, step in any time-series analysis. Key series characteristics, including trend, seasonality, outliers, and discontinuities, may be shown in



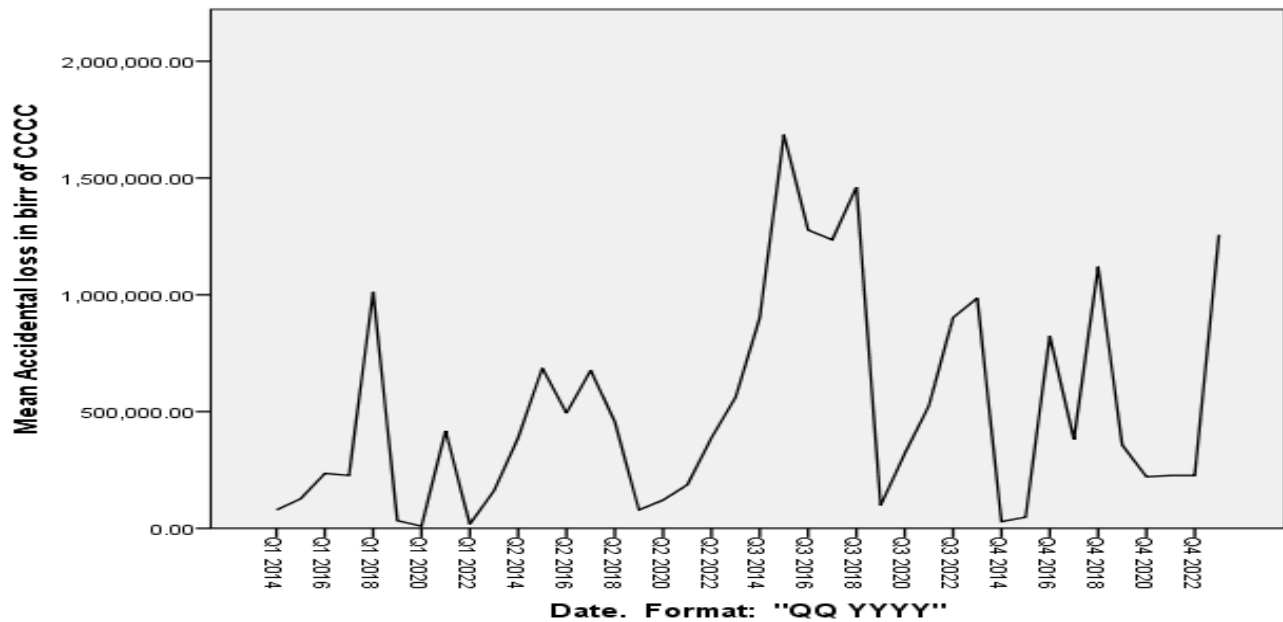
a time plot. Plotting is essential for both describing the data and assisting in the creation of a logical model.

**Figure 6:** Time plot for Cumulative accidental loss

Both companies exhibit a rising trend in cumulative accidental losses, suggesting common challenges or risk factors affecting their operations. While the magnitude of losses may differ between the two companies in some years, the overall trend indicates a need for robust risk management strategies and mitigation efforts for both.

### 1.3.1.2 TREND ANALYSIS

A statistical approach called trend analysis is used to find and examine patterns or trends across time in a dataset. To identify underlying patterns, trends, or movements in the data, it entails analyzing the direction and size of changes in the data. It is an analytical technique that enables researchers to forecast future stock performance. The foundation of trend analysis is historical data about the performance of the stock in relation to general trends (Adhikari, R., and R. K. Agrawal, 2013).

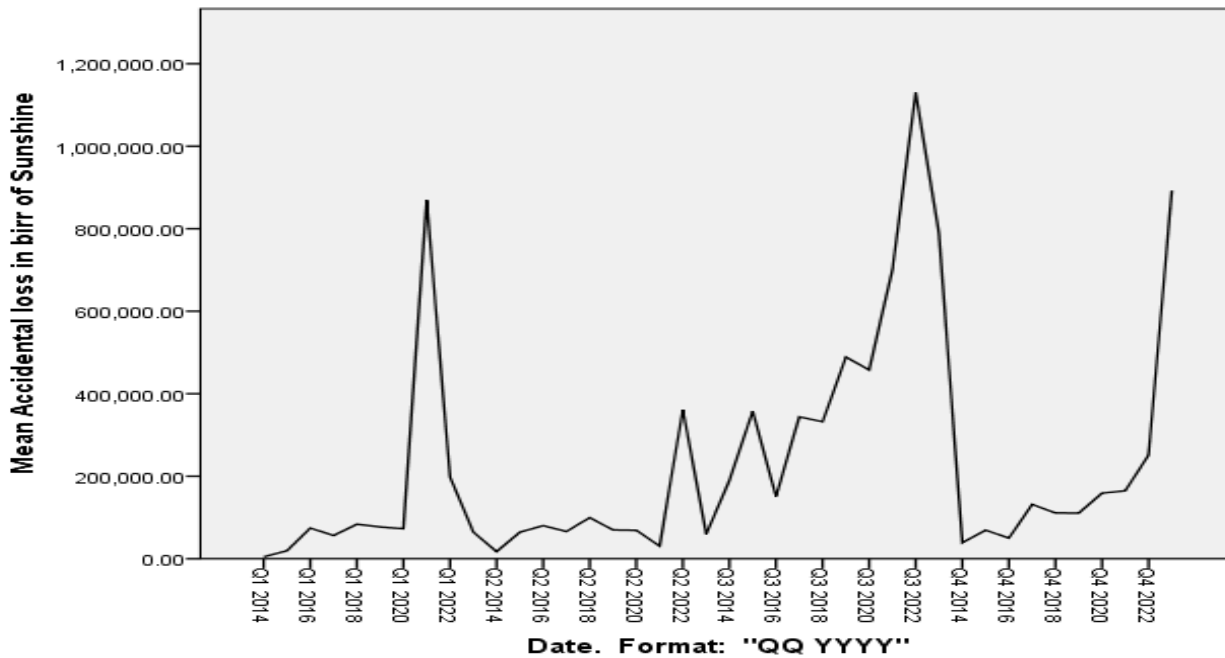


**Figure 7 :** Cumulative accidental loss of CCCC- Quarterly data

Source: Graph is derived from own analysis using SPSS

- Initial Years (2014-2015): The values show significant fluctuations. There is a sharp increase from Q1 2014 to Q3 2014, followed by a sharp decrease in Q4 2014. The same pattern is repeated in 2015 with a peak in Q3.
- Middle Years (2016-2018): The data still shows fluctuations, with significant peaks in Q3 each year and lower values in Q1 and Q4.
- Recent Years (2019-2023): The fluctuations seem less extreme, but there are still noticeable peaks in certain quarters, particularly Q3 2023.

Based on the above plotted in SPSS, it has provided a clearer visual representation of trends. It can be noted that there is Seasonal Peaks. Especially, Q3 of each year tends to have higher accidental losses. The Overall Trend shows an increasing trend in the accidental loss amounts over the years, particularly noticeable in the peaks during Q3. This trend analysis highlights both seasonal variations and an overall increase in accidental losses over the observed period.



**Figure 8:** Cumulative accidental loss of Sunshine Construction - Quarterly data

Source: Graph is derived from own analysis using SPSS

- Initial Years (2014-2015): Starting with relatively low values, there is an increasing trend with a significant peak in Q3 2015.
- Middle Years (2016-2018): Continued fluctuations with notable peaks in Q3 of each year, although the values vary.
- Recent Years (2019-2023): Significant peaks and troughs with some of the highest values in Q1 2021, Q3 2022, and Q3 2023.

