



Addis Ababa University

College of Business and Economics

School of Commerce

**Risk Factors affecting construction project
performance: The case of Residential real Estate
Development Projects in Flintstone**

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AUGUST 2023

Addis Ababa, Ethiopia



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A Thesis Submitted to the School of Post Graduate Studies Presented in Partial Fulfilment of the Requirements for the Degree of MA in project management.

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August 2023

Declaration

I, **Bitanya Shiferaw**, the under signed, declare that this thesis entitled “Risk Factors affecting construction project performance: The case of Residential real estate development projects in Flintstone”. I have undertaken the research work independently with the guidance and support of the research supervisor. This study has not been submitted for any degree or diploma program in this or any other institution and all sources of materials used for the thesis has been duly acknowledged.

Name of Student	Signature	Date
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This is to certify that the thesis entitled "Risk Factors affecting construction project performance: The case of Residential real estate development projects in Flintstone " was submitted in partial fulfilment of the requirements for the degree of masters of project management of the Postgraduate Studies, Addis Ababa university and a record of original research carried out by **Bitanya Shiferaw**(ID/GSR/7098/14), under my supervision, and no part of the thesis has been submitted for any other degree or diploma. The assistance and help received during the course of this investigation have been duly acknowledged. Therefore, I recommend that it should be accepted as fulfilling the thesis requirements.

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Certificate of Approval

This is to certify that the thesis prepared by **Bitanya Shiferaw**, entitled “Risk Factors affecting construction project performance: The case of Residential real estate development projects in Flintstone” is submitted in partial fulfilment of the requirements for the project management with the regulations of the University and meets the accepted standards with respect to originality and quality.

Signature of Board of Examiner`s:

_____ Advisor	_____ Signature	_____ Date
_____ Internal examiner	_____ Signature	_____ Date
_____ External examiner	_____ Signature	_____ Date

ACKNOWLEDGMENT

In the First place; the glory, grace and thanks are going to the Almighty God with his holy mother, Saint Mary! Thank you my lord! Then, I would like to express my gratitude and appreciation to the following individuals who have contributed to the completion of this research paper:

First and foremost, I would like to thank my research advisor, **Dr Zegeye Muluye**, for his invaluable guidance, support, and encouragement throughout the course of this project. His expertise in the field and his insightful feedback have been instrumental in shaping this paper.

I would also like to extend my thanks to the participants of this study, without whom this research would not have been possible. Their willingness to share their time, experiences, and insights has been crucial to the success of this study.

Additionally, I would like to acknowledge the support, love and inspiration provided by my dear Husband and my 3 beautiful children. Thank you!

Finally, I would like to thank my whole family and friends for their unwavering support and encouragement, especially during the challenging moments of this project. Their love and encouragement have been a constant source of inspiration and motivation.

Thank you all for your contributions to this research paper.

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Abbreviations

(APM) Association for Project Management

(BP) British Petroleum

(BTCPA) British Town and Country Planning Act

(CAS) Casualty Actuarial Society

(CEM) Control Effective Matrix

(COSO) Committee of Sponsoring Organizations

(ERM) Enterprise Risk Management

(IP) Investigation Panel

(KPI) key performance indicator

(MLR) Multiple Linear Regression

(PRA) Project Risk Analysis

(PRM) Project Risk Management

(RBS) Risk Breakdown Structure

(PMBOK) Project Management Body of Knowledge

(RMD) Risk Management Department

(SPSS) statistical package for social sciences

(TRM) Traditional Risk Management

ABSTRACT

Real estate development is considered as one of the sectors with transaction of billions of Birr in the market in Ethiopia. Real estate contributes to the economy of the country and in alleviating housing problems. However, real estate development in the country is facing different problems. Problems that exist in the real estate development make the business environment susceptible to uncertainty. This paper is aimed at identifying and examining the risk factors affecting construction project performance of residential real estate development projects and their impact on it.. Both primary and secondary data were used in the study. The primary data was collected through questionnaires and informal preliminary interviews. The annual reports, manuals, directives, and procedures issued by the real estate were used as secondary data sources. To define and select the population of the study, random sampling method was employed for this research. It has one dependent and four independent variables, which are the project performance, finance and Economy risk, Contractual and legal risk, resource risk and design risk, respectively. The design and approaches of the research is explanatory and quantitative. The researcher distributed 133 questionnaires and collected 124 samples from the entire population by using random sampling (stratified) and descriptive & inferential data analysis methods. The study's findings revealed that all predictors have a significant relationship with project performance. This study's findings indicate that the four identified independent factors affect project performance by 69.8 percent. For improvement purpose, the researcher recommended that Flintstone Company should work towards minimizing the probability of occurrence of these factors. Developers are recommended to continuously identify and analyze possible risks to cope with the dynamic nature of the business and such projects, so that they could successfully deliver housing units to their clients.

Key words: *project performance, Real estate, Risk, Risk analysis, Risk identification*

CHAPTER ONE

1. INTRODUCTION

This chapter includes some historical information about real estate construction industry due to the necessity of such information to the subject of this thesis. In addition, the chapter contains necessary definitions; background of the research, objectives of the study, problem statements, research questions, organization of researches and its boundaries.

1.1 Background of the Study

Every human endeavor carries danger in life. Risk is by its very nature a source of worry since it is unclear and unpredictable, yet in order for life to be fascinating, one must accept the challenge. Success or failure is possible, even though the degree of failure is proportionate and cannot be precisely defined (Dey and Ogunlana, 2004).

Real estate project evaluation necessitates understanding the planning and construction phases as well as current management practices. Construction projects have predetermined objectives, constraints, and a completion date. These are expensive projects, therefore many people try to cut costs by being penny-wise and pound-foolish.

Construction work involves constant change, the majority of projects fall short of their budget, schedule, and quality goals, and the sector is regarded as one of the riskiest to work in. Regrettably, few researchers have contributed to this topic's discussion of the local construction market. In this study, risk variables affecting the building sector in flint stone real estate has been analyzed. Engineers may, however, enhance the efficient management of this transformation by using the risk management concepts. Each of the three key targets for construction projects cost, time, quality and scope is likely to be vulnerable to risk and uncertainty. Many people complicate projects by trying to make changes at the lowest possible cost. Construction projects might be jeopardized by a lack of risk analysis and management, or even by a risk analysis that is insufficient.

In Ethiopia, the development of real estate is one of the industries with the highest dollar volume of trade. The construction of homes in Ethiopia has attracted a lot of investors. 124 investors acquired business licenses to operate in the Addis Ababa City Administration Land Management and Construction Licensing Authority's records for the 2011/2012 fiscal year. Development of residential real estate helps solve the nation's housing crisis and boosts the economy. The real estate development sector, particularly in Addis Ababa, suffers a variety of issues and difficulties, according to studies on Ethiopian real estate. The real estate development industry has issues, which makes the climate insecure. (Eshete and Teshome, 2015)

Risk exists in an unpredictable environment, and compared to many other industries, the construction sector is more vulnerable to risks because of the distinctive characteristics of building activities (Akintoye & Macleod, 1997; Flanagan & Norman, 1993; Smith, 2003). Risk in construction projects can be characterized as the probability that something bad will happen to the project. The most significant risks in construction are those associated with not meeting the aims because they are typically articulated as goals for function, cost, time, and quality (Baloi & Price, 2003).

Like any other type of building or business venture, real estate development initiatives are not without risks and uncertainties. These risks and uncertainties have the potential to significantly impact all associated developments across the full lifecycle of assets (Chen & Khumpaisal, 2009). Nevertheless, risks aren't always linked to bad things happening (Baloi & Price, 2003). For any business enterprises working in the current climate, where risks are inherent (Groton, Smith, & Risk Allocation Subcommittee, 2010; Mead, 2007; Wiegmann, 2012), risk management has become increasingly crucial (Mead, 2007). Identification, comprehension, anticipation, assessment, analysis, and learning how to handle risks are crucial (Groton et al., 2010; Wiegmann, 2012). "In complex economic and contractual situations, failure to appropriately identify and make adequate authorization being assumed can have terrible implications." (Mead, 2007)

Risk analysis establishes the likelihood of bad events occurring and evaluates the potential impact of risk event outcomes as part of the risk management process (Edwards & Bowen, 1998) Real estate developers must manage risks to reduce their effects on project goals and their overall business. Risks that are present in the real estate development industry have an impact. It's critical to understand the risks that real estate development projects face and how they affect the goals of the project.

1.2 Statement of the Problem

Understanding risk and doing a risk analysis are crucial, but there hasn't been much research done on the subject. Project objectives, such as meeting deadlines, costs, scope, and quality expectations, are all impacted by risks.

Most construction organizations struggle to plan for uncertain projects and achieve the three project requirements of schedule, money, and quality because they don't do risk analyses. These three issues are serious ones that have a big impact on how trustworthy developers are. Many influencing elements that are present in the real estate development industry may be the root of these issues.

By identifying the reasons and making plans to reduce the risks associated with the factors, it is possible to reduce the uncertainty the factors produce. Very little is known about the risk management procedures used in projects; even among studies that focused on projects, it is difficult to locate studies centered on the real estate sector. Finding the best research papers on risk analysis in real estate development projects in Ethiopia based on schedule, cost, and quality becomes rather challenging as a result. Consequently, the purpose of this study is to investigate the risks associated with real estate development projects in Addis Ababa specifically Flintstone and their effects on project quality, cost and schedule. By their very nature, projects are distinct and many of the interesting ones are also complicated they usually require the commitment of several resources, including people, money, facilities, materials, and intellectual property, over a lengthy period of time. Most projects have specified goals or an end result that gives everyone participating in the project a clear understanding of their intended outcome.

The significance of understanding risk analysis principles in real estate will be highlighted. Research specifically addressing risk assessment approaches in real estate development is relatively rare, despite the fact that there is a wealth of literature on risk and general risk analysis and a dearth of empirical data on risk for real estate development projects (Graaskamp, 1977). Understanding the three investment decision making limitations (time, money, and quality) is essential for real estate development projects.

Residential real estate development projects face a multitude of risk factors that can adversely affect their performance, leading to delays, cost overruns, reduced quality, and overall project failure. The statement of the problem encompasses the analysis of these risk factors, their potential impacts, and the need for effective risk management strategies in the construction industry.

1.3. Research Questions

Based on the statement of the problem, the Research questions has formulated as follows.

1. How much influence do the independent variables have on project performance?
2. Which risk factor have a greater impact on project performance of the selected developer site?
3. Which Risk factor is strongly correlated with project performance?

1.4 Objectives of the Study

1.4.1 General Objective

The Objective of this study is to analyze the risk factors that affect the construction project performance in the case of residential real estate development projects.

1.4.2 Specific Objectives

The specific objectives are list below.

1. Assess and analyze the influence of the independent variables on project performance.
2. Analyze and Rank the risk factors according to their impact on project performance of the selected site.
3. Assess the strength of the correlation among risk factors with project performance.

1.5 Research Hypothesis

This section deals with the formulation of the research hypothesis that will help to achieve the objectives of the study. These are;

H₁₀: Financial risk factor does not have a significant effect on project performance.

H_{1A}: Financial risk factor do have a significant effect on project performance.

H₂₀: contractual and legislation risk factor does not have a significant effect on project performance.

H_{2A}: Contractual and legislation risk factor do have a significant effect on project performance.

H₃₀: Resource risk factor does not have a significant effect on project performance.

H_{3a}: Resource risk factor do have a significant effect on project performance.

H₄₀: Design risk factor does not have a significant effect on project performance.

H_{4A}: Design risk factor do have a significant effect on project performance.

1.6 Significance of the Research

In Ethiopia, real estate development as a commercial venture has only been around for about 25 years, and the sector is currently facing a number of challenges due to various causes. Real estate development risks have a negative impact on initiatives, so they cannot be completely ignored. For real estate developers, having pertinent knowledge about project risks is crucial. Therefore, by providing a more comprehensive understanding of risks and their effect on project objectives, particularly on cost, schedule, and quality, this study is significant because it will provide insights into the risk factors that affect the construction project performance. in the case of residential real estate development projects. The findings of the study will be useful for

project managers, contractors and other stakeholders involved in residential real estate development projects, as they can use the information to identify and mitigate risks and improve project performance. The study will also contribute to the body of knowledge on risk management in construction projects.

1.7 Scope of the Research

This research focuses on identifying Risk factors that affect the construction project performance of residential real estate development projects. The study has a limited geographic scope because it solely considers Ethiopia and its capital city Addis Ababa particularly focuses on a single construction company, Flintstone Engineering plc. In reality, the organization under evaluation has projects and project offices spread around the nation, the study is only restricted to the main office. Even though researching other construction companies might boost the accuracy of the results, the period prevented the researcher from doing so.

1.8. Limitation of the research

As we know, when the number of sample is increased, the relevancy of the research also increase; so the researcher believe that the number of sample and data collection area are not more adequate.

1.9 Definition of key terms

1. Project performance: The overall measurement of whether a project has met objectives and requirements of quality, scope, cost, and schedule.
2. Real Estate: Real estate is a form of real property, meaning that it is something you own that is attached to a piece of land. It can be used for residential, commercial or industrial purposes, and typically includes any resources on the land such as water or minerals.
3. Risk: the possibility of events that may affect the outcome of a project's objectives.
4. Risk identification: Risk identification (RI) is a set of activities that detect, describe and catalog all potential risks to assets and processes that could have negatively impact business outcomes in terms of performance, quality, damage, loss or reputation.