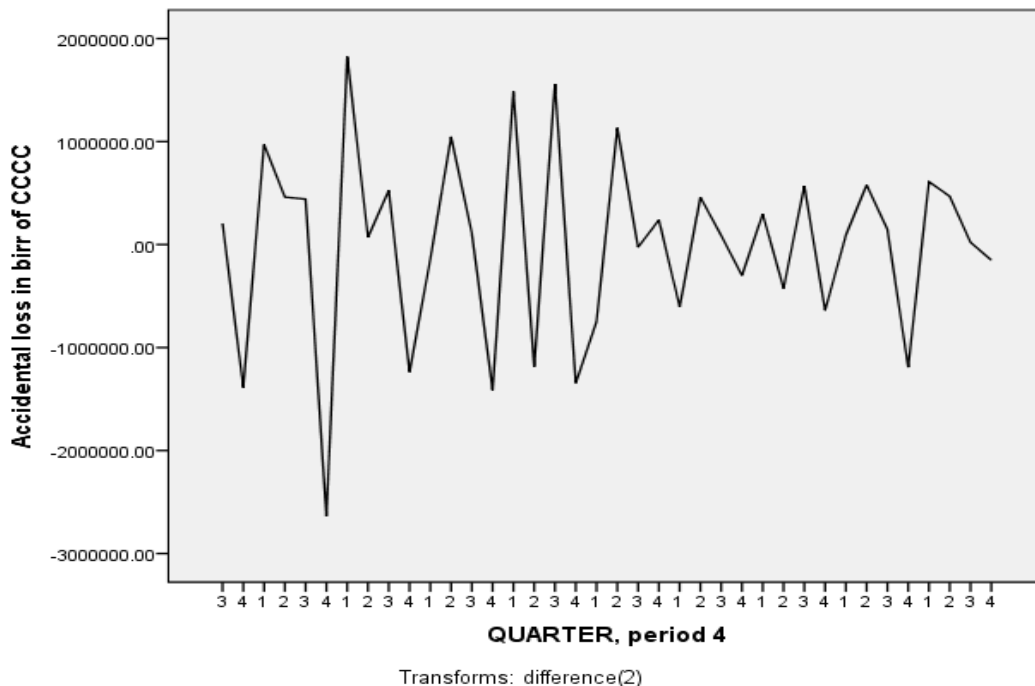
Based on the above plotted in SPSS, it has provided a clearer visual representation of trends. It can be noted that there is seasonal patterns where q3 tends to have higher accidental losses. And the overall trend is an increasing trend when comparing the peaks of the earlier years to the later years. Specifically, Q3 2022 and Q3 2023 show very high values.

### 1.3.1.3 MODELING AND FORECASTING

Prior to doing any analysis, it is necessary to verify that the time series data is stationary before applying models to it. A stationary series is one that oscillates around a constant mean without exhibiting any trend. It is one whose statistical characteristics hold true across time, including mean, variance, autocorrelation, etc. ( Jenkins & Reinsel, 1994). Based on the idea that the time series may be made roughly stationary (or "stationarized") by applying mathematical modifications, most statistical forecasting techniques operate. Predicting a stationarized series is not too difficult.

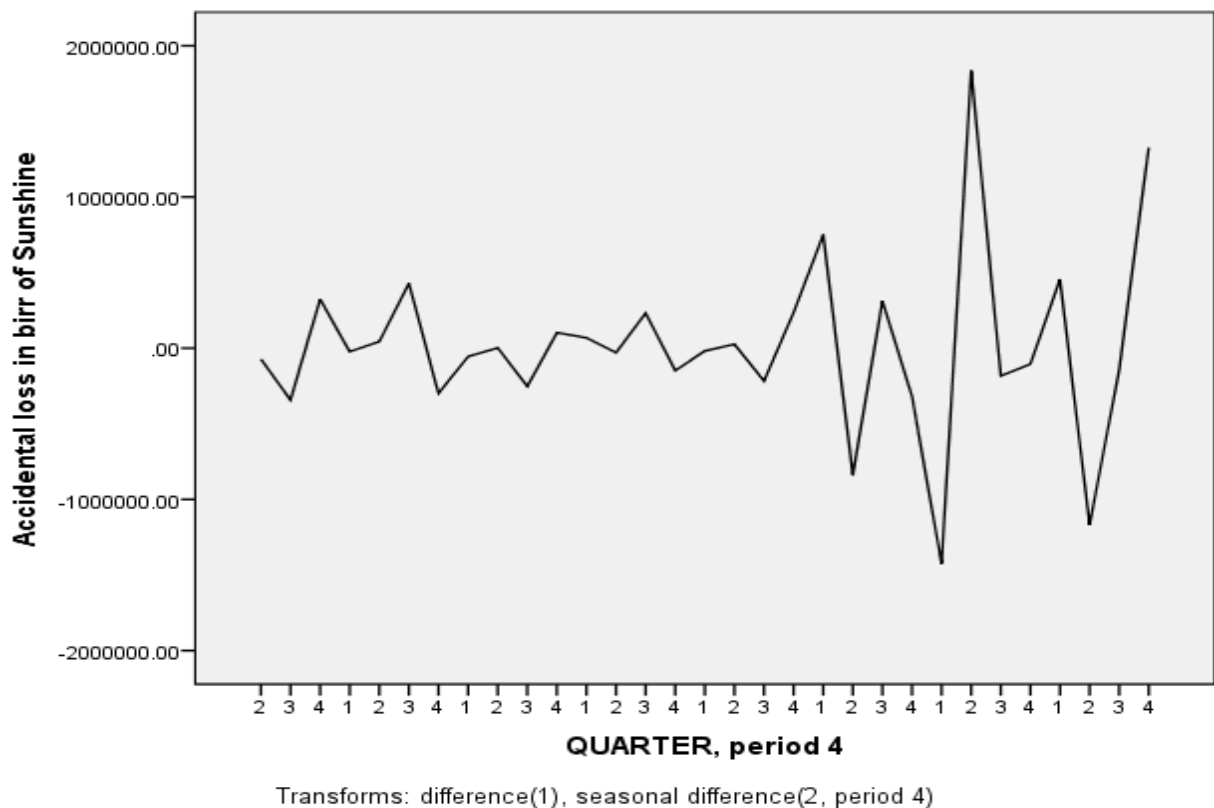
#### 1.3.1.3.1 Removing Non-stationary: Differencing

The most common way to remove non-stationary is to difference the time series. The concept is the same here. Differencing a series is pretty straightforward. The researcher should subtract the first value from the second, the second value from the third, and so forth. Subtracting a period's value from its immediate subsequent period's value is called *first differencing* ( Jenkins & Reinsel, 1994).



**Figure 9:** Stationary series- CCCC

Source: Graph is derived from own analysis using SPSS



**Figure 10 :** Stationary series- Sunshine

Source: Graph is derived from own analysis using SPSS

As observed in the graph above, the series achieves stationary after the appropriate differencing is applied.

### 1.3.2 MODELING

Among several potential models considered, the Simple Seasonal model for CCCC and winters' Additive for Sunshine Construction demonstrated a favorable fit, characterized by a notably higher stationary R-squared value. This indicates that the models effectively captures and explains the variability within the stationary portion of the dataset, particularly focusing on seasonal patterns.

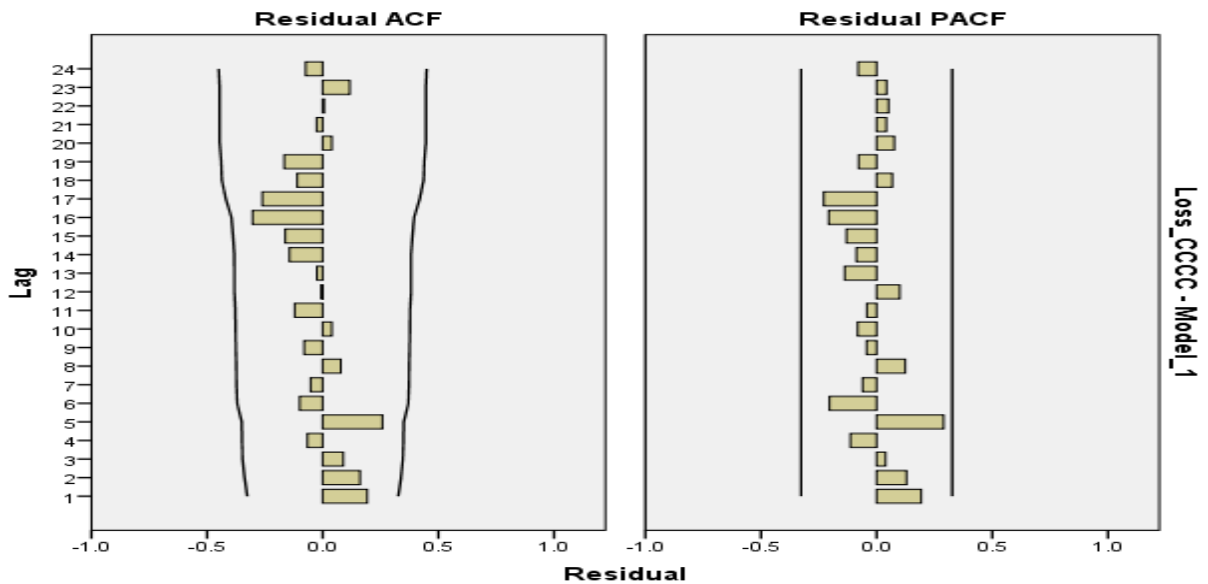
**Table 22: MODELING ACCIDENTAL LOSS OF CCCC - Simple Seasonal model**

Model	Number of Predictors	Model Statistics				Number of Outliers
		Model Fit statistics	Ljung-Box Q(18)			
		Stationary R-squared	Statistic	DF	Sig.	
Accidental loss in birr of CCCC-Model_1	0	.633	15.898	16	.460	0

Source: Graph is derived from own analysis using SPSS

The model "Accidental loss in birr of CCCC-Model\_1" is a simplistic model with no predictor variables, suggesting a straightforward approach to understanding accidental losses in birr within the context of CCCC.

Despite its simplicity, the model demonstrates a strong fit, as evidenced by its high stationary R-squared value of 0.633. This indicates that the model effectively captures the variability within the stationary portion of the dataset, likely by incorporating seasonal patterns or other stationary trends. However, it's worth noting that the traditional R-squared value is not provided, because the focus on stationarity in the analysis.



**Figure 11: Test of autocorrelation and partial autocorrelation- CCCC**

Source: Graph is derived from own analysis using SPSS

The Ljung-Box Q(18) statistic, which tests for autocorrelation in the residuals up to lag 18, yields a non-significant p-value of 0.460, suggesting the absence of significant autocorrelation in the model's residuals.

Additionally, no outliers were detected in the data. Overall, while the model's has ability to explain the full variability in the data, its strong fit to the stationary portion of the dataset suggests it may offer valuable insights into the factors influencing accidental loss in birr within the CCCC context.

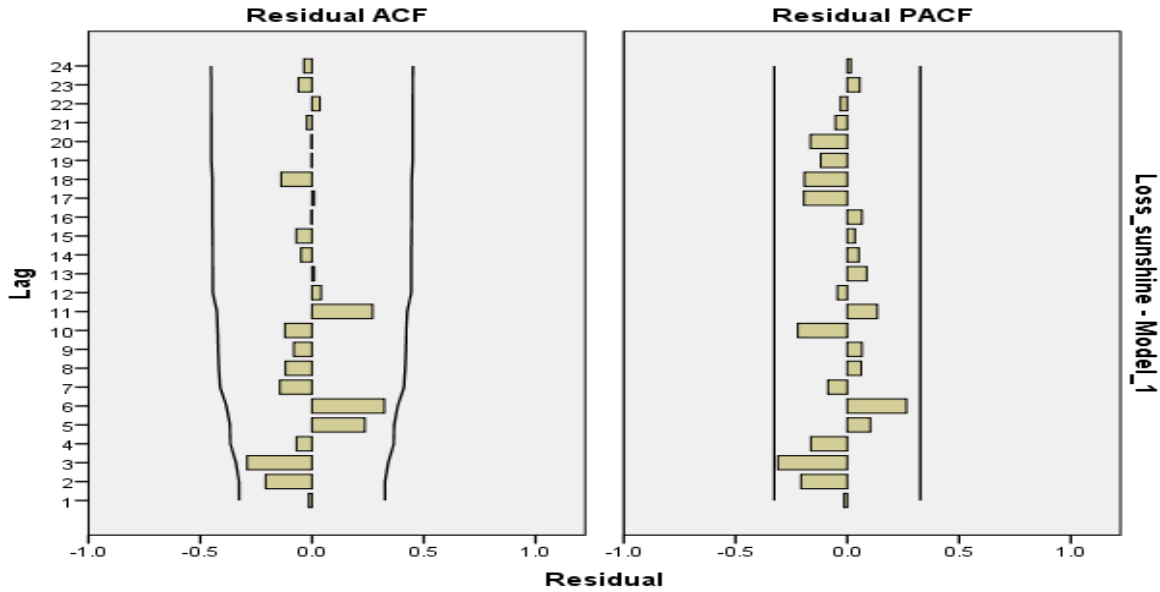
Overall, the Simple Seasonal model provides a reasonable fit for the data, effectively capturing the seasonal patterns and ensuring that the residuals are mostly random. This lays a good foundation for forecasting future values

**Table 23:** MODELING ACCIDENTAL LOSS OF SUNSHINE CONSTRUCTION COMPANY- winters' Additive model

Model	Number of Predictors	Model Statistics				Number of Outliers
		Model Fit statistics	Ljung-Box Q(18)			
		Stationary R-squared	Statistics	DF	Sig.	
Accidental loss in birr of Sunshine -Model_1	0	.682	22.393	15	.098	0

Source: Graph is derived from own analysis using SPSS

The "Accidental loss in birr of Sunshine -Model\_1" utilizes a winter additive model, customized to capture seasonal variations in accidental losses within the Sunshine context. With a noteworthy stationary R-squared value of 0.682, the model adeptly accommodates the variability inherent in the stationary data, likely by incorporating patterns specific to the winter season. However, it's worth noting that the traditional R-squared value is not provided, because the focus on stationarity in the analysis.



**Figure 12:** Test of autocorrelation and partial autocorrelation- Sunshine Construction

Source: Graph is derived from own analysis using SPSS

Although the Ljung-Box Q(18) statistic returns a p-value of 0.098, slightly surpassing the conventional significance threshold of 0.05, it still indicates a relatively low level of autocorrelation in the residuals. Moreover, the absence of outliers in the dataset further enhances the model's reliability.

Overall, the winter additive model provides a reasonable fit for the data, effectively capturing the seasonal patterns and ensuring that the residuals are mostly random. This lays a good foundation for forecasting future values.

### 1.3.3 FORECASTING

Using a model to forecast future values based on previously observed values is known as time series forecasting. After the researcher has determined which candidate model best fits the time series data, you may estimate the model's parameters and use it as a predictive model to anticipate the values of your time series going forward. Accordingly, predication of three years accidental loss has presented in the following table.