5. Risk analysis: Risk analysis is the process of identifying and analyzing potential issues that could negatively impact key business initiatives or projects. This process is done in order to help organizations avoid or mitigate those risks.

Source: <https://www.google.com>, encyclopedia and Webster dictionary

1.10 Organization of the Research

This thesis is divided into five chapters. Chapter one is about an introduction of the research. Chapter Two is the review of a previous related research works. Chapter Three presents design of the research, and the methods apply for data collection and analysis. Chapter Four covers results of the analysis and discussion. Finally, last chapter covers the major findings, conclusions and recommendations of the research.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

By evaluating the existing theoretical and empirical literatures, this chapter has offer insightful analysis into the idea of risk management. In the chapter, the real estate sector has been introduced. This will make it easier to choose the optimal strategy and methodology for investigating risk management techniques.

2.1 Theoretical Background

The deep horizon disaster in the Gulf of Mexico, also known as the Macon do blowout, which occurred in 2010 by British Petroleum (BP) ships as a result of poor risk management, serve as a practical illustration of the significance of risk management. The offshore oil well accident was largely caused by these failures. The decisions taken by BP to save money and time without taking any precautions or mitigating measures, according to the inquiry panel (IP), were another element that contributed to the disaster. Furthermore, BP did not see the need for such assessments because the chances of them happening were so slim. Eleven people died and several more were injured when the offshore rig caught fire after the blast (Azwell et al. 2011). As a result, the Gulf of Mexico received over five million barrels of oil, which led to more environmental catastrophes.

Following the Macon do Disaster, BP implemented new assessment procedures that were more stringent, involved recognizing the threats they faced, and included more checks and balances to prevent future tragedies (Azwell et al., 2011).

In 2100 BC, the idea of risk management first evolved as a means of insurance for situations where ships and their cargo were lost at sea. This practice persisted up until the 1960s and 1970s, when insurers promoted the adoption of safety measures at work to lower the number of claims made, thereby lowering their potential losses. This period is known as the "first age of risk management" (Sad grove, 2015: 1).

The development and application of quality assurance, through which businesses verified that products complied to their specifications and possible risk was addressed more proactively, ushered in the second age of risk management during the 1970s and 1980s. He reviewed policies put in place by governments that backed these measures and fervently urged firms to address hazards posed to employees and customers.

In addition, during the 1980s, environmental problems started to become more apparent. The first universal risk management standard, AS/NZS 4360:1995, was presented by Standards Australia in 1995, ushering in the third age of risk management. The Canadian standard, CAN/CSA-Q850-97, was introduced shortly after. These rules broadened the definition of typical business hazards in order to address issues with entrepreneurial risks. Razali & Tahir, (2011) examined how Project Risk Analyzes were established by many authors for enterprises and how Enterprise Risk Management (ERM) varies from Traditional Risk Management (TRM).

Beginning with the definition of ERM given by the Casualty Actuarial Society (2003), which is to increase the "organization's short and long term value to its stakeholders" by evaluating, controlling, exploiting, funding, and monitoring the risks of every department within the company (Razali & Tahir, 2011:1). To maximize a firm's value, ERM, on the other hand, is characterized by (Lam, 2000) as an integration of controlling risks on various fronts, including: credit, market, operational, economical, and transfer. ERM is a strategy for the entire firm to manage risk and consolidate information "according to the risk exposures," according to Alvinunessen and Jankensgard (2009a) (Razali & Tahir, 2011:1).

The management team may go further to assess the possibility and impact of the risk based on the firm's aim if the risk influencing future cash flow and the entity of the company was recognized (Alvinunessen & Jankensgard, 2009). A comprehensive Framework was created by the Committee of Sponsoring Organizations of the Tread-way Commission (COSO) to assist businesses in improving their risk management systems (Connell, 2005). Also, this framework was extensively adopted by many corporations and it gained credibility after proving successful thanks to the promotion it received from worldwide auditing and accounting firms when it was

formed in the 1990s. "A process affected by an entity's board of directors, management, and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risks to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives," is how COSO defines enterprise risk management (ERM) (COSO, 2004; Connell, 2005:2). The COSO and other frameworks can be compared, and while there are many similarities, there are notable variances in the PRA components. Also, the COSO framework primarily places more responsibility on the shareholders, calling for their cooperation and active participation in the PRA process (rims, 2011:8).

Nevertheless, (rims, 2011) criticized the COSO framework for not pursuing various activities, such as "root cause analysis or business resiliency and sustainability." Due to these shortcomings in the framework, businesses adopting the COSO must take into account extra risk management strategies in order to recognize and fill in the framework's holes.

2.2 Project Risk Analysis and Management

Risk has been defined in a number of different ways in the literature we have reviewed. The drawback of risk is that its negative features, such as losses or damages, have been highlighted in most definitions (Schieg, 2006). According to several authors (including Hillson (2002), Khedekar & Dhawale (2015), P. Simon & Newland (1997), Teneyuca (2001), Wiegelmann (2012), and Zhang, Zhang, & Gao (2006), this notion of risk, which stresses its negative features, is a classic one. Uncertainties may help people achieve their aims, according to several literary works. These publications include El, El Nawawy, & Abdel-Alim (2015) and A. Faridi & El-Sayegh (2006). Risk and uncertainty may be used interchangeably in some literary works. However, risk is defined by the PMBOK in terms of uncertainty; risk arises from the ambiguity that occurs in every project.

These two occurrences are not equivalent, claims PMI (2013). "Project risk" is defined as "an uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives, such as scope, schedule, cost, and quality." Therefore, a definition of risk

that is restricted to the risk of loss falls short of the understanding of a risk concept that is now in use (Duncan, 2002). The concept of risk is sometimes restricted to being a "downside risk" because only losses constitute a significant threat to an enterprise's ability to continue operating. As a result, the possibility of a positive difference between the actual worth and the anticipated value (such as a profit), can be referred to as an opportunity or upside potential (Lewin, 2001). Therefore, a chance or upside potential can be used to describe the potential for a positive difference between the actual value and the anticipated value (such as a profit) (Lewin, 2001).

The Royal Institute of Chartered Surveyors (2003) stated that there is "Uncertainty of consequence, whether positive opportunity or negative threat" when deviating from a predetermined aim. According to VAUGHAM (1996), p. 8, risk is a situation where there is a probability that a desirable outcome will not occur as expected. The original definition of risk in the Australian/New Zealand Standard for Risk Management (AS/NZ 4360, 2004) was "the probability of something occurring that has an impact on your objectives. "An illustration of a more inclusive concept of risk is this. It presents the chance to gain or lose money. It is evaluated in terms of probability and effects. The 2009 adoption of the international framework by the new Australian/New Zealand Standard for Risk Management, known as AS/NZS/ISO 3100, defined risk as "the influence of uncertainty on objectives." Dickinson (2001, p. 361) states that "Enterprise risk is the extent to which the outcomes from an organization's business strategy may differ from those defined in its corporate objectives, or the extent to which these objectives are not met." Both positive and negative departures from the anticipated result are feasible based on the essential definitions.

The possibility of either a positive or negative deviation contains a risk in the broadest sense, with the positive divergence giving an opportunity (Hommel / Lehmann, 2002). Prospective negative deviations are commonly described as hazards in the strictest sense. Usually, a positive deviation entails exceeding the initial projections.

Another area where ambiguity exists is in the comparison of risk and uncertainty.

Several academic sources, most notably Byrne/Cadman, 1984; Hargitay/Yu, 1993; Pellat, 197

2; and Whipple, 1988, provide definitions and discussions of risk and uncertainty with application to real estate development.

Showcase a qualitative spectrum that runs across the range from total certainty to ambiguity. It suggests that if all possible outcomes could be defined and the possibility of occurrence could be determined, there wouldn't be any ambiguity. Even if this perspective were able to identify all possible outcomes and assess their relative likelihood of occurring, it would still be impossible to foretell which of the future events or outcomes will actually take place. Future occurrences are never assured. If the future was certain, there would be no risk.

2.2.1 Project Risk Management

A project is a transient, unique, and time limited piece of work that frequently necessitates completing a number of activities in order to achieve set goals (PMI, 2018). To carry out those efforts, numerous stakeholders from diverse organizations headquartered in various places frequently work together. Every undertaking, no matter how simple or complex, little or vast, faces several uncertainties. This uncertainty, known as project risk, is crucial in determining whether a project will succeed or fail. Hillson (2002) asserts that risk is mostly related to unfavorable events that occur during a project, however the Association for Project Management (APM) and the Project Management Institute (PMI) contend that risk can have both positive and bad consequences. "An uncertain occurrence or circumstance that, if it occurs, has a positive or negative effect on at least one project objective, such as time, cost, scope, or quality," according to the definition of project risk.

(PMI 2016) Project risk is defined as an unknown event or collection of circumstances that, if they materialize, will have an impact on the accomplishment of one or more objectives. (APM 2012) We can conclude from these two definitions that project risk is an unknown phenomenon that has the potential to affect a project's result. Thus, project risk management is crucial, especially for large or complicated projects, to ensure that project risk generates the fewest adverse effects. Numerous earlier studies have found an association between poor risk management and project failure. Numerous earlier works agree that ineffective risk management

in unsuccessful projects is closely related to project failure (Flyvbjerg et al., 2003, Sharma et al., 2011, Kutsch et al., 2011).

Several authors use different definitions of risk management. Risk management is a systematic method of addressing risk, according to (Edwards and Bowen, 1998; El et al., 2015). Risk management is "a systematic approach of looking at areas of risk and actively selecting how each should be managed," according to (T.Uher, 2003). It is a management tool that tries to locate risk and uncertainty sources, evaluate their effects, and provide effective management solutions.

Another definition of risk management is the scientific method of recognizing, foreseeing, and reducing potential negative effects on projects (Koirala, 2014). In the literature we evaluated, risk management is also described as a process. To mention a few, (Koirala, 2014) described risk management as a collection of procedures for project monitoring and control, risk identification, risk analysis, and response planning. Risk management is described as a systematic process of identifying, analyzing, and responding to project risk by (Thompson and Perry, 1992; El et al., 2015). It entails maximizing the probability and consequences of positive attributes and minimizing the probability and consequences of attributes harmful to project objectives. The establishment of context, risk identification, risk analysis, risk evaluation, and risk response are the typical steps in a risk management process (Berkeley, Humphreys, & Thomas, 1991; Edwards & Bowen, 1998; Flanagan & Norman, 1993; Lam et al., 2007; Lyons, 2003; Perry & Hayes, 1985; Uff & Odams, 1995; Wiegmann, 2012; Wysocki, 2011).

It creates a plan for preventing losses, utilizing opportunities that may be present or, more accurately, opportunities that may result from risks, and influencing risk-taking decisions (Baloi & Price, 2003; Edwards & Bowen, 1998; Flanagan & Norman, 1993; Raftery, 1994; Schieg, 2006). This entails identifying potential threats, avoiding or lessening the effects of such threats, as well as exploiting opportunities that may present themselves (Mead, 2007; Schieg, 2006).

According to (Zavadskas, Turskis, and Tamoaitiene, 2010), risk management is the process of defining sources of uncertainty (risk identification), estimating the consequences of uncertain events/conditions (risk analysis), and developing response strategies in light of expected

Outcomes. Finally, based on feedback received on actual outcomes and risks that emerged, repeating the identification, analysis, and response generation steps throughout the process. The project management processes are included in any or all of the PMI knowledge areas individually.

Project risk management, for instance, entails (PMI, 2008):

A. Risk management planning;

B. Risk identification;

C. Risk analysis;

D. Risk response planning;

E. Risk monitoring and control.

A. Risk Management Planning

Risk management planning is a process of defining how to conduct risk management activities for a project. It is a very important process for the success of a project and therefore, the process should begin as a project is conceived and should be completed during project planning (PMI, 2013).

B. Risk Identification

This is the first stage in a risk management process. Many people believe that it is the most important stage in this process, because if you don't know the risk, you cannot react efficiently;

meaning, either to take the necessary actions in order to deal sufficiently with the threat, or to exploit the opportunity. The goal of the risk identification is to identify exhaustively all significant sources of risk in a project, as well as the causes of them (Bing, Tiong and Chow, 1999). Simply speaking, risk identification is trying to identify “causes and effects” (what could happen and what would be next) or the reverse, “effects and causes” (what outcomes must be avoided or encouraged). The process by which risk identification is accomplished is varied between organizations but usually include one or more of the followings: interviews, brainstorming session’s into risk teams, site visits and a large volume of data from previous experience (Akintola and Malcolm, 1997). The risk catalog contains all risks that company has faced in the past, as well, may be presented in the future. In particularly developed organizations, it is possible to meet the methods of confrontation that were used when they had dealt with risk, as also the outcomes of their actions.

As we have already mentioned, the risks and the actions are not the same for each project, because every project is unique and a construction company is a dynamic sector, where new risks can be emerged from every project at any time. So, the reliability of those risk catalogs depends direct on how often they update the existent databases. For this reason, it is very important, the risk identification process to be performed throughout the whole project life cycle (Heerkens, 2002). In the process of risk identification in a project, it is necessary to analyze the different sources of risks present in a project, as well as the different classification of risks. The results of risk identification methods are usually some unstructured lists of dangers, having any relation with the project. In these lists, the potential risks appeared isolated, out of any frame and they don’t give the general picture of threats within the project. Such creation of lists will make it easier for the risk manager to visualize risks and to deal with them in a systematic way (Ding, 1996). It is proposed that the risk factors can be categorized in three main groups:

A. Internal-risks means things that the project team can control or influence, such as scope of the project, resource assignments, and production costs, etc.