**Table 24:** Predication of three years accidental loss

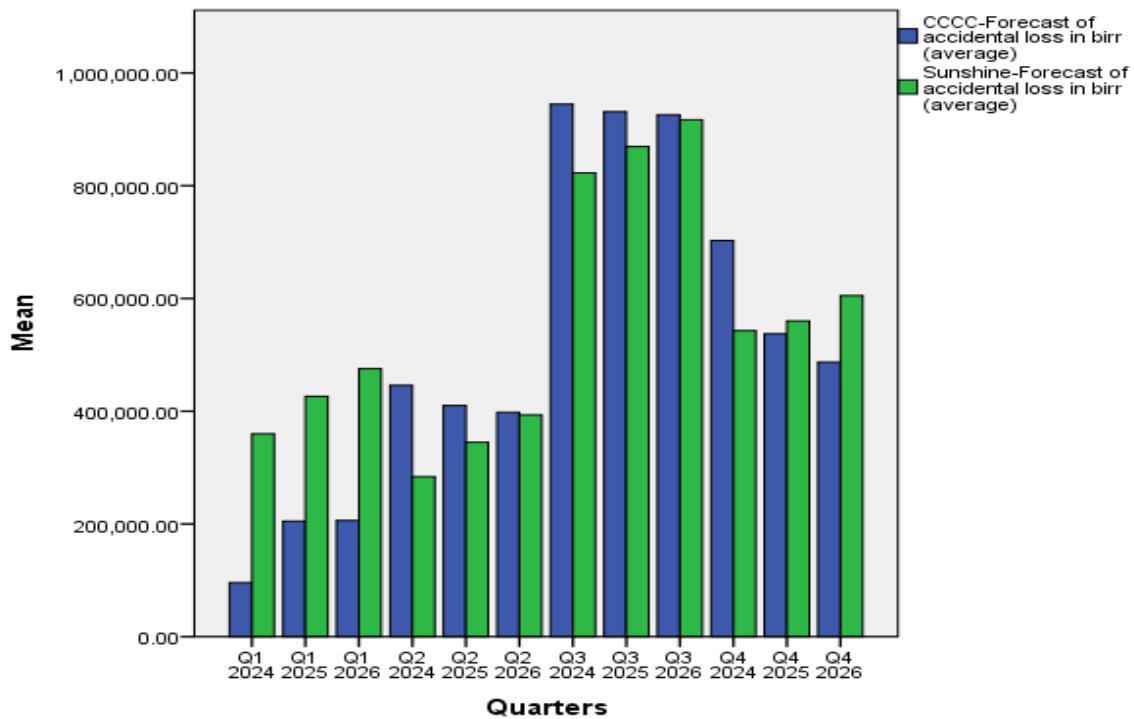
Quarters	CCCC		Sunshine	
	Forecast of accidental loss in birr (average)	Total per year	Forecast of accidental loss in birr (average)	Total per year
Q1 2024	95,995.76	2,289,538.68	359,892.27	2,009,272.45
Q2 2024	445,916.80		283,737.26	
Q3 2024	944,816.79		822,845.23	
Q4 2024	702,809.33		542,797.69	
Q1 2025	204,958.60	2,083,636.33	426,332.50	2,200,610.04
Q2 2025	409,980.04		344,740.85	
Q3 2025	931,282.41		869,502.73	
Q4 2025	537,415.28		560,033.95	
Q1 2026	206,146.69	2,016,875.49	475,318.00	2,390,874.81
Q2 2026	397,886.37		393,311.63	
Q3 2026	925,815.59		916,979.15	
Q4 2026	487,026.84		605,266.04	

Source: own analysis using SPSS

The forecasted values for CCCC in 2024 show a notable fluctuation across the quarters. The highest loss is expected in Q3 (944,816.79), while the lowest is in Q1 (95,995.76). This suggests a seasonal pattern where losses tend to increase towards the middle of the year. The forecast for 2025 indicates a similar pattern with the highest losses again in Q3 (931,282.41) and the lowest in Q1 (204,958.60). The total annual forecasted loss is slightly lower than in 2024. The pattern of higher losses in Q3 persists in 2026 (925,815.59), with a slight overall decrease in the total annual loss compared to the previous years. This trend suggests a potential stabilization or improvement in managing accidental losses over time.

Sunshine's forecasted losses for 2024 show significant variability, with the highest loss expected in Q3 (822,845.23) and the lowest in Q2 (283,737.26). The total forecasted annual loss is substantial, indicating significant risk periods throughout the year. For 2025, the highest

forecasted loss remains in Q3 (869,502.73), with the lowest in Q2 (344,740.85). The total annual loss is higher than in 2024, suggesting increasing accidental losses for Sunshine. The forecast for 2026 shows a continuation of the trend with the highest losses in Q3 (916,979.15) and the lowest in Q2 (393,311.63). The total annual loss continues to increase, indicating worsening conditions or increasing risk factors affecting accidental losses.



**Figure 13:** Predication of three years - accidental loss

Source: Graph is derived from own analysis using SPSS

- Seasonal Pattern:
  - Both CCCC and Sunshine exhibit a seasonal pattern with higher losses typically in Q3 each year, suggesting specific risks or operational challenges during this period.
- Annual Trends:
  - For CCCC, there is a slight decreasing trend in the total annual losses from 2024 to 2026, indicating potential improvements in risk management.
  - For Sunshine, the total annual losses are increasing over the same period, suggesting that the risk factors are either growing or are not being adequately managed.

## **CHAPTER FIVE**

### **CONCLUSION AND RECOMMENDATION**

#### **5.1 INTRODUCTION**

This chapter presents the summaries of the findings, conclusions derived from the analysis and the recommendations that are suggested and will help to improve the risk management practices of Chain Construction Company (Ethiopia Branch) and Sunshine Construction Company.

#### **5.2 SUMMARY OF FINDINGS**

##### **5.2.1 GENERAL INFORMATION ABOUT THE RESPONDENT**

Both companies' risk management departments are predominantly male, with CCCC having a higher proportion of male respondents compared to Sunshine. The departments are primarily composed of individuals aged 31-40 years. This age distribution suggests a workforce with significant experience, stability, and potentially developed leadership skills. In addition they demonstrate high levels of educational attainment, with a considerable proportion holding advanced degrees. The CCCC group has a higher percentage of postgraduate degrees, while the Sunshine group also includes respondents with diplomas, indicating a slightly more varied educational background.

Both companies have a diverse range of experience levels within their groups, with a significant proportion of respondents having extensive experience in the construction industry. This diversity suggests a well-rounded workforce capable of bringing various perspectives and expertise to their roles. Along with they have a balanced portfolio between commercial/industrial and public/community building projects, with only marginal differences in the percentages of each type of work they undertake. The balanced portfolio indicates that both companies are versatile and engaged in a variety of project types, which can enhance their resilience and adaptability in the industry.

### **5.2.2 RISK MANAGEMENT SYSTEM**

The analysis of the risk management systems at CCCC and Sunshine Construction reveals a nuanced picture of each company's practices and perceptions among their respondents. At CCCC, the cumulative mean of 3.26 indicates a generally positive perception of risk management practices, with strong consensus on the effectiveness of risk-related policies and procedures (mean of 3.98) and a robust culture of accountability (mean of 4.08). However, areas such as risk language/communication (mean of 2.54) and internal relationships or "no blame culture" (mean of 1.88) highlight significant opportunities for improvement, particularly in fostering open communication and learning from mistakes.

In contrast, Sunshine Construction's risk management system is perceived more favorably overall, with a higher cumulative mean of 3.78. Respondents express strong agreement with the adequacy of risk-related policies and procedures (mean of 4.18) and accountability (mean of 4.09), indicating robust risk management frameworks and cultural practices. However, like CCCC, Sunshine Construction also shows variability in responses related to incentives (mean of 3.55) and risk response strategies (mean of 3.36), suggesting that while generally positive, these areas could benefit from further refinement to enhance effectiveness.

Comparing the two companies, Sunshine Construction consistently scores higher across most individual statements, suggesting that its respondents have a more positive perception of the company's risk management practices compared to CCCC. This trend highlights Sunshine Construction's stronger performance in areas such as risk communication and fostering a "no blame culture," while also pointing to common challenges both companies face in incentivizing risk management efforts and refining their risk response strategies.

### **5.2.3 RISK MANAGEMENT PROCESS**

The analysis of risk management processes at CCCC highlights strong points such as early risk identification and robust risk monitoring and control, with cumulative means of 3.77 and 3.77, respectively. Respondents express confidence in the company's ability to proactively identify risks and maintain effective oversight of risk management activities. However, there is a need for improvement in the use of structured risk identification methods and communication of analytical practices, as indicated by lower mean scores and significant variability in responses.

Sunshine Construction, on the other hand, shows slightly higher overall effectiveness in its risk management processes, with a cumulative mean score for early risk identification of 3.82 and a strong endorsement of its risk monitoring and control processes. Despite some variability in perceptions of the structured risk identification method and risk response strategies, Sunshine demonstrates strengths in systematically updating project documents and ensuring clear communication about potential risks. These practices suggest a more consistent and refined approach to risk management.

In comparison, Sunshine Construction appears to be in a better position regarding risk management processes than CCCC, reflecting higher agreement levels across various aspects of risk management. While both companies exhibit strengths, Sunshine's more robust and aligned practices with industry best standards position it favorably in terms of risk management effectiveness, offering a model for CCCC to enhance its methodologies and communication strategies.

#### **5.2.4 CHALLENGES FACED WHILE PURCHASING INSURANCE POLICY AND FAMILIARITY WITH CONSTRUCTION INSURANCE POLICY**

Both CCCC and Sunshine Construction acknowledge lack of awareness, complexity in insurance language, high insurance premiums, and insurers' lack of responsiveness to claims as significant challenges, with slight variations in perception between the two groups. However, while both groups identify poor interaction with insurers as a challenge, interestingly, all respondents in the CCCC group and Sunshine group do not perceive poor interaction as a significant challenge.

The data analysis reveals varying levels of familiarity with different insurance policies among respondents from the "CCCC" and "Sunshine" groups. Both groups exhibit a high level of familiarity with the "Contractors' All Risks (CAR)" insurance policy, indicating widespread understanding. In contrast, policies such as "Electronic Equipment Insurance" and "Machinery Breakdown Insurance" show a low to moderate level of familiarity in both groups, with many respondents rating themselves as either "Not at all familiar" or "Slightly familiar."

For the "Erection All Risks (EAR)" policy, both groups demonstrate a reasonable level of familiarity, with the "Sunshine" group showing a slightly higher level than the "CCCC" group. Conversely, policies like "Boiler and Pressure Vessel Insurance" and "Contractors Professional

Liability" lack familiarity in both groups, with a significant portion of respondents rating themselves as "Not at all familiar" or "Slightly familiar."

However, policies like "Professional Indemnity Insurance," "Automobile Insurance," "Worker's Compensation Insurance," "Bid Bonds," "Performance Bonds," and "Goods in Transit and Marine Insurance" have higher levels of familiarity among respondents from both groups, suggesting these policies are well-known and understood. Overall, the analysis highlights the diverse familiarity levels among respondents regarding different insurance policies and underscores the importance of enhancing awareness and understanding, particularly for less familiar policies.

### **5.2.5 TREND ANALYSIS AND FORECASTING**

The trend analysis of accidental losses for both the CCCC and Sunshine groups over different time periods reveals distinct patterns. In the initial years (2014-2015) of CCCC, there are significant fluctuations, characterized by sharp increases followed by decreases, with notable peaks in Q3.

Similarly, for Sunshine during the same period, the data starts with relatively low values but exhibits an increasing trend, with a significant peak in Q3 2015. Throughout the middle years (2016-2018), both groups experience fluctuations, with consistent peaks in Q3 each year alongside lower values in Q1 and Q4.

However, the values vary between the two groups. In the recent years (2019-2023), fluctuations appear less extreme for both groups, but there are still noticeable peaks in certain quarters, particularly Q3 2023, indicating ongoing seasonal patterns and an overall increasing trend in accidental loss amounts.

When visually represented in SPSS, both datasets underscore seasonal peaks, particularly in Q3 of each year, suggesting a recurring pattern of higher accidental losses during this period for both the CCCC and Sunshine groups. Additionally, the overall trend reveals an increasing trend in accidental loss amounts over the years, with pronounced peaks during Q3, especially notable in the recent years. This trend analysis highlights both seasonal variations and a general upward trend in accidental losses across both groups throughout the observed period.

The forecasted values for both CCCC and Sunshine in 2024, 2025, and 2026 reveal notable fluctuations across quarters, with a consistent pattern of higher losses in Q3. For CCCC, the highest losses are expected in Q3 of each year, while the lowest occur in Q1, suggesting a seasonal trend where losses tend to peak towards the middle of the year.

Despite slight variations in the total annual forecasted losses, there is an overall trend indicating potential stabilization or improvement in managing accidental losses over time for CCCC. Conversely, Sunshine's forecasted losses also display significant variability, with Q3 consistently showing the highest losses and Q2 the lowest.

However, the total annual losses for Sunshine are increasing over the observed period, suggesting either worsening conditions or inadequate management of risk factors affecting accidental losses.

Both CCCC and Sunshine exhibit a clear seasonal pattern with higher losses typically occurring in Q3 each year, indicating specific risks or operational challenges during this period. While CCCC shows a slight decreasing trend in total annual losses from 2024 to 2026, suggesting potential improvements in risk management, Sunshine's total annual losses are increasing over the same period, implying that risk factors may be growing or not adequately addressed. These trends underscore the importance of proactive risk management strategies to mitigate losses and ensure long-term financial stability for both CCCC and Sunshine.

### **5.3 CONCLUSION**

In conclusion, the analysis of both CCCC and Sunshine Construction's risk management departments reveals several noteworthy findings. Firstly, both companies exhibit a predominantly male workforce, with CCCC having a higher proportion of male respondents compared to Sunshine. Additionally, both departments consist primarily of individuals aged 31-40 years, suggesting a workforce with substantial experience and stability. Moreover, high levels of educational attainment are observed in both groups, with a considerable proportion holding advanced degrees, indicating a well-educated workforce capable of addressing complex challenges.

Furthermore, both companies demonstrate strong commitments to disciplined risk management policies and procedures, with high levels of agreement among employees on their presence. However, significant differences emerge in perceptions of risk communication and transparency, with Sunshine Construction exhibiting more positive perceptions in these areas. While both companies acknowledge challenges such as lack of awareness and complexity in insurance language, they demonstrate varying levels of familiarity with different insurance policies, suggesting opportunities for enhancing awareness and understanding, particularly for less familiar policies.

Lastly, the trend analysis of accidental losses for both groups reveals distinct patterns, with notable fluctuations across quarters and consistent peaks in Q3. While CCCC shows a slight decreasing trend in total annual losses over time, Sunshine's total annual losses are increasing, indicating the importance of proactive risk management strategies for mitigating losses and ensuring long-term financial stability. Overall, these findings highlight specific strengths and areas for improvement in both CCCC and Sunshine Construction's risk management practices, emphasizing the importance of ongoing evaluation and adaptation to effectively address evolving risks in the construction industry.

#### **5.4 RECOMMENDATION**

Based on the comprehensive analysis of both CCCC and Sunshine Construction's risk management practices, several recommendations can be made to further enhance their risk management capabilities:

**Promote Diversity and Inclusion:** While both companies have experienced and educated workforces, efforts should be made to further promote gender diversity and inclusion, particularly in leadership roles within the risk management departments. Encouraging diverse perspectives and backgrounds can lead to more robust risk assessments and decision-making processes.

**Strengthen Risk Communication and Transparency:** CCCC can learn from Sunshine Construction's positive perceptions regarding risk communication, brainstorming practices, and transparency. Implementing structured communication channels and encouraging open dialogue among employees can foster a culture of transparency and shared learning, ultimately enhancing risk management effectiveness.

**Invest in Risk Identification Methods:** Both companies exhibit mixed opinions regarding the effectiveness of structured risk identification methods. Investing in training programs and tools to improve the efficacy of risk identification processes can help streamline risk management efforts and ensure comprehensive risk coverage.

**Enhance Familiarity with Insurance Policies:** Given the varying levels of familiarity with different insurance policies, both companies should prioritize education and training initiatives to enhance employees' understanding of less familiar policies, such as "Electronic Equipment Insurance" and "Machinery Breakdown Insurance." This can empower employees to make informed decisions and mitigate potential risks effectively.

**Address Challenges in Insurance Interactions:** Acknowledging challenges related to insurance interactions, such as complexity in insurance language and insurers' lack of responsiveness to claims, both CCCC and Sunshine Construction should explore strategies to streamline communication with insurers and advocate for their needs more effectively.

**Proactive Risk Mitigation Strategies:** Considering the seasonal patterns of higher losses, particularly in Q3, both companies should implement proactive risk mitigation strategies during these periods. This may involve strengthening safety protocols, increasing oversight, or investing in additional resources to address identified risks effectively.