B. Project- specific risks means unexpected things during the construction project that leads to time or cost overrunning or in lower level in performance.

C. External risks means things that are beyond the control of the project team, such as financial, government actions. (Baloi and Price, 2003)

(Dubois and Gadde, 2001) found that complexity in construction projects emerged from two basic sources: independence of tasks and uncertainty. Uncertainty has four main sources:

- I. Unfamiliar management with local policy and environment,
- ii. Lack of detailed specifications about the tasks at the construction site,
- iii. Lack of uniformity of materials, work and teams and
- Iv. Unpredictability of environment.

The most characteristic paradigm of a structured risk allocation is the Risk breakdown Structure (RBS). The RBS defines as a hierarchical structure of risk sources in a project, in which every lower level of it contains a specific risk group (Hillson, 2002). It is an open, flexible and easily updatable structure, in which all types of risks can be classified and categorized, and finally helps the risk grouping for better cause-effect determination.

C. Risk Analysis

Risk analysis is the systematic assessment of decision variables which are subject to risk and uncertainty. Risk analysis aims at taking the inherent uncertainty of costs (or duration) of individual activities or elements within a project when assessing the anticipated final cost of a particular scheme. This enables the project director to evaluate the likelihood of meeting budget or time limits (Mack, 1995). It comprises the establishment of probabilities of occurrence of adverse events; the setting of assumptive bounds to associated uncertainties; and the measurement of the potential impact of risk event outcomes (Edwards & Bowen, 1998) in a qualitative or in a quantitative way (Gehner, Halman, & de Jonge, 2006).

D. Risk Response

Risk can be transferred, accepted, managed, minimized, or shared, but cannot be ignored (Latham, 1994). Risk response is a process of developing options an action to enhance opportunities and to reduce threats to project objectives (PMI, 2013). It aims at deciding whether or not to accept the total of risks in a project. One can take measures to risk according to the four general types of risk response: avoidance, reduction, transfer, and acceptance of a risk (Gehner et al., 2006).The decision is based on the willingness to knowingly take risks (M. Simon, Houghton, & Aquino, 2000). According to (Chapman, 1997), mitigating actions are normally based on classical approaches such as: risk avoidance/ mitigation, risks haring, risk transfer or risk acceptance providing a suitable contingency. Once risk is accepted, there are three main approaches for risk allocation, to retain the risk, transfer it or share it (Alsalman, 2012).

The risk mitigation actions are discussed here below.

- i. Risk avoidance
- ii. Risk reduction
- iii. Risk transfer
- iv. Risk retention

i. Risk avoidance

Where the risk assessment determines that particular risk position significantly exceed the limits of the risk strategy, risk control must be intensified. The most radical form of risk management is risk avoidance, which prevents any risks from materializing by reducing their likelihood to nil. Given an existing risk, risk avoidance implies the intentional exclusion of potential opportunities (HALLER, 1986). Therefore, risk avoidance will generally apply only where a

risk represents a significant exposure potential when using alternative management measures and if it exceeds the risk appetite of an organization (FÜRER, 1990; LASTER, 1999a).

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ii. Risk reduction

Risk reduction is the prevention or limitation of loss by decreasing the likelihood of a disturbance occurring and its significance is called risk reduction (Haller, 1986). Risk reduction measures are called reactive measures. They are for risks that do not appear suddenly, which rather emerge over a period of time. Risk reduction measures may be taken even after the risk has materialized (Wiegelmann, 2012).

For risks that do not appear suddenly, but rather emerge over a period of time, risk-reducing measures (so called reactive measures) may be taken even after the risk has materialized.

Another form of risk reduction is risk diversification whereby a single risk is disaggregated into several individual risks, which should, where possible, not be positively correlated (LASTER, 1999a).

iii. Risk transfer

Risk transfer is an action of transferring business implications of risks to external risk bearers (Laster, 1999). It does not eliminate the cause of risk but only passes the implications of risks onto third parties. Risk transfer can also be done by spreading the implications across multiple partners, with not only the risk but also the profit being shared among the partners or by entirely; transferring the risk to third parties entirely (Wiegelmann, 2012). The shifting of risk is the safest type of risk management; however, it is associated with relatively high costs and limited

applicability. Certain risks, for example, may be transferred to suppliers or customers by way of contractual arrangements (Wiegelmann, 2012). Contractual exclusions, limitations of liability, indemnity clauses, risk transference, guarantees, performance bonds and insertion of a risk premium are within mitigation strategies particularly risk transference (Mead, 2007).

In the case of risk transfer, an organization transfers the business implications of risks to external risk bearers (LASTER, 1999a). In principle, this strategy does not eliminate the cause of risk but merely passes the implications of risks on to third parties. On the one hand, the risk can be spread across multiple partners, with not only the risk but also the profit being shared among the partners; alternatively it is possible to transfer risk to third parties entirely: The shifting of risk is the safest type of risk management; however, it is associated with relatively high costs and limited applicability. Certain risks, for example, may be transferred to suppliers or customers by way of contractual arrangements

iv. Risk retention/accept risk

Risk retention involves a voluntary and involuntary assumption of possible risk implications (Laster, 1999). Relevant risks and their possible impact on the investment decision are deliberately accepted with the risk appetite of the investor being taken into consideration (Wiegelmann, 2012).

E. Risk Monitoring and Control

Risk monitoring is a process examining to what extent operation adheres to the planned standards across all units and functions. It determines whether the established goals have been met, risk management complies with risk policy, the organization is efficiently designed and a corresponding risk culture is in place, and whether responsibilities have been clearly defined. It is done by gathering and analyzing data through key indicator analysis and benchmark comparisons, among others, and reported both internally to the responsible functions and externally to its stakeholders (Wiegelmann, 2012).

Risk control is intended to actively influence the risks identified and assessed in order to manage all significant loss exposures through the targeted use of risk management measures (Wiegelmann, 2012). It is a process of implementing risk response (PMI, 2013).

The goal of risk monitoring is to examine to what extent operating processes adhere to the planned standards. In the monitoring phase, the primary focus is on evaluating the risk management process across all units and functions. Risk monitoring is multi-tiered and is primarily intended to determine whether

- ❖ The established goals have been met,
- ❖ Risk management complies with risk policy;
- ❖ The organization is efficiently designed and a corresponding risk culture is in place, and whether
- ❖ Responsibilities have been clearly defined.

Risk monitoring consists of two core elements: control and reporting. During the control stage, risk management data are gathered and analyzed through key indicator analysis and benchmark comparisons, among others, and reported both internally to the responsible functions and externally to its stakeholders. Controls are generally related to operational or strategic aspects. While operational controls monitor the achievement of predefined targets, thereby performing a corrective function, strategic controls perform an anticipatory function in support of planning. The major risk control tools are systematic key indicator comparisons in the form of period, cross-section and target-to-actual comparisons. This tests the risk position of the organization at a specific point in time. In this connection, value-at-risk is increasingly used as a control. These tools represent a major contribution to the mapping of the risk position.

A risk management system must be adequately documented and the safeguards and control measures that have been adopted must be recorded in a summary report. This documentation

serves not only to protect internal and external confidence but, in a loss event, is also considered important proof that a risk management system was created, that corporate risk management was improved and that the necessary loss prevention measures were taken. Further good reporting practices are an indication of continued corporate governance, which is important for financiers, investors, and other stakeholders of the project or organization. This is discussed further in the dissertation. Reporting is vital at all levels of an organization for risk monitoring. Management reports are designed in line with the information needs of individuals who are responsible for executing processes in line with the risk strategy / appetite of the development organization.

Typically, the Board of Directors is primarily responsible for ensuring that an effective risk management system is in place. From an internal reporting perspective, communication of information is required in the first instance to establish a foundation by providing a tone from the top that stresses the importance of monitoring (COSO Guidance on Monitoring).

Risk monitoring is the final stage within the risk management process, but it does not represent the end of the risk management cycle. Up until now, the project risks have identified, assessed, analyzed, and some kind of risk handling strategy has been adopted for them. It is vital to continuously assess the effectiveness and efficiency of risk management in order to be able to identify areas for possible improvement (Deloach, 2000). The risk management process must in no way be interpreted as a one off event, but is necessarily subject to an ongoing adjustment and improvement process. In addition, risks are time-based and as such their impact and probability will vary with time. (Deloach, 2000) Concludes, “Redefining the value proposition of risk management is vital in this day and age.

2.2.2 Risk factors and their classification

Enshassi and Mayer (2015) conducted a study on risk classification and grouped construction project risk factors into six (6) categories, which are God's law, physical, economic and financial, environmental and political, engineering and construction site. Risk factors were also classified by Mojahedi et al.

(2010) as internal and external. External risk factors were defined as **economic and financial**, environmental and political and act of God, while internal risk factors were defined as planning, site-specific work, management and operations.

Ali F Bakr et al. (2012) developed a heuristic approach to risk assessment modeling and developed RBS for EPCCM (Engineering, Procurement, Construction, Contract and Management and Placement Risk Factors as follows, Engineer - Financial and Contractor Risk Factors, Procurement - Procurement Risk Factors, Construction). Construction risk factors, Contract - Contract risk factors, Management - Management risk factors.

Sowmya et al (2014) classify risk factors into nine (9) groups, external environment risk factors, contractor group risk factors, owner group risk factors, **resource risk factors**, project management group risk factors, contractor clause group risk factors, and financial group risk factors.

Née raj et al., (2015) categorized risks factors into 8 groups, Environmental risk factors, Construction risk factors, Financial risk factors, Management risk factors, Political risk factors, **Design risk factors**, Subcontractors risk factors, Procurement risk factors and technical risk factors. Furthermore Renuka and Kamal, (2014) layout risk factors into two (2) groups; Engineered and non-Engineered risk factors unlikely Gunduz and Sonmez, (2013) who classified risk factors into five (5) categories - technical, Act of God, Economic, Political, and risk related to Statutory.

According to (Anglo, 1993) the typical risk on construction project is as; occurrence of accidents, failure to complete within the specified time, failure to obtain the expected outline, unforeseen adverse conditions, unexpected rises for labor and materials, force majeure, and failure to complete the project within the client's budget.

According to (Adhikari, kumar, 2020) presented 122 risk factors identified in construction projects which have been categorized Into 15 risk classification. The risk identification can be

done in various ways. Generally, the risks are classified into two (2), Internal and External.(S.S Asadi 2018).

Survey conducted by Abu Mousa et Al (2005), revealed that financial failure of the contractor, working in the hot environment, defective design and delayed payment on contracts were the most crucial risk factors causing projects to failure.

According to the studies of related title from different researchers in Ethiopia shows almost similar factors that affect the construction project performance of real estate.

Financial and Economic Risk

It explores the influence of macroeconomic conditions. Such as interest rates, inflation, market stability on the construction industry and unexpected price fluctuations are the most significant zhang and Hu (2018). Currency fluctuations are an Economic risk to consider when designed a significant construction project, especially for international enterprises. It investigates the financial constraints, availability of funds, and economic fluctuations on project financing, cost estimation and profitability.

Design Risk

Defects in the design that caused the asset to be built yet failed to meet the specified standards, legal requirements and any environmental or other constraints. such situations necessitate a revision to the project, resulting in delays and, most importantly, cost increase defects or failure in the design that cause the project to fall short of the contract's service standards or that cause a rise in operation and maintenance expenses to fulfill the contract service requirements. Some design risk include design flaws and omissions, the design process taking longer from expected, stakeholders requesting late revision and failing to complete the work in line with the contract, Al-Momani (2019)

Contractual and legal Risk

It focuses on the potential legal disputes, regulatory issues and contractual conflicts that can arise during the construction of residential real estate. Some of the contractual and legal related risks include; project partner breach of contract, lack of enforcement of legal judgments, improper verification of contracts documents, lack of knowledge and arbitrations, and uncertainty and unfairness of Court Justice. Chan and Kumaraswamy (1997)

Resource Risk

Resource risk examines the uncertainties associated with the availability, allocation, and utilization of construction resources such as materials, labor, and equipment. It explores the impact of resource shortages, price fluctuation, and skill gaps on project schedule, productivity and cost control. Akintoye and MacLeod (1997),

2.3 Project performance

Project performance is a crucial component of project management since it shows whether a project has achieved its goals and added the value it was designed to. The main conclusions of several studies on project performance will be analyzed in this overview of the literature, along with the elements that influence project performance, methods for measuring and assessing project performance, and strategies for enhancing project performance.

Factors affecting project performance:

Project complexity, project size, project team makeup, project management competency, project governance, and project culture are among the variables that have been identified as influencing project performance. Project complexity is the most important element determining project performance, according to a study by Shenhar and Dvir (2007), as it raises the probability of project failure. Project size has been recognized as a significant influence in other research as well, with larger projects being more difficult to manage and consequently more vulnerable to performance concerns (Geraldi & Lechter, 2012).