Rajan (2023) indicates the seven principles to proactively manage risk in Companywide. Hence In order to proactively mitigate the risks, both companies should;

- **Enhance Safety Protocols:** Review and enhance existing safety protocols and procedures to address specific risks associated with the seasonal peaks in Q3. This may include implementing additional safety training for employees, conducting regular safety inspections, and reinforcing adherence to safety guidelines on construction sites.
- **Increase Oversight and Monitoring:** Implement increased oversight and monitoring measures during Q3 to proactively identify and address potential risks before they escalate. This could involve deploying additional supervisors or safety officers on construction sites, implementing real-time monitoring systems, and conducting more frequent risk assessments.

- **Invest in Technology Solutions:** Invest in technology solutions such as predictive analytics, remote monitoring systems, and IoT sensors to identify potential risks in real-time and take proactive measures to mitigate them. These technologies can provide early warnings of safety hazards, equipment failures, or other potential issues during Q3 when risks are heightened.
- **Engage Stakeholders and Communities:** Engage stakeholders, including employees, subcontractors, local communities, and regulatory authorities, to collaboratively identify and address risks during Q3. Encourage open communication and collaboration among all parties involved in construction projects to ensure timely identification and resolution of potential issues.
- **Implement Early Warning Systems:** Establish early warning systems to alert key stakeholders of potential risks or adverse events during Q3. This could involve setting up communication channels, such as dedicated hotlines or online portals, for reporting safety concerns or incidents, as well as developing protocols for responding to escalating issues as needed.
- **Continuous Improvement and Learning:** Foster a culture of continuous improvement and learning within the risk management departments, where lessons learned from past experiences during Q3 are systematically documented, analyzed, and used to inform future risk mitigation strategies. Encourage employees to share insights, best practices, and innovative ideas for mitigating risks effectively.
- **Continuous Monitoring and Improvement:** Finally, both CCCC and Sunshine Construction should prioritize continuous monitoring and improvement of their risk management processes. Regular evaluations, feedback mechanisms, and benchmarking against industry best practices can help identify areas for improvement and drive ongoing enhancements in risk management effectiveness.

To address the increasing total annual losses observed for Sunshine Construction, the following recommendations are proposed:

- ✓ **Root Cause Analysis:** Conduct a thorough root cause analysis to identify the underlying factors contributing to the increase in total annual losses. Assess whether the rise in

losses is attributed to external factors such as market dynamics, regulatory changes, or internal factors such as operational inefficiencies, resource constraints, or inadequate risk management practices.

- ✓ Risk Management Review: Review and evaluate the effectiveness of existing risk management practices and procedures within Sunshine Construction. Identify any gaps, weaknesses, or areas for improvement in risk identification, assessment, mitigation, and monitoring processes. Consider implementing a risk maturity assessment framework to benchmark current practices against industry standards and best practices.
- ✓ Enhanced Risk Mitigation Strategies: Develop and implement enhanced risk mitigation strategies to address identified risks and minimize potential losses. Prioritize proactive measures to mitigate high-impact risks, strengthen safety protocols, and invest in additional resources or technologies to improve risk control and prevention measures.
- ✓ Employee Training and Awareness: Provide comprehensive training and awareness programs for employees to enhance their understanding of risk management principles, practices, and protocols. Empower employees at all levels to actively participate in risk identification, assessment, and mitigation efforts. Foster a culture of risk awareness, accountability, and continuous improvement across the organization.

By implementing these recommendations, both companies can further strengthen their risk management capabilities, mitigate potential threats, and ultimately enhance their resilience and long-term success in the construction industry.

## **5.5 IMPLICATION FOR FUTURE RESEARCH**

Exploring advanced risk management strategies: - future research could delve into exploring advanced risk management strategies beyond insurance that construction companies can adopt to enhance their resilience to project risks. This could include studying the integration of technology, data analytics and artificial intelligence in risk assessment and response.

Longitudinal study on risk trends: - conducting a longitudinal study to track and analyze trends in project risk over an extended period could provide valuable insight into the evolving nature of risk in the construction industry. This approach can help in identifying recurring patterns, reemerging risk and the effectiveness of risk management (response) over time.

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## Appendix A: Research Questionnaire

Date: \_\_\_\_\_

Dear Respondent,

I the undersigned am a postgraduate student in Addis Ababa University, School of Commerce; Department of project management. I am currently doing my Masters of Science (Msc.) degree project paper on the title — *Comparative Assessment of Risk Management through Insurance in case of Sunshine Construction Company and China communication Construction Company (Ethiopia branch) LTD.*

The aim of this questionnaire is to evaluate the level of risk management practices specially with regard to the practice of construction related insurances. To this end, I kindly request you to complete the following questionnaire carefully and honestly since your response is of the utmost importance to the successful completion of the research.

All the information you provide will be kept in strict confidentiality and it will be used only for academic research purpose. Thank you in advance for your kind response.

If you have any questions and comments, you are welcome to contact me at the address stated below.

Best Regards,

Bruk Semma

09 23 21 45 65

bsemma21@gmail.com

**SECTION ONE: GENERAL PROFILE OF THE RESPONDENT**

Respond to the questions by ticking on the box only once that you prefer best

1.1 Gender : Female  Male

1.2 Address: \_\_\_\_\_

1.3 Age : 20-30 years  , 31 -40 year  , 41-50 years  ,51 – 60 years  above 60 years

1.4 Level of Education: Diploma  Degree  Postgraduate

1.5 Currently work at (Company name) : \_\_\_\_\_

1.6 Profession/ job title\_\_\_\_\_

1.7 Years of experience

a) In the construction industry:

Below 3 years  , 3-7 years  , 8-12 years  , 13-17 years  ,18 years and above

b) In current Company

Below 3 years  , 3-7 years  , 8-12 years  , 13-17 years  ,18 years and above

c) In your current position:

Below 3 years  , 3-7 years  , 8-12 years  , 13-17 years  ,18 years and above

1.8 Type of work usually undertaken (please tick as applicable)

- Commercial/industrial building :-
- Public/ community building :-
- Others, please specify\_\_\_\_\_

**SECTION TWO:**

**Part 1: Questions about project risk management system/culture**

Indicate your opinion by marking ‘√’ in the respective grid box corresponding to the number against the following five-point linguistic scale that best describes your perception about risk management practice of your company.

(1)=Strongly Disagree, (2)= Disagree (3)=uncertain, (4)=Agree and (5)= Strongly Agree

No	Question/Statements	(1)	(2)	(3)	(4)	(5)
1.	Your Company has policies and procedures that require its workforce to go through disciplined risk planning, identification, assessment and risk response.					
2.	At your company risk analysis is an important step and prerequisite in					

	significant decisions that may affect time, cost, quality, customer satisfaction or combination of them.					
3.	Your Company has identified key risk indicators: such as Design risks, Organizational risks, Project management risks, Right of way risks, Construction risks and Environmental risks					
4.	In your daily operations and decision-making do you check and take measures for things that could go wrong?					
5.	Project managers are accountable for delays, cost overruns and or property damages and poor quality of products.					
6.	Your Company's professionals have top management support in acquiring additional resources as backup and contingency plans ready to use when risk occur.					
7.	Your Company has financial and non-financial incentives for those taking risks, manage it and maximize corporation's benefit.					
8.	Your Company openly communicate risk information,					
9.	Brainstorming/ informal meetings and discussions supported by different guidelines applied to identify risk.					
10.	Work breakdown structure (WBS) or bill items are inputs for risk identification					
11.	At your Company do you make transparent risk discussion with your team members, supervisors or stakeholders for informed risk taking?					
12.	At your Company employees don't hesitate to communicate mistakes and there is sufficient sharing of and learning from mistakes.					
13.	There is a well-developed strategy within the project to respond to risk					
14.	Factors such as budget, schedule and resources are considered while responding to risk					

**Part 2:** Questions about project risk management process

Indicate your opinion by marking '√' in the respective grid box corresponding to the number against the following five-point linguistic scale that best describes your perception about risk management practice of your company.

(1)=Strongly Disagree, (2)= Disagree (3)=uncertain, (4)=Agree and (5)= Strongly Agree

No	Question/Statements	(1)	(2)	(3)	(4)	(5)
15.	Risks are identified at initial stage of the project or early in the project.					
16.	There is lack of professionals to identify risks early					
17.	We use a structured and formal risk identification method.					
18.	There is a measurement system to analyze the risk					
19.	Project documents are updated after assessment of the risk that might occur					
20.	There is a well-developed strategy within the project to respond to risk					
21.	The Project monitor, control and review the process for risk management to ensure that it complies with standards and procedures.					
22.	Risks that occur within the project are controlled in a way that goes with the goal and objective of the project.					

**Part 3:**

3.1 Questions about construction insurance

23. Are you aware of the concept of insurance as construction risk management tool?

Yes  No

24. How do you define your level of understanding on importance of relevant construction insurance policies in construction project risk management?

Very low , Low , Fair , High , Very High ,

25. How do you measure the importance of insurance as risk transferring tool in building construction projects?

Very Important , Important , Less Important , Not Important ,

26. Do you consider construction insurance policies under your contract conditions in the selection of contracting parties to your projects?

Yes  No

27. Which one is the greatest challenge you face for being insured? (you can select more than one)

- A. Lack of awareness
- B. Complex insurance language
- C. High insurance premium
- D. Lack of claim responding ability by insurer
- E. Poor interaction with insurer
- F. Any other please list out \_\_\_\_\_

3.2 Among the following list of construction related insurance policies which are found from different sources of literature being marketed in different countries across the world please tick (√) on the

corresponding columns to indicate level of familiarity of the insurance policy Not at all familiar (1), Slightly familiar (2), Moderately familiar(3), Very familiar(4), and Extremely familiar (5)

S/N	Name of Insurance policy	(1)	(2)	(3)	(4)	(5)
28.	<i>Contractors' all risks (CAR)</i>					
29.	<i>Erection all risks (EAR)</i>					
30.	<i>Electronic Equipment Insurance</i>					
31.	<i>Machinery Breakdown Insurance</i>					
32.	<i>Boiler and Pressure Vessel Insurance</i>					
33.	<i>Professional Indemnity Insurance</i>					
34.	<i>Automobile Insurance</i>					
35.	<i>Worker's Compensation Insurance</i>					
36.	<i>Contractors Professional Liability</i>					
37.	<i>Bid bonds</i>					
38.	<i>Performance bonds</i>					
39.	<i>Goods in transit and Marine Insurance</i>					

**Part 4: Recommendation**

40. What are your overall suggestions on improving construction Insurance practices by parties in Ethiopian construction industry?

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41. Any other comments you wish to provide:

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*I sincerely appreciate your timely response and cooperation. Thank You!!*

## Appendix B : Transcripts of questions

No	Code	Question/Statements
1.	RMS1	Your Company has policies and procedures that require its workforce to go through disciplined risk planning, identification, assessment and risk response.
2.	RMS2	At your company risk analysis is an important step and prerequisite in significant decisions that may affect time, cost, quality, customer satisfaction or combination of them.
3.	RMS3	Your Company has identified key risk indicators: such as Design risks, Organizational risks, Project management risks, Right of way risks, Construction risks and Environmental risks
4.	RMS4	In your daily operations and decision-making do you check and take measures for things that could go wrong?
5.	RMS5	Project managers are accountable for delays, cost overruns and or property damages and poor quality of products.
6.	RMS6	Your Company's professionals have top management support in acquiring additional resources as backup and contingency plans ready to use when risk occur.
7.	RMS7	Your Company has financial and non-financial incentives for those taking risks, manage it and maximize corporation's benefit.
8.	RMS8	Your Company openly communicate risk information,
9.	RMS9	Brainstorming/ informal meetings and discussions supported by different guidelines applied to identify risk.
10.	RMS10	Work breakdown structure (WBS) or bill items are inputs for risk identification
11.	RMS11	At your Company do you make transparent risk discussion with your team members, supervisors or stakeholders for informed risk taking?
12.	RMS12	At your Company employees don't hesitate to communicate mistakes and there is sufficient sharing of and learning from mistakes.
13.	RMS13	There is a well-developed strategy within the project to respond to risk

14.	RMS14	Factors such as budget, schedule and resources are considered while responding to risk
15.	RMP1	Risks are identified at initial stage of the project or early in the project.
16.	RMP2	There is lack of professionals to identify risks early
17.	RMP3	We use a structured and formal risk identification method.
18.	RMP4	There is a measurement system to analyze the risk
19.	RMP5	Project documents are updated after assessment of the risk that might occur
20.	RMP6	There is a well-developed strategy within the project to respond to risk
21.	RMP7	The Project monitor, control and review the process for risk management to ensure that it complies with standards and procedures.
22.	RMP8	Risks that occur within the project are controlled in a way that goes with the goal and objective of the project.

**Appendix C: Main data analysis details output**

A. Different model for forecast

The following are different model that are significant but are not selected because they have lowest stationery R<sup>2</sup> value.

**Model Description**

			Model Type
Model ID	Accidental loss in birr of Sunshine	Model_1	ARIMA(1,1,0)(1,1,0)
	Accidental loss in birr of CCCC	Model_2	ARIMA(1,1,0)(1,1,0)

**Model Statistics**

Model	Number of Predictors	Model Fit statistics	Ljung-Box Q(18)			Number of Outliers
		Stationary R-squared	Statistics	DF	Sig.	
Accidental loss in birr of Sunshine -Model_1	0	.310	21.113	16	.174	0
Accidental loss in birr of CCCC-Model_2	0	.260	19.617	16	.238	0

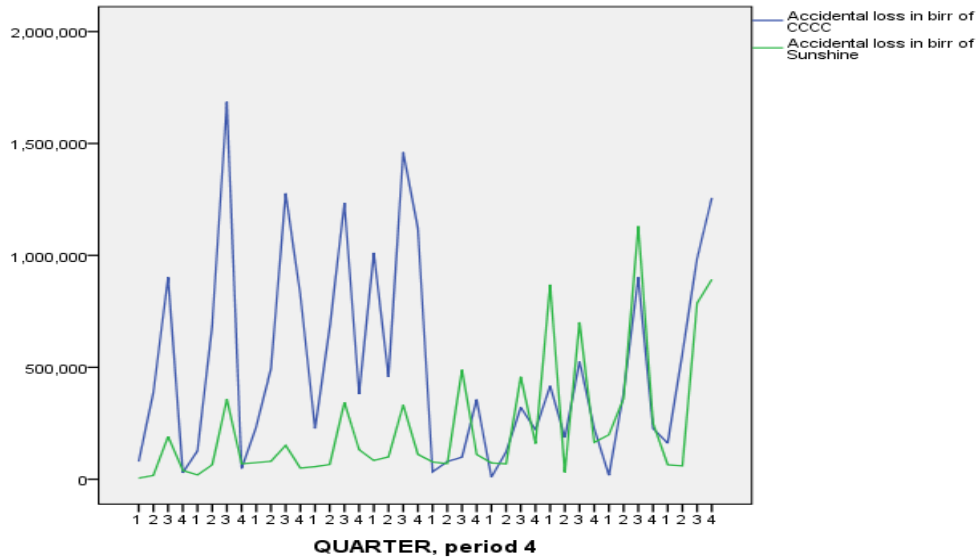
**Model Description**

			Model Type
Model ID	Accidental loss in birr of Sunshine	Model_1	ARIMA(0,0,0)(1,0,0)
	Accidental loss in birr of CCCC	Model_2	ARIMA(0,0,0)(1,0,0)