Methods for measuring and assessing project performance:

Measurement and evaluation of project performance are crucial in order to ascertain whether a project has achieved its goals. Earned value management (EVM), key performance indicators (KPIs), and project scorecards are a few techniques that have been recommended for measuring and evaluating project performance. According to a study by Kerzner and Kerzner (2017), EVM is the most popular technique for gauging the efficiency of projects because it offers a complete picture of project efficiency in terms of time, cost, and quality. The performance of projects is frequently evaluated using KPIs and project scorecards, with KPIs focused on particular performance metrics and project scorecards offering a comprehensive perspective of project performance.

Techniques for improving project performance:

The process of determining and putting into practice measures to enhance project performance is known as project performance improvement.

Lean management, Six Sigma, and agile project management are a few methods that have been recommended for enhancing project performance. Agile project management, which stresses flexibility, cooperation, and continuous improvement, was determined to be the most effective technique for enhancing project performance, according to a study by Pinto and Slevin (2019). Because they put a strong emphasis on reducing waste and boosting process effectiveness, lean management and Six Sigma are also useful tools for enhancing project performance. In conclusion, a crucial component of project management is project performance, which is influenced by a variety of factors. To measure and assess project performance, several methods have been suggested, including EVM, KPIs, and project scorecards. To improve project performance, several techniques have been suggested, including lean management, Six Sigma, and agile project management. Project managers should be aware of these factors, methods, and techniques to ensure that their projects meet their objectives and deliver their intended value.

2.3.1 Project Complexity

The proper way to describe "complexity" has been the subject of a long running discussion because it is a difficult concept to pin down. It is challenging to provide a succinct description of "complexity" in this context because many scientists struggle to describe it (Johnson, 2006). When there are variances and frequent chaos, complexity can develop. It is exceedingly challenging to say with precision when this uncertainty and chaos develop in the context of a project. Projects may become increasingly complicated over time as the frequency of deviations and chaos increases. The construction industry is one example of a sector that is particularly vulnerable to complexity and risk. When it comes to coping with the potential variation and chaos, this industry is typically in a disadvantageous position (Baccarini, 1996).

Thus, understanding project complexity and how to handle it in various circumstances is crucial for determining the outcome of a project. By asserting that construction projects are among the most volatile and difficult project types and suffer from negative feedback on failure to deal with various obstacles, (Mills, 2001) reinforced Baccarini's argument. They include missing deadlines Mulholland and Christian (1999) note that the construction industry operates in a dynamic and competitive environment with the difficulty of addressing a variety of risks and uncertainties, which could lead to project scheduling challenges and budget limits.

According to a different article by (Bertelsen, 2003), the construction industry is frequently viewed as a linear system that can be readily managed and structured through proper planning. Nonetheless, the high rate of construction projects failing to finish on schedule and within budget demonstrates how unstable and unpredictable the sector is. Hence, in his opinion, construction projects are extremely complicated and nonlinear, and as a result, chaos will inevitably occur, overspent budgets, and scheduling issues, among others.

Project complexity, according to (Baccarini, 1996), "consists of different interrelated pieces that can be managed with distinction and interdependency." The author claims that this definition of project complexity can be used to describe any aspect of a project, and that it is crucial to specify the type of complexity of a problem when using the word "project complexity" in order to

comprehend the organizational and technological context. He recommended placing more emphasis on the idea of project complexity and its consequences as the project becomes more complicated. Organizational and technological complexity is referred to as "Structural Complexity" by (Williams, 1999). A relationship between differentiation and interdependency was maintained, according to William, when he described the idea of "structural complexity." Regardless of the field, this specification can be used for many other project kinds. Pooled, sequential, and reciprocal interdependencies are the three different types. When an organization has a pooling structural complexity or interdependency, its several departments often operate independently of one another yet each makes a little, individual contribution to the larger problem. In sequential interdependencies, the output of one department is used as the model's input by another department.

The output of one department is utilized to support the input of another in reciprocal interdependencies, which are similar to sequential ones but have cyclical properties. They are the most important and difficult to manage since the effectiveness of one department can have a big impact on another. Subsequently, he included "Uncertainty" as an additional complexity factor. He argues that "Uncertainty and Structural Complexity" are the two most important factors that might cause the overall project environment to become extremely chaotic and complex. Project interdependencies could grow as a result of this uncertainty, making them even more complex. The project manager may try to alter the project's goals and action plan in an effort to lessen the effects of ambiguity. The project's structural complexity and product complexity are the two main areas where these changes to the action plan may lead to a rise in project complexity.

(Geraldi & Albrecht, 2007) introduced three new categories for complexity: faith, fact, and interaction, based on the research on "Uncertainty & Structural Complexity, "Faith" complexity mostly refers to the complexity produced by original and creative problem solving and high levels of uncertainty."Fact" complexity refers to the complexity that result from staff members' lack of time or other resources in terms of processing sizable amounts of interdependent and

connected data, necessitating the necessity to make choices with some level of uncertainty. The "interaction" complexity is linked to and influences the "faith" and "fact" complexities.

(Wood & Gidado, 2008) was highlighted in their interview with construction industry specialists about project complexity. According to the results of the interviews about project complexity, projects can be categorized as follows: Projects where a large number of systems must be synchronized with one another and have numerous interfaces between them; Projects where a variety of complexities exist and make it challenging to reach the project's target or approach the action plan; Projects where the execution of the project action plan necessitates a combination of the aforementioned. He illustrated two perspectives of project complexity the managerial perspective and the operational and technological perspectives based on the findings of these specialists from the construction industry.

Several components of the work are planned and integrated throughout the project from a managerial viewpoint, but from an operational and technological standpoint, various technical challenges that must be overcome to incorporate the work into the project are taken into account. Also, he suggested two project complexity sources that are relevant to the project. He designated these complexity sources as Category A & B. The resource related aspects of individual activities in category A cause complexity, but the various components needed to form the project's workflow create complexity in category B. Consequently, it is possible to assert that complexity is produced through a variety of pathways, all of which work together to bring about chaos in the project. A project is exposed to more hazards as it becomes more sophisticated, and it might potentially become quite fragile. Typically, this elevated risk probability keeps rising during the course of the project. According to research on project complexity, a project's likelihood of success or failure largely depends on its level of complexity.

2.4 Risk in Real Estate Development projects

2.4.1 Real Estate Development

The specific definition of the phrase as it is used to describe "real estate development" in specialized literature is diverse and, to some extent, inconsistent. Most definitions discuss using imagination, concentration, and cooperation to develop real estate assets (NEARY, 2009).

Both (Cadman / Topping, 1995, p. 177) and reference the legal definition of real estate development found in section 55 I of the British Town and Country Planning Act (BTCPA), 1990. (Millington, 2000, p. 1). According to this, "development" refers to carrying out building or other operations in, on, over, or under land, or to make any significant changes to the way any buildings or other land is used. The functional aspects of real estate development are reflected in this definition, which is still in widespread use.

The definition of real estate development as "a process that involves changing or intensifying the use of land to produce buildings for occupation" is one that (Wilkinson / Reed, 2008) adopt. Real estate is defined as land, as well as any buildings or other structures that are situated on it as well as the air and ground above and below it. Residential homes, business offices, trading places like theaters, hotels, and restaurants, retail establishments, industrial structures like factories, and governmental structures are all included. Real estate includes the acquisition, resale, and development of both residential and non-residential structures on land.

The main players in real estate market are the developers, builders, real estate agents, tenants, buyers, etc. (Khedekar & Dhawale, 2015). (Khedekar & Dhawale, 2015). (Isaac, Balchin and Chen, 2000: 320) define development with respect to real estate or property as "a process of conversion (development or redevelopment) of land from one use to another. "In the sense that a person develops land and property for sale or rent, real estate development is connected to specialization (Truneh, 2013). Real estate development is defined as "a process that involves modifying or intensifying the use of land to construct buildings for occupation" by Wiegelmann (2012), citing Wilkinson and Reed (2008). A developer is a person or business

that actively participates in development, assumes the associated risks, and reaps the benefits of development. The three product types that developers offer are residential, commercial, and special na purpose.

2.4.2 Risk in Real Estate Projects in General

For every business firm working in the current climate, where risks are inherent (Groton et al., 2010; Mead, 2007; Wiegelmann, 2012), risk management has become increasingly crucial (Mead, 2007). Identification, comprehension, anticipation, assessment, analysis, and learning how to handle risks are crucial (Groton et al., 2010; Wiegelmann, 2012). It can have disastrous repercussions if risks assumed in intricate commercial and contractual relationships are not clearly identified and properly allowed for (Mead, 2007). The construction industry has risk, just like any other industry (El-Sayegh, 2008; Taroun, 2014). Due to the fact that the construction industry is one of the most dynamic, risky, challenging, and lucrative sectors, risks are present in all construction projects (Dey & Ogunlana, 2004; El-Sayegh, 2008; M. Motiar & M.M, 2002). (Kangari, 1995; Sterman, 1992; TE Uher & Loosemore, 2004; Zeng, An, & Smith, 2007). The construction business is said to be more vulnerable to risks and uncertainties than any other industry, according to Flanagan and Norman (1993). The views of Dey and Ogunlana (2004) are in agreement. There is no building project that is risk-free (Lam et al., 2007). Construction projects are never replicated and are only built once (Oyegoke, 2006; Pheng & Chuan, 2006). (Zavadskas et al., 2010).

Construction also has a lot of stakeholders and takes a long time to complete, which makes it more uncertain (Zou, Zhang, & Wang, 2007). There are numerous dangers that could potentially have a negative impact on the results of any building project (Loose more & mccarthy, 2008). Many construction projects fail to meet their time, cost, and quality targets because the construction process is complex and characterized by a number of risks (Baloi & Price, 2003; Banaitiene & Banaitis, 2012; Mohammad & Jamal, 1991; Zavadskas et al., 2010; Zeng et al., 2007; Zhang et al., 2006). Project hazards could even lead to the complete failure of a building project (Banaitiene & Banaitis, 2012). In the construction industry, there will inevitably be risks and unpredictability. For managing uncertainty and risk, improving project performance, and

successfully completing a project (Farnad Nasirzadeh, Afshar, & Khanzadi, 2008), risk management ideas must be incorporated into construction practice (Zou, Zhang, & Wang, 2006). The construction business, however, does not have a good reputation for managing risk. Several initiatives fall short of their intended deadlines, budgets, and requirements (Dey & Ogunlana, 2004). The risky aspect of building also applies to the real estate development industry. Like any other economic activity, real estate development initiatives are not without risks and uncertainties. As was previously indicated, these risks and uncertainties have the potential to significantly affect all associated developments across the full lifecycle of assets (Chen & Khumpaisal, 2009).

According to (Wiegelmann, 2012), the definition of risk as it relates to the real estate development sector should include, but not be limited to, an element of uncertainty that is in line with the goals and expectations of a real estate development organization within a given time frame and budget, differentiating between the negative (threat) and positive (opportunity) aspects of risk. However this study is focused on the negative aspects of risk.

2.4.3 Risky nature of real estate development

A number of specifics that are not, or are not as prominently, faced in connection with other investment / asset classes must be brought up when discussing real estate related difficulties. Among others, BoneWinkel (1994), Brown (1971), Geschwender (2010), and others have provided descriptions of the key special features of real estate as an investment good (Millington, 2000).

Real estate has a number of distinctive qualities, but its ties to place, heterogeneity, scarcity, and limited substitutability stand out. These elements have broad ramifications for the economy, the law, and the truth. The value of real estate is largely determined by external factors such as the condition and potential uses of neighboring properties as well as the infrastructural facilities provided by the public sector. The geographic location alone frequently determines the most likely use as well as the physical and/or structural possibilities. Land cannot be duplicated, hence any buildings or other developments made on a particular plot of ground are incredibly unique.

Real estate's immobility is the source of its variability. The emergence of local and material submarkets due to low levels of heterogeneity limits the comparability of real estate. Submarket risks, property hazards, and value risks are all brought on by heterogeneity. Limited substitutability and scarcity are both caused by heterogeneity. The location, structural characteristics, and governing laws all have a significant role in determining the potential uses of real land. As a result, real estate exhibits restricted substitutability in addition to scarcity.

The development of real estate is a very challenging, dynamic and multidisciplinary endeavor. Real estate developers lack the relative flexibility to respond and adapt swiftly to any changes in the tenant and investor markets since the length and complexity of the development process requires a significant amount of time (Barkham, 1997; Brauer, 2003; Byrne, 1996; Gehner, 2008). More economic risk follows from this. Moreover, substantial expenditure is needed for both the construction of real estate and the purchase of an already built property (Dubben / Sayce, 1991). Due to the fact that not all real estate developers are also investors in real estate, as well as the goal of optimizing return on equity, external funds are frequently required to fulfill capital demands. The capital market and the development sector are hence closely intertwined. Last but not least, real estate is distinguished by its lengthy lifespan and useful life.

The economic life of real estate varies between 20 and 100+ years, depending on its use, its ability to be utilized by others, and its idea of utilization. Properties must be maintained, renovated, or relocated throughout this extended period of time.

2.4.4 Specific characteristics of the real estate market

Given the distinct qualities of real estate as an asset class, it follows that the real estate market which is defined as a mechanism by which real estate related assets and services are exchanged (Jaffe / Sirmans, 1995) has distinctive qualities in comparison to markets for other goods. According to Schulte and Vogler (1998), the emergence of submarkets, reliance on and interaction with upstream and downstream markets, transparency, and government influence are examples of how the unique characteristics of the real estate market are manifested.