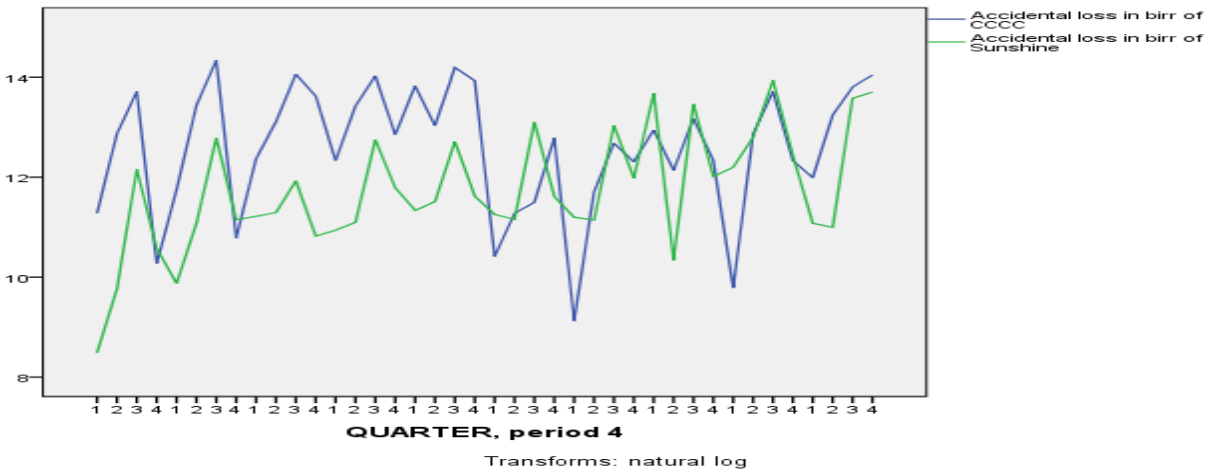
**Model Statistics**

Model	Number of Predictors	Model Fit statistics	Ljung-Box Q(18)			Number of Outliers
		Stationary R-squared	Statistics	DF	Sig.	
Accidental loss in birr of Sunshine -Model_1	0	.310	21.113	16	.174	0
Accidental loss in birr of CCCC-Model_2	0	.460	19.617	16	.238	0

B. Time plot for not stationary data



C. Transformed data by natural log – but still seasonality of the data not removed by this method of data transformation.



D. ANOVA assumption test  
Risk management system

**Tests of Normality**

	risk management system for CCCC and Sunshine	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
mean score of risk management system	CCCC	.216	13	.077	.807	13	.086
	Sunshine Construction	.150	11	.200*	.946	11	.495

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

**Test of Homogeneity of Variances**

mean score of risk management system

Levene Statistic	df1	df2	Sig.
.836	1	22	.083

Risk management process

**Tests of Normality**

	for CCCC and Sunshine	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
mean score of risk management process	CCCC	.275	13	.076	.896	13	.264
	Sunshine	.239	11	.200*	.899	11	.283

\*. This is a lower bound of the true significance.

Lilliefors Significance Correction

Familiarity levels with various insurance policies

**Test of Homogeneity of Variances**

mean score of risk management process

Levene Statistic	df1	df2	Sig.
.043	1	22	.840

**Tests of Normality**

	Familiarity levels with various insurance policies	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Mean Score of Familiarity levels with various insurance policies	CCCC	.219	13	.090	.860	13	.079
	Sunshine	.255	11	.064	.815	11	.055

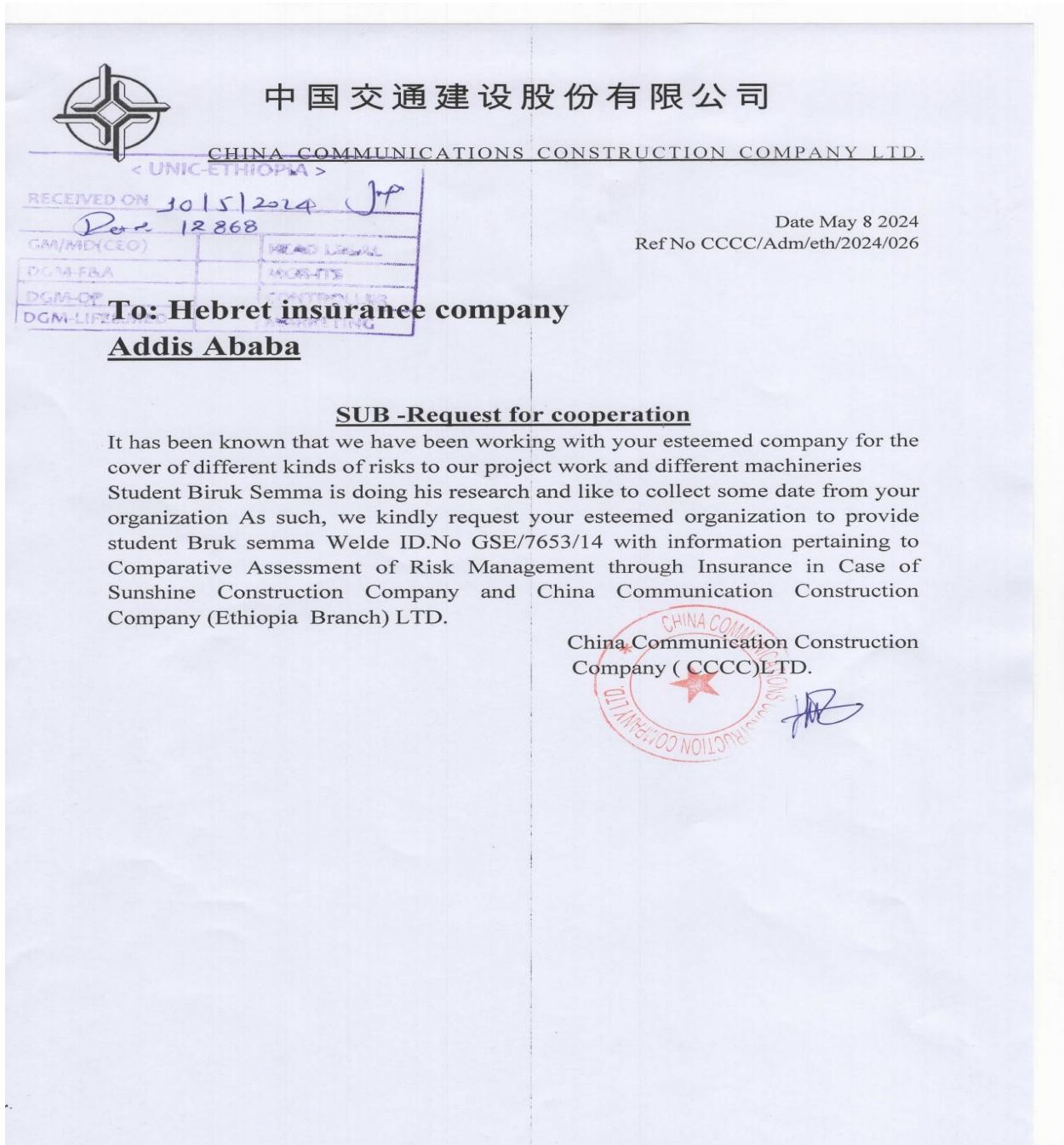
a. Lilliefors Significance Correction

**Test of Homogeneity of Variances**

Mean Score of Familiarity levels with various insurance policies

Levene Statistic	df1	df2	Sig.
.235	1	22	.633

**Appendix D: Permission letter to use secondary data**





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Ref. አኃጣጫ/ጋ.የተ.የግ.ማ/21/03/41/16

Date 02/09/2016

ለትብብር ኢንቨስትመንት አ/ማ  
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DGM-OT	CONSTRUCTION
DGM-INT&MED	ACCOUNTING

ጉዳዩ:- ትብብር ስለመጠየቅ

አቶ ብሩክ ሰማ ወልዴ የአዲስ አበባ ዩንቨርሲቲ በቢዝነስና ኢኮኖሚክስ ኮሌጅ የፕሮጀክት ማኔጅመንት ተማሪ የመመረቁያ ዕውቅና የሚሆን መረጃ (secondary data) እንዲያገኙ የትብብር ደብዳቤ እንድንሰጣቸው ጠይቀዋል።

በመሆኑም ድርጅታችንን በሚመለከት የሚፈልጉትን መረጃ እንዲሰጣቸውና አስፈላጊውን ትብብር እንድደረግላቸው በአክብሮት እንጠይቃለን።

ከሠላምታ ጋር

  
 ገዢ ተብታ  
 የፋይናንስ ማኅሪያ  
 ሥራ አስኪያጅ