Fundamentally speaking, the real estate market is an open one that is open to anyone. Yet; there are still significant entrance barriers to professional development of larger projects.

The real estate market is generally speaking, and in terms of mature European countries, a highly regulated and organized sector. The state, acting in the best interests of its citizens as well as to safeguard the general welfare, does not merely leave the distribution of land to unfettered market forces for instance, the state can have an impact through social and tax policy, such as through depreciation allowances or rent rules, or more directly by establishing planning policy frameworks. Furthermore, the real estate market clearly deviates from the ideal of a perfect market due to the unique qualities of real estate as an economic asset. Real estate's dependence on its location and the resulting immobility are its most salient features in this context.

Real estate is geographically constrained in addition to being unmistakably linked to a particular place. As a result, a property's catchment area is constrained and nonfungible. This means that real estate, in theory, cannot be copied and differs primarily in terms of location, size, usage, and architectural style (Bone-Winkel, 1994).

Tenant and landlord, or buyer and seller, respectively, do not have full knowledge of all transactions in this imperfect market (leases and sales respectively). Real estate appraisal is made more challenging by the fact that market players typically have limited access to comparable sales data. As a result, the real estate market frequently demonstrates a lack of transparency, complexity, and, to some extent, inefficiency because prices do not accurately and instantly reflect all of the factors that determine drivers of value. On the one hand, it is impossible to instantly confirm current pricing, while on the other, it is made noticeably more challenging to determine the comparability of the observed (lease and sales) prices. The restricted individual opportunities for receiving, processing, and disseminating information interfere with both communication between the various market groups and the decisions made by market players on a regular basis. Real estate markets are cyclical, necessitating careful planning and market research. Throughout the whole market cycle, risk management should be a top priority for development organizations.

The completed real estate product may always be delivered to the (tenancy and investment) market at a different stage in the cycle due to the comparably lengthy development period of plans. So, an important activity and risk management tool for developers is to analyze and plan for the various cycle phases. Examining the factors that influence real estate prices is outside the purview of this dissertation, but it is important to remember that cyclical market changes have always been a feature of real estate markets.

2.5 Empirical review

Several academics evaluated how risk management procedures were used on various projects both domestically, abroad, and in Ethiopia. Many Ethiopian projects are seen operating below their intended objectives since the majority of risk management approaches are inefficient and ineffective.

2.5.1 Risks in Real Estate Development Projects in Ethiopia, Addis Ababa

The development of real estate is one of the industries that see market transactions in the billions of birr. Nonetheless, studies on Ethiopian real estate, particularly in Addis Abeba, demonstrate that the sector's development faces a variety of issues. (Eshete and Teshome, 2015) used a local and macro perspective to assess the effectiveness, difficulties, and future possibilities of Addis Abeba's real estate financing. According to the findings of their study, some of the difficulties and shortfalls in Addis Ababa's real estate development include poor land management, inadequate infrastructure, and low construction capacity of developers or contractors hired for construction, poor borrowing capacity, price inflation, and low affordability. Similar findings are shared by (Kiros, 2009), which likewise evaluated and detailed the elements influencing the real estate market. According to Kiros, there is a lack of foreign currency, a slow and inadequate supply of land, and a rise in the cost and scarcity of building supplies for homes.

Moreover, the lack of long-term house financing and inflation had an impact on the real estate market. He noted that sales have significantly decreased and that market property prices are becoming more unaffordable. The devaluation of the birr and price increases are both significant difficulties, according to study on private residential real estate developers by Paulos (2011). The survey's findings support

the contention that there is a delay in handover, which was shared by the majority of the real estate developers that participated in the study.

Increased costs, a lack of building supplies, and inadequate financing were the main cause for the delay. Other causes of delay were also discovered to include adverse weather and a shortage of skilled staff. One of the primary issues undermining the credibility of real estate developers is the failure to execute housing developments on time (Bewket, 2014; Muluken, 2013). Only 15 of them completed the houses and handed them over to their clients, and four of them were ejected, leaving the remaining ones with unfinished homes for up to ten years (Bewket, 2014).

According to a report from the City Administration's Land Administration and Building Permit Authority, the City Administration's delay in handing over the site, the delay in providing infrastructure, lack of Loan Finance and the increase in building price are the typical justifications given by developers as major challenges.(Tiruneh,2013). The absence of readily accessible property, the use of funds collected from customers for housing projects for other purposes, and the lack of competent and coordinated professional teams to handle such significant investments were all key issues, according to experts and developers (Muluken, 2013).

Delays have an impact on developers as well as clients because they increase the initial cost that contractors had originally projected for a particular project in connection to inflation, currency exchange, and other factors. However, since they are undoubtedly responsible for the additional costs, clients are typically the ones that suffer the most because of the delay. Real estate developers counter that some of them might go bankrupt and be force out of the real estate market Due to the fact that customers are the only sources of funding for real estate projects, insufficient funds are another problem that significantly contributed to delays for extended periods of time (Muluken, 2013). The findings (Paulos, 2011) indicate that the client developer contractual relationship has other problems besides time extension. Most developers, it turns out, change prices in response to rising costs for some construction supplies and the depreciation of the birr. Few of these developers obtain consultant permission; while the majority of them require engineers to approve the modification. Customers, however, typically reject the adjustment, contrary to what some developers said. Another reason for the handover's delay is due to this. Construction material pricing adjustments have an impact on future orders as well as the ability of consumers and buyers to make the remaining installment payments (Kiros, 2009). If customers refuse to accept new terms and conditions, including a new price, the

contract may be terminate before the homes are delivered, and customers may then take the seller to court to obtain the homes they paid for (Tadeos, 2012).

Customers' contracts were terminated by developers who were unable to complete projects due to a lack of funding if they did not agree to the revised terms and conditions, which included a higher price.(selam,2016).Many of the issues covered in this section pose difficulties for real estate development initiatives. The real estate development industry has issues, which makes the climate insecure. Risk exists in an uncertain environment, and in order to limit its effects, decisions must be made by identifying risks and evaluating their impact. Several danger indicators have been found through studies and publications on issues pertaining to Addis Ababa real estate development projects.

Table 1: Risk factor and author

No	Risk Factors	Authors
1	Price escalation of construction materials	Kiros (2009), Paulos (2011), Truneh (2013), Eshete and Teshome (2015)
2	Inflation	Kiros (2009), Paulos (2011)
3	Foreign currency shortages	Kiros (2009), Muluken (15 April 2013)
4	Shortages of Construction materials	Kiros (2009), Paulos (2011)
5	Adverse climatic conditions	Paulos (2011)
6	Unavailability of skilled Labor	Paulos (2011), Muluken (15 April 2013)
7	Delay in delivery of housing projects	Muluken (15 April 2013), Bewket (13 January 2014)
8	Availability of infrastructure	Truneh (2013), Eshete and Teshome (2015)

2.6 Conceptual framework

The conceptual framework, which is derived from the literature and the risk management procedures, is as follows. In this study, the impact of risk factors and their correlations are examined using a dependent approach in a systematic variable called "project performance" as an output. The chance of an event and its consequences are combined to form risk, according to the Institute of Risk Management (IRM). Consequences can be either favorable or unfavorable (Paul Hopkin, 2010). The cumulative impact of the possibilities of uncertain events having a negative impact on the project's goals are known as "project risk." In other words, it is the extent to which adverse events are exposed, and the likelihood that these repercussions will have an influence on the project's goals as described in terms of scope, quality, time, and money (Max, 1992).

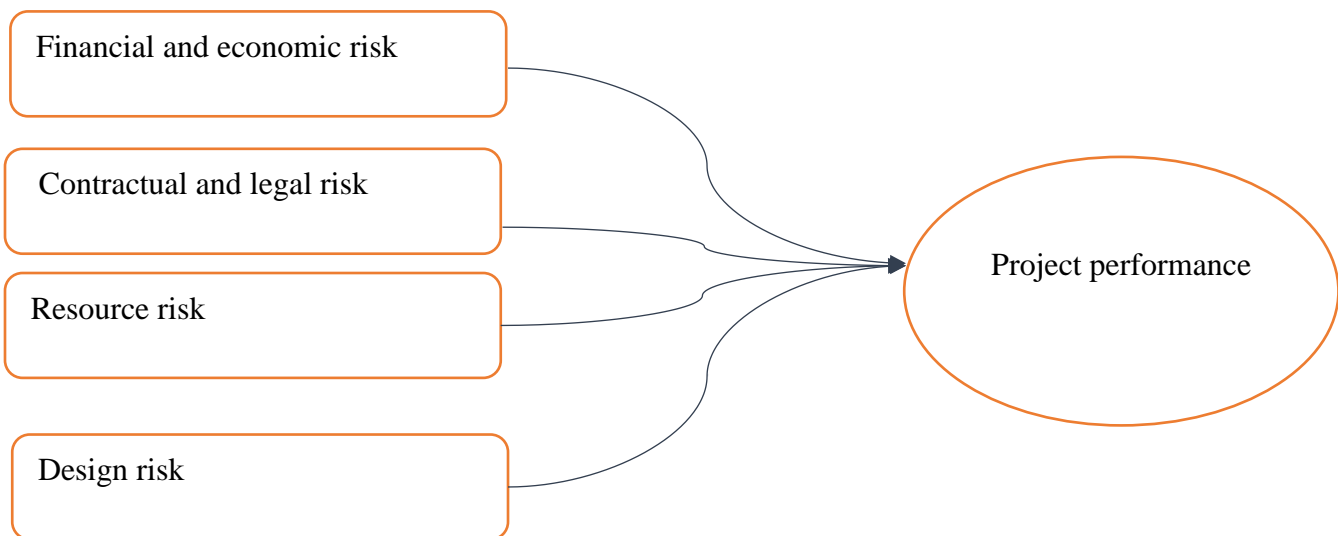


Figure 1: Conceptual Framework

(Source: literature review)

CHAPTER THREE

3. RESEARCH METHODOLOGY

This chapter outlines the research's activities, methodology, and the measures that had done to accomplish the study's goals. Potential risks has already identified, along with their effects on project performance and the relationship between each risk element. The most efficient way to assess the risks' likelihood of occurring and the influence they have on project aspects determined by the research, which would be based on observation and Questionnaires. On the Flintstone residential real estate developer sites, the observation and questionnaires has conducted and evaluated the strength of the connection between hazards in real estate development projects. Although real estate organizations' strategies for dealing with risks and uncertainties are well recognized, there is limited information on the use of risk analysis as a systematic tool within the organization.

3.1 Research Design and Research Approach

3.1.1 Research Design

The conceptual framework through which research has carried out is known as the research design. It can be used as the guideline for data gathering, measurement, and analysis. It entails a number of phases, including defining the information required, defining the measurement and scaling techniques, generating the questionnaire, defining the sample procedure and size, and developing a plan for data analysis. The assessment and analysis of hazards in construction projects, particularly real estate developments, were the subject of a thorough literature review. Three types of research purposes; exploratory, descriptive, and explanatory are most frequently used research designs in the literature on research methodologies (Saunders, Lewis and Thornhill, 2009). This study adopts an explanatory methodology. Explanatory research design is a type of research design that aims to explain the relationship between variables. It is used to identify the causes and effects of phenomena by exploring and analyzing the underlying

mechanisms that govern them. It involves the use of statistical analysis and experimental methods to test hypothesis and draw conclusions about the relationships between variables.

3.1.2 Research Approach

The study's survey methodology enables as the collection of quantitative data that can then be quantitatively analyzed using descriptive and inferential statistics. In order to evaluate risk management practices, such as the degree of risk awareness and risk management, the application of risk identification, risk analysis, and risk response techniques in real estate projects, this study adopts a quantitative approach.

Any data gathering method (like a questionnaire) or data analysis strategy (like graphs or statistics) that produces or uses numerical data has sometimes referred to as a "quantitative approach" (Saunders et al. 2009). On this study, the researcher has been used quantitative research approach.

3.2 Description of study Variables

The dependent and independent variables of the study, which is analysis of risk factors affecting construction project performance the case of residential real estate development projects in Flintstone; are chosen and given as follows using the research problem (gaps) and the relevant literature.

Dependent variable: based on the title of the research, the study has only one dependent variable and that is Project performance. **Project performance** is a critical aspect of project management, as it determines whether the project has met its objectives and delivered its intended values.

Independent variables: the independent variables of the study, which are the risk factors affecting a construction project performance are:

Financial and Economic Risk:

It explores the influence of macroeconomic conditions. Such as interest rates, inflation, market stability on the construction industry and unexpected price fluctuations are the most significant (21). Currency fluctuations are an Economic risk to consider when designed a significant construction project, especially for international enterprises. It investigates the financial constraints, availability of funds, and economic fluctuations on project financing, cost estimation and profitability. according to a study by Zhang and Hu (2018), finance and economy is one of the main factors affecting construction project performance. The study found that the instability of financial markets, changes in interest rates, and inflation can all contribute to cost overruns and delays in project completion. The authors suggest that risk management strategies, such as contingency planning and risk-sharing contracts, can help mitigate these risks.

Design Risk

The design risk is another important factor that affects construction project performance. Defects in the design that caused the asset to be built yet failed to meet the specified standards, legal requirements and any environmental or other constraints. such situations necessitate a revision to the project, resulting in delays and, most importantly, cost increase defects or failure in the design that cause the project to fall short of the contract's service standards or that cause a rise in operation and maintenance expenses to fulfill the contract service requirements. Some design risk include design flaws and omissions, the design process taking longer from expected, stakeholders requesting late revision and failing to complete the work in line with the contract.

According to a study by Al-Momani and Al-Qawasmeh (2019), design changes during the construction phase and lack of experience in managing complex projects can contribute to delays and cost overruns. The authors suggest that early involvement of experienced project managers and stakeholders in the design phase can help reduce these risks.

Resource Risk

Resource risk is another factor that can affect construction project performance. Resource risk examines the uncertainties associated with the availability, allocation, and utilization of construction resources such as materials, labor, and equipment. It explores the impact of resource shortages, price fluctuation, skill gaps on project schedule, productivity and cost control.

According to a study by Akintoye and MacLeod (1997), insufficient resources, such as skilled labor and materials, lack of experience in managing complex projects can contribute to delays and cost overruns. The authors suggest that effective resource planning and management, as well as early involvement of experienced project managers, can help mitigate these risks.

Contractual and Legal Risk

Finally, contractual and legal risk is another factor that can affect construction project performance. It focuses on the potential legal disputes, regulatory issues and contractual conflicts that can arise during the construction of residential real estate. Some of the contractual and legal related risks include; project partner breach of contract, lack of enforcement of legal judgments, improper verification of contracts documents, lack of knowledge and arbitrations, and uncertainty and unfairness of Court Justice.

According to a study by Chan and Kumaraswamy (1997), changes in regulations and laws can contribute to delays and cost overruns. The authors suggest that early identification of legal and regulatory risks, as well as effective communication with stakeholders and regulatory bodies, can help mitigate these risks.

3.3 Sampling methods and Data collection

3.3.1 Geographical Description and Population

One of Ethiopia's 124 real estate developers is Flintstone. When it was established in 1992, Flintstone Engineering s.co, originally known as "Tsedeke Yihune Construction," entered the Ethiopian construction industry as a level 8 building contractor. A year later, the business was renamed Flintstone engineering in honor of the "flint stones" that prehistoric men used to start fire representing how technology and ingenuity have advanced humankind. Back then, when the local construction industry was just getting started, Flintstone began to engage in subcontracting work from established businesses and began its incredible journey, increasing its construction management and labor capabilities along the way. The business has succeeded in becoming one of Ethiopia's top construction and real estate companies today. Flintstone Engineering, a construction company established in 1991, launched Flintstone Houses in 2008 as a real estate venture. Flintstone will commemorate its 31st birthday this Coming year. Flintstone supplied a total of 1532units to the homebuyers. Flintstone Engineering, a renowned construction company that was founded in October 1991, is renowned for offering a unique balance of affordability and excellence. Since its founding in 2007, when there was a shortage of power, cement, and funds, Flintstone Engineering's strong quality management system was ISO-9001-2000 certified. Since then, the company's construction revenue has surpassed the \$100 million mark. This represented more than 20% of their overall portfolio, significantly more than the roughly 10% local industry norm, demonstrating their dedication to their customers.

3.3.2 Target population and Sampling Unit

The workers on the Flintstone construction projects are 200. From those, a purposeful random sample of units has been chosen to reflect the organization's entire population. These samples had included project managers, site engineers, office engineers, and consultant supervisor and client supervisor.

3.3.3 Sampling methods

The Flintstone real estate construction projects was the study's target population, which includes site engineers, office engineers, supervisors, and project managers. First, stratified sampling was conducted. Since we have a heterogeneous population, we must divide the population into appropriate strata based on I.e. Education, position, and working experience. Then, Simple Random Sampling was utilized to choose respondents for the risk analysis of project performance and relationship between risk factors. Due to the difficulty in accessing all creature types and the discomfort of having to meet them all within a certain time frame, the selection of entities had made using a random selection technique. The sample for this study was determined using Yamane, (1967) sample size determination formula at 95% precision level;

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

Where, n= sample size

N= total number of population

e = desirable margin of error

Accordingly, the sample size for the study would be 133 employees and computed as follows.

$$n = \frac{200}{1 + 200(0.05^2)}$$

n= 133 employees

3.3.4 Data collection

In order to provide practical responses to the research topics, data was gathered by questionnaire. The company had provided the primary and secondary data that would be used to support this argument (Bryman & Bell, 2007). To learn how risks are managed, beginning with identification and concluding with treatment, the researcher conducted informal interviews with departmental officials in charge of risk management.

3.3.4.1 Types of Data and Tools of Data Collection

This section goes over the various data collection techniques that has been used in this study. Lack of empirical evidence is discovered in the context of the specified problem while studying pertinent literature. Questionnaire has been conducted for this purpose in order to collect the necessary data. Through exploring the experiences of experts and practitioners involved in real estate development projects questionnaire papers had aid as the most effective technique to accomplish the purpose of this study.

Data gathered from research participants performed among Flintstone residential real estate developers has been used to satisfy this. In the first portion, information regarding the survey respondents has examined. In the second section, the researcher used a Likert scale questionnaire. Typically a Likert scale questionnaire consists of a series of statements or questions related to a particular topic. A respondents are then asked to indicate their level of agreement with each statement on a numerical scale commonly ranging from 1 to 5.

3.4 Data Analysis Techniques

The study utilized a multiple linear regression (MLR) model. Regression models are used to characterize associations between variables by fitting a line to the observed data. You can estimate a dependent variable's change as an independent variable or set of independent variables changes using regression. To calculate the association between two or more independent variables and one dependent variable, utilize multiple linear regression. When you want to know: How strong the association is between two or more independent variables and one dependent variable, as well as the value of the dependent variable at a specific value of the independent variables, you can use multiple linear regression. (2022, Bevans)

Multiple regression, or MLR model, is a statistical method that use a number of explanatory factors to forecast the result of a response variable. Modeling the linear relationship between the explanatory (independent) factors and response (dependent) variables is the aim of multiple linear regression. Since multiple regression comprises more than one explanatory variable, it

can be thought of as an extension of ordinary least-squares (OLS) regression. The formula for a multiple Linear Regression is;

$$Y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \dots + \beta_nx_n + \varepsilon$$

Then, the equation for the variables in this study will be:

$$Y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + \varepsilon$$

1. Y = dependent variable which in this study is (project performance)
 - X1: represents the variable financial and economic risk
 - X2: represents the variable contractual and legal risk
 - X3: represents the variable resource risk
 - X4: represents the variable design risk

2. B0 = the y-intercept (value of y when all other parameters are set to 0)
 - Bn = regression coefficient that measures a unit change in the dependent variable when Xn changes.

After gathering the quantitative data in statistics, the following stage was analyzing the data. Data preparation, analysis, reporting, and discussion all goes into the process of analysis. The quantitative data was imported into SPSS version 27 and analyzed after being gathered by the researcher. With the use of SPSS version 27, the collected data was analyzed by using descriptive and inferential methods. Inferential analysis is a statistical method used to make accurate predictions and generalizations about a population based on a representative sample.

3.5 Reliability and Validity

Reliability is the degree of consistency of a measure. A test will be reliable when it gives the same repeated result under the same conditions. This research has administered the most commonly used internal consistency reliability measure of Cronbach's alpha, which has originally designed by Lee Cronbach in 1951.p

Table 2: Reliability of the overall independent variable

Reliability Statistics		
Variable	Cronbach's Alpha	N of Items
Financial and economic Risk	.796	5
Contractual and legal Risk	.778	6
Resource Risk	.704	6
Design Risk	.751	6

Source: Researchers own survey (2023)

The above result shows that instrument used in this study was reliable with Cronbach's alpha value of all independent variable such as Financial and economy, Contractual and legal, Resource and Design 0.796, 0.778, 0.704 and .751 respectively. Which refers to the fact that a scale should consistently reflect the respondents had 79.6% common premises on the raised five questions under Finance and economy. In addition, had 77.8%, 70.4%, 75.1% shared view on the contractual and legislation, resource and design. Therefore, among 124 respondent most of them have similar understanding on the providing questions?

3.6 Ethical Considerations

The moral standards that direct a person's behavior are known as ethics. Doing what is morally and legally correct in research is sometimes referred to as practicing research ethic. In reality, they are standards of behavior that set boundaries between what is morally correct and inappropriate. In terms of the rights of persons who become the subjects of the research or are otherwise impacted by it, ethics refers to the propriety of the researcher's behavior (Saunders et al. 2009). In line with this; I take the responsibility for maintaining the confidentiality of the data and for any errors that may occur in this study.

CHAPTER FOUR

4. Data Presentation, Analysis and Discussion

4.1 Response Rate

The previous chapters dealt with general introduction of the study, review related theoretical literature to identify the knowledge gap and the research methodology used to meet its objectives. This chapter describes the results of the analysis and interpretation of the empirical data collected from the respondent. The chapter begins with a general description of the data based on the respondents' working experience in the industry, position and educational level.

The analysis based on the information obtained from 133 employees. In order to get a representative data, 133 questionnaires has developed and distributed to employees of Flintstone real state in Addis Ababa specifically in Head quarter (Bole, friendship) and some selective sites. Out of these 133 questionnaires distributed to the respondents, 124 questionnaires have collected. Thus, the analysis is based on the valid 124 questionnaires responded by employees. The rest nine questionnaires has not returned.

Table 3: Questionnaire respondent's percentage

Item	Respondents	
	Correctly filled and returned	Not returned
Number	124	9
Percentage	93.2%	6.8%

Source: Researcher own survey (2023)

From the total prepared and distributed questionnaires 124(93.2%) respondents had correctly filled and returned. This implies that the response rate is enough to analyze the data and the remained unreturned data has not had a significant impact on this research analysis relevancy.

4.2 Demographic Information

In this section respondent of current working position, year of experience, and educational level were clearly stated in terms of frequency and percentages. The detail shows in the below tables.

Table 4: Position of respondents

Position	Frequency	Percent	Valid Percent
Project Manager	3	2.4	2.4
Office engineer	44	35.5	35.5
Site engineer	34	27.4	27.4
Consultant supervisor	28	22.6	22.6
Client supervisor	15	12.1	12.1
Total	124	100.0	100.0

Source: Researcher own survey (2023)

Table 4 shows the demographic composition of staffs. From 124 staff respondents, (35.5%) positions are office engineer, (27.4%), (22.6%), (12.1%) and (2.4%) positions are also site engineer, consultant supervisor, client supervisor and project manager respectively. This demographic composition shows that the data were collected from employees those who have different position and knowledge about the real estate industry challenges and opportunity.

Table 5: Professional experience in real state

Year of experience	Frequency	Percent	Valid Percent
0-5 year	21	16.9	16.9
6-10 year	52	41.9	41.9
11-15 year	42	33.9	33.9
> 20 years	9	7.3	7.3
Total	124	100.0	100.0

Source: researcher own survey, (2023)

Table 5 shows the working experience of respondents. Based on the outputs, Respondents that have work experience ranging from 0-5 years, 6-10 years, 11-15 years and more than 20 years are (16.9%), (41.9%), (33.9%) and (7.3%) respectively. The result shows that the most respondents working experience have more than 6 year, which implies that, the experience worth a lot for data reliability. Therefore, the target populations are the right person to analyze the company's project performance because the more he/she can acquire an experience on the industry, in-terms of which factor affects the project performance and how to deal with these factors in the organization for sure help in reducing the risks in the first place.

Table 6: Educational level of respondents

Level of education	Frequency	Percent	Valid Percent
MSc	62	50.0	50.0
Bachelor	55	44.4	44.4
Diploma	7	5.6	5.6
Total	124	100.0	100.0

Source: Researcher own survey, (2023)

Like employees position and working experience, level of education have a great value to this study because academic level enable any individuals to know the strengths, weaknesses, opportunities, and threats of organizations. In this regard, the data collected from the respondents, as we can observe from table 4.4, the largest groups of respondents 50% have a master, and 44.4% have a bachelor degree and 5.6% respondent have a diploma. Therefore, most respondent's academic career are excellent to clarify the overall organizational movement.

4.3. The mean of variables

Mean is the average of the given numbers and is calculated by dividing the sum of given number by the total number of numbers. The researcher applying descriptive statistics (specially mean and standard deviation) for the sake of better understanding and summarization, 30 items are grouped into five basic factors based on which construct every questionnaire item is measuring.

Table 7: the mean and standard deviation

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Project performance	124	3.71	5.00	4.4101	.33785
Financial and economic Risk	124	3.80	5.00	4.4774	.38988
Contractual and Legal Risk	124	3.17	5.00	4.4368	.37515
Resource Risk	124	3.17	5.00	4.3737	.35586
Design Risk	124	3.17	5.00	4.3898	.38483
Valid N (list wise)	124				

Source: Researcher own survey (2023)

To analyze the effect of project performance in Flintstone homes real estate, 30 attributes has selected. The importance of various attributes has ranked by measuring mean and standard deviation. A high mean score stands for a high level of agreement; while a low mean score dictates a high level of disagreement. The standard deviation on the flip side presents the degree of dissipation of responses from the mean score.

Accordingly, the above discloses that the mean value of project performance, financial and economic , contractual and legal, resource and design risk were found to be above the average mean of 4.41, 4.47, 4.43, 4.37, 4.38 and standard deviations of 0.33, 0.38, 0.37, 0.35 and .38 respectively. Which proves the financial and economic, contractual and legal, resource and design risk are the main potential risk factor for project performance. Therefore, Flintstone homes should give prior solution for these affecting factors.

4.4. Correlation analysis

Correlation is a bivariate analysis that measures the strength of association between two variables and the direction of the relationship. In terms of the strength of relationship, the value of the correlation coefficient varies between +1 and -1. A value of ± 1 indicates a perfect degree

of association between the two variables. Correlations of .01 to .30 are considered weak, correlations of .30 to .50 are considered moderate, correlations of 0.50 to .90 is considered strong, and correlations of .90 to 1.00 are considered very large. As the correlation coefficient value goes towards zero, the relationship between the two variables will be weaker. The direction of the relationship is indicated by the sign of the coefficient; a + sign indicates a positive relationship and a - sign indicates a negative relationship. Usually, in statistics, we measure four types of correlations: Pearson correlation, Kendall rank correlation, Spearman correlation, and the Point-Bacterial correlation. In this study, the researcher used Pearson correlation analysis.

Table 8: Inter component correlation

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

Correlations				
		Project performance	Finance and economy	Contractual and legal
Project performance	Pearson Correlation	1	.711**	.493**
	Sig. (2-tailed)		.000	.000
	N	124	124	124
Financial and economic Risk	Pearson Correlation	.711**	1	.345**
	Sig. (2-tailed)	.000		.000
	N	124	124	124
Contractual and Legal Risk	Pearson Correlation	.493**	.345**	1
	Sig. (2-tailed)	.000	.000	
	N	124	124	124
Resource Risk	Pearson Correlation	.468**	.296**	.187*
	Sig. (2-tailed)	.000	.001	.038
	N	124	124	124

Design Risk	Pearson Correlation	.694**	.608**	.355**
	Sig. (2-tailed)	.000	.000	.000
	N	124	124	124

Source: Researchers own survey, (2023)

✚ Dependent variable: Project performance

✚ Independent variables:

- 1) Financial and economic risk
- 2) Contractual and legal risk
- 3) Resource risk
- 4) Design risk

Table 8 shows that the association between all variables is positive as presented above. A significant relationship also found among many variables. All variables, which are Financial and economic risk, contractual and legal risk, resource risk and design risk have a significant relationship with project performance .000, which is less than 0.05.

Financial and economic risk has a strong positive relationship with the project performance at the value of 0.71. Contractual and legal risk has a positive relationship with project performance at the value of 0.49. Resource risk has a positive relationship with project performance at the value of 0.463, which near to 0.5 and design risk has a strong positive relationship with the project performance at the value of 0.69.

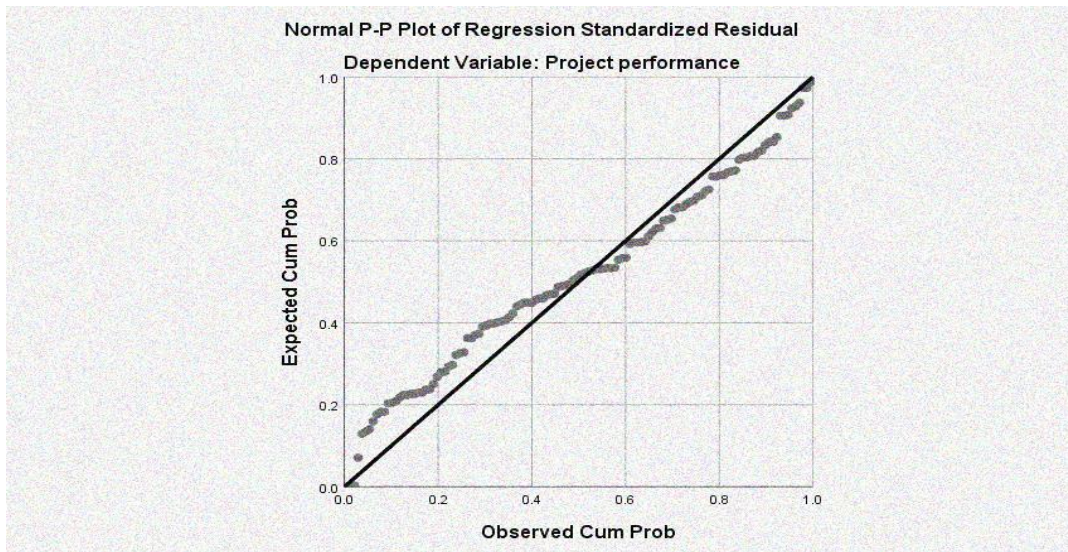
Based on this result the two independent variables which are financial and economic, and design risk have a significant and positive relationship with the project performance whereas contractual and legal, and resource risk have a moderate relationship with the project performance. A strong relationship implies that if an independent variable is increases /decreases the dependent variable will also increases or decreases at the same time. On this scenario when finance and economy, contractual and legal, resource risk and design risk increases , the project performance also increases and vice versa.

4.5. Violation assumption test

Violations of the assumptions of analysis influence the ability to trust results and validly draw inferences about research results. On this study, the researcher tried to test the five violation assumptions.

Figure 2: Zero conditional mean

$E(ut) = 0$, where Ut : unknown variables or error terms.



Source: Researcher own survey, (2023)

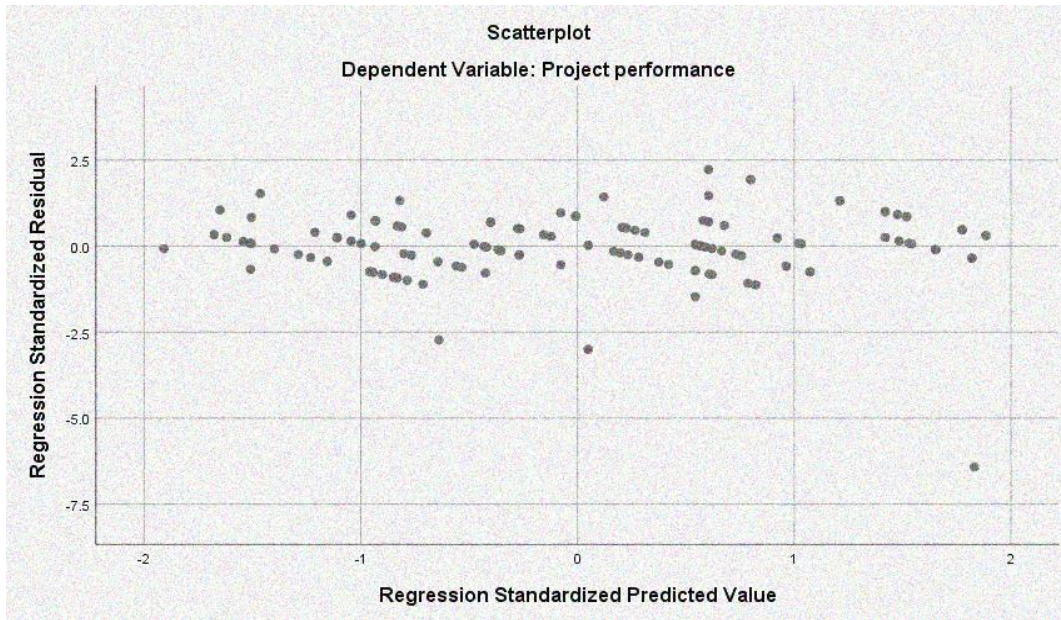
The above graph shows that the output is homoscedasticity. Because no symmetric relationship between the independent variable and the regression residuals. Therefore, assumption one is not violated on this studies outputs.

Figure 3: Homoscedasticity test:

$E(Ux, Uy) = 0$, where E : mean error terms.

Ux : Error term 1

Uy : Error term 2



Source: Researcher own survey (2023)

When we come to this assumption three scenario if the plot is condensed, there will not be correlation between the two error terms. Therefore, the output shows that the plot is highly condensed and the assumption two has not violated.

Table 9: Autocorrelation test

$$COV(X_t, U_t) = 0$$

Where: COV means the covariance between two variables

X_t: Predictor variables

U_t: Error terms

Model	Change Statistics		
	df2	Sig. F Change	
1	119	.000	1.819

Source: Researcher own survey (2023)

If the possible ranges of Durbin-Waston >2.5 the autocorrelation between the two variables are negative. If the value of Durbin-Watson <1.5 the autocorrelation between two variables are positive and the value of nearest to 2.0 the autocorrelation between two variables is zero or nothing. Based on this fact the value of Durbin-Watson on this research was 1.8, which is ~ 2 . That means there was no autocorrelation between them. Therefore, assumption three has not been violated.

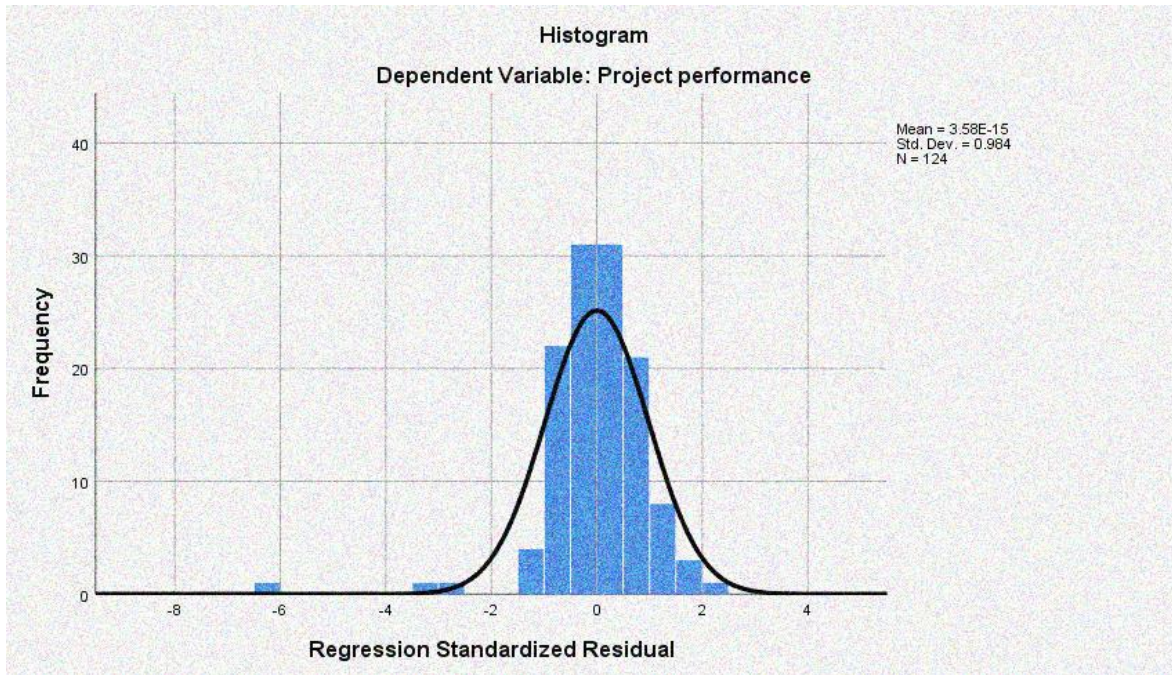
Table 10: Collinearity test

Model		Correlations			Collinearity Statistics	
		Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)					
	Financial and economic risk	.711	.471	.293	.601	1.665
	Contractual and legal risk	.493	.327	.190	.844	1.185
	Resource risk	.468	.348	.204	.882	1.133
	Design risk	.694	.412	.249	.591	1.691

Source: Researcher own survey, (2023)

Collinearity, in statistics, is the correlation between predictor variables (or independent variables), such that they express a linear relationship in a regression model. Multicollinearity describes a situation in which more than two predictor variables are associated so that, when all are included in the model, a decrease in statistical significance has observed. If the coefficient of tolerance is greater than 0.2 and the coefficient variance Inflation factor (VIF) is less than 10, it won't have collinearity between the variables. As shown in table 13 the coefficient of tolerance is > 0.2 and $VIF < 10$. Therefore, assumption five has not been violated.

Figure 4: Normality test



Source: Researcher own survey, (2023)

Normality tests are checked by two methods. The first test mechanism is histogram checking and the second mechanism is significance checking. For this study, the researcher used a histogram mechanism. Based on the output, the graph was skewed. So, the data are normally distributed which means assumption five was not violated

4.6. Regression Analysis

Regression analysis is a statistical method that helps us to analyze and understand the relationship between two or more variables of interest. The process that is adapted to perform regression analysis helps to understand which factors are important, which factors could be ignored, and how they are influencing each other. Regression is a method of predicting a value on some dependent variable given the values of one or more independent variables. Like correlations, statistical regression examines the association or relationship between variables. Unlike correlations, the primary purpose of regression is prediction (Marczyk, DeMatteo and Festinger, 2005). Since having four independent variables, multiple

regression models had used as a measure of their relationship. Eventually, the prediction equation then is calculated as the **project performance = A + B1finance and economy + B2contractual and legal + B3resource + B4design**. Where the project performance is a dependent variable, A is the constant term, B is the beta coefficient of each independent variable and finance and economy, contractual and legislation, resource and experience and design experience are predictor variables.

Table 11: Coefficient analysis

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.036	.287		-.125	.901
	Financial and economic risk	.328	.056	.379	5.823	.000
	Contractual and Legal risk	.187	.049	.207	3.778	.000
	Resource risk	.207	.051	.218	4.055	.000
	Design risk	.284	.058	.323	4.931	.000

Source: Researcher own survey, (2023)

- A: Constant
- Dependent variable: Project performance
- Predictors: 1) Financial and economic risk
 - 2) Contractual and legal risk
 - 3) Resource risk
 - 4) Design risk

Therefore, based on the above information the final linear equation formulates as follows.
 The Project performance = -0.36+ (0.33*financial and economic) + (0.19*contractual and

legal) + (0.207*resource) + (0.28*design). The coefficient of constant -.36 implies that it is the dependent (the project performance) value when the independent value is zero, which implies that if the Flintstone homes, could not manage the affecting factors properly, exposing to bankruptcy is a possible scenario. The coefficient of finance and economy of 0.33 indicates that as the level of financial and economic risk increased by one unit, the project performance will also increase by 0.33 unit keeping other things or variables constant. The coefficient of contractual and legal of 0.19 indicates that as the level of predictors increases by one unit, the project performance increases by 0.19 keeping other things constant and the remaining variable coefficients implication are similar too.

Table 12: Multiple regression of multiple predictors on project performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	Sig.
1	.835 ^a	.698	.688	.18884	.698	68.677	.000

Source: Researcher own survey, (2023)

This regression table measures the amount of total impact percentage in the dependent variable due to the independent variable. The above table outputs show the value of R² is 0.698. This value indicates that almost 69.8% of the variance on project performance is occurred because of the independent variables. The value of F must be greater than 5. In this study, the value of F is 68.677 at 0.000 significant level, which is greater than 5, this implies that all independent variables are jointly relevant to the regression. Totally, the researcher believed that regressions have a goodness of fit because the half and above percentage of the determinant (affecting) factors were identified.

4.7. Hypothesis testing

Hypothesis testing is a formal procedure for investigating our ideas about the world using statistics. Scientists to test specific predictions, called hypotheses, which arise from theories, most often use it. Hypothesis testing is based on standardized coefficients beta and P-value to test whether the hypotheses are rejected or not. Upon on the above testing result, the researcher tested each proposed hypothesis as follows.

Hypothesis 1

H₁: Financial and economic risk doesn't have a significant effect on project performance.

The results of regressions as obtainable above, revealed financial and economic risk has a strong significant effect on affecting the project performance with a beta value (beta = 0.33), at 95% confidence interval (p = 0.00). Consequently, the null hypothesis is rejected and the alternative hypothesis, financial and economic risk has a significant effect on project performance has been accepted.

Hypothesis 2

H₂: Contractual and legal risk doesn't have a significant effect on project performance.

The results of regressions as showed above, Contractual and legislation risk has a strong significant effect on affecting the project performance with a beta value (beta = 0.19), at 95% confidence interval (p = 0.001). Therefore, the null hypothesis is rejected and the alternative hypothesis, contractual and legal risk have a positive impact on project performance has been accepted.

Hypothesis 3

H₃: Resource risk doesn't have a significant effect on project performance.

The results of regressions as obtainable above, shown resource and experience has a strong significant on affecting the project performance with a beta value (beta = 0.207), at 95% confidence interval (p = 0.00). Consequently, the null hypothesis is rejected and the alternative hypothesis, resource risk has a positive influence on project performance has been accepted.

Hypothesis 4

H₄: Design risk doesn't have a significant effect on project performance.

According to the above regression coefficient results, design risk has strong impact on the project performance with a beta value (beta = 0.284), at 95% confidence level (p=0.00). Therefore, the null hypothesis is rejected and the alternative hypothesis, design has a significant influence on the project performance has been accepted as well.

In social science studies, the decision to reject the null hypothesis and accept the alternative hypothesis depends on the specific research question, study design, and statistical analysis employed. The criteria for making this decision typically involve statistical significance and effect size. Statistical significance refers to the probability that the observed results are not due to random chance. Researchers use statistical tests, such as t-tests, chi-square tests, or analysis of variance (ANOVA), to determine if the observed differences or relationships between variables are statistically significant. If the p-value associated with the statistical test is below a predetermined threshold (commonly set at 0.05), researchers reject the null hypothesis and accept the alternative hypothesis. Effect size, on the other hand, measures the magnitude or strength of the observed effect or relationship. It provides an indication of the practical significance of the findings. While statistical significance determines if the results are unlikely to occur by chance, effect size helps researchers understand the magnitude of the observed effect and its practical implications.

In social science studies, the decision to reject the null hypothesis and accept the alternative hypothesis is based on a combination of statistical significance and effect size. If the statistical test yields a significant result (p-value below the predetermined threshold) and the effect size is considered meaningful or substantial, researchers will reject the null hypothesis and accept the alternative hypothesis.

It is important to note that the specific thresholds for statistical significance and effect size may vary depending on the field of study, research tradition, and the nature of the research question. Additionally, other factors such as sample size, research design, and the validity of the measures used also influence the decision-making process.

In summary, social science studies determine the acceptance of the alternative hypothesis through a combination of statistical significance and effect size. This decision is made based on the results of statistical tests and the assessment of the practical significance of the observed effects or relationships.

Chapter Five

5. Summary of findings, Conclusion and Recommendation

This chapter summarizes the findings and results based on the data collected from respondents. This study looks at the risk factors that influence project performance. Following that, the discussion had attempted to achieve all of the study's objectives. As a result, recommendations has made to the target company in order to address the issue at hand.

5.1 Summary of Major findings

The study has conducted to identify the risk factors, which affects the project performance of a residential real estate development projects.. A total of 133 samples were selected for the study and collected data from Flintstone homes head quarter and some selective sites. Accordingly, a four-dimensional instrument comprising of finance and economy, contractual and legislation, resource and design risk factor had used for the study. The data obtained from the respondent have analyzed using various statistical tools.

The relative importance of the significant predictors is determined by looking at the standardized coefficients. All independent variables have the highest standardized coefficient and the lowest significance, which means finance, legislation; resource and design are the best predictor variables. The affecting factors and project performance had the value of adjusted $R^2=69.8\%$. This indicates that the project performance is affected 69.8% by those factors and the remaining 30.2% could be explain by other factors.

From the Pearson's correlation result, it indicated that there is a positive and significant relationship between the all-affecting factors such as finance, legislation, resource and design. Accordingly, assurance was found to have the highest correlation with project performance. The correlation result indicates that the strong correlation found between finance and Economy risk and design risk with project performance while the moderate relationship was found between

resource risk and contractual and legal risk with project performance. The respondents had believed that all four independent variables affected the project performance.

Based on the findings, the four independent variables had a direct relationship with project performance. This means that those variables are the main affecting predictor for project performance. Because most respondents confirmed their agreement on the existence of finance and economy risk, contractual and legal risk, resource risk and design risk affectedness on project performance.

5.2 Conclusion of the study

Any Construction project's goal is to accomplish the project's objectives while staying within the budget, schedule, and quality standards set by the client. However, risks are situations that could impair the goals of construction projects. Through a thorough assessment of the literature, the most important risk factors that significantly affect the performance of residential real estate development projects had identified and categorized in this study. Questionnaire survey was performed for a quantitative study to get information about the identified risk factors from their experiences.

According to the findings, instability of financial markets, changes in interest rate, inflation, design change during the construction phase, differences in design practices and standards, Insufficient resources such as; skilled labor and materials and lack of experience in managing complex projects, changes in tax laws, environmental regulations, labor laws, breach of contract, failure to perform obligations under the contract can all contribute to cost overruns and delays in project completion.

The findings would serve as the foundation for a framework that shows how good investment decisions require more than just risk analysis to support justification; it also calls for problem-solving around time, cost, and performance issues, as well as making sure that someone is held accountable for the decision. The preliminary interview results I received show that there is a lack of understanding of how developers manage the inherent hazards of their line of work.

even though such understanding is necessary to enable the continued professionalization of the sector (Gehner, 2008). Risk analysis helps project managers determine priorities, allocate resources, and put processes and actions in place that lessen the chance that the project won't accomplish its goals. Better company and project outcomes are facilitated by risks analysis, which gives insight, knowledge, and confidence for improved decision making. In particular, it will encourage smarter choices about planning and design procedures to reduce or eliminate risks as well as to seize and take advantage of possibilities. It improves contingency planning for addressing risks and their effects, supports better resource allocation to risks and budget alignment to risks, and facilitates judgments regarding the optimum risk allocation among the stakeholders involved in a project activity. All of these factors taken together will boost certainty and decrease total risk exposure by Project Management Book (PMI,2004).

The research also shows that Finance and Economy risk along with design risk has major impact on the performance of a project whereas Resource with contractual and legal risk has moderate impact.

This suggests that care should be taken to prevent the occurrence of significant hazards during the planning and management of construction projects.

5.3 Recommendations of the study

This research has identified the affecting variables of Project performance in Flintstone real estate. The availability of adequate finance, clear Contractual and legal process, sufficient resource and well-designed design influence project Performance of the real estate directly. Therefore, the following proposed recommendations help to solve the identified affecting factors.

1. Financial and economic risk:

- Conduct regular financial analysis to identify potential risks and take proactive measures to manage them.
- Consider purchasing insurance or hedging instruments to protect against financial losses.
- Maintain strong relationships with lenders and financial institutions to ensure access to capital when needed.
- Stay informed about economic trends and developments that could impact the business.

2. Design risk:

- Conduct thorough market research and user testing before launching a new product or service.
- Invest in design and user experience expertise to ensure that products and services are user-friendly and meet customer needs.
- Implement a quality control process to catch and address design flaws and issues before they become major problems.
- Solicit customer feedback and incorporate it into product and service design and development.

3. Resource risk:

- Conduct regular resource assessments to ensure that the business has the necessary tools, personnel, and equipment to operate effectively.
- Invest in training and development programs to ensure that employees have the skills and knowledge to perform their jobs effectively.
- Develop contingency plans for potential disruptions to resources, such as power outages, supply chain disruptions, or natural disasters.

- Establish a culture of continuous improvement to encourage innovation and efficiency.

4. Contractual and legal risk:

- Hire legal counsel to review and negotiate contracts and agreements to ensure that the business is protected from legal risks.

- Stay informed about changes in laws and regulations that could impact the business and adjust operations accordingly.

- Establish clear policies and procedures for compliance with relevant laws and regulations.

- Maintain accurate records and documentation to demonstrate compliance with legal requirements and contractual obligations.

5.4 Research Limitations and Areas for Further Study

5.4.1 Limitations of the study

This study had several limitations. For starters, like any other sort of research, the sample size may affect or influence the conclusions. As it's known when the sample size is increased, the relevancy of the study also increases. Secondly, this study focused primarily and specifically on a particular construction company. As a result, it may not be applicable to other similar companies.

5.4.2 Areas for Future Study

This research mainly focuses on the housing business of real estate sector. Further research can be done to identify risk factors affecting the project performance of a commercial, Institutional and Industrial real estate's development projects. On this research, it only incorporated the insight of Flintstone homes head quarter and some selective site employees. But it needs the perception of all site employee to increase the relevance of the research.

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APPENDIX

Dear Sir or Madam,

April, 2023

I am a graduate student in project management at the School of Commerce at Addis Ababa University. For my graduation thesis topic, I'm conducting a survey on the hazards involved with private real estate development project. I'd like to extend an invitation to you to participate in this study. I'm hoping that with your help, I can comprehend, name, and rank the main risk elements in the industry. I would appreciate it if you would review the questionnaire and, if you so choose, complete it. It can take about 20 minutes to complete the survey. Please do not include your name on the survey since your responses are anonymous. All responses will remain private.

Individual responses will not be presented or recorded; only group results will. Your participation in this research is wholly voluntary. If you don't want to, you are not required to respond to any questions. Your agreement to engage in this study will be indicated by the return of an answered survey. Please get in touch with me at (+251) 913301567 or shiferawbitanya921@gmail.com if you have any queries or worries.

Please get in touch with the School of Graduate Studies at (+251) 11-5-51-80-20 if you have any questions about your rights as a study participant. I appreciate your thoughts and time.

Sincerely,

Bitanya Shiferaw

Post-Graduate Student

INSTRUCTION:

- i. Please do not write your name on the questionnaire.
- ii. Please read each question carefully.
- iii. Kindly answer all the questions by circling your answer from the alternatives.

PART I Respondent's Profile

1. The position of the respondent?

a) Project manager b) Office Engineer c) site engineer d) consultant supervisor e) client supervisor

2. Working experience

A) 1 to 5 years (b) 6 to 10 years (c) 11 to 20 years (d) Above 21

3. Educational Qualifications

(a) Certificate (b) Diploma (c) Degree (d) Master and above

PART II Questionnaire

Project performance

PP1. In adequate project planning has impacted the project performance of the real estate.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

PP2. Inadequate risk management practices contribute to construction project performance risk.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

PP3. Poor communication among project stakeholders affected construction project performance of the real estate.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

PP4. Poor contractor selection influence construction project performance.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

PP5. Inadequate project budgeting contributes to construction project performance risk.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

PP6. Unforeseen ground conditions impact project performance.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

PP7. A failure to quality of a project work has happened in this real estate.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

Finance and Economy factor

FE1. Tighten lending criteria of banks or financial institutions during challenging economic conditions affected this real estate development projects.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

FE2. Fluctuations in interest rates affected the real estate development projects.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

FE3. Economy recessions has impacted the viability of the real estate projects.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

FE4. Experienced delays in obtaining project financing for the real estate development projects due to economic factors.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

FE5. Stable Financial source is applied in the organization.-

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

Contractual and Legal factor

CL1. The Employees are familiar with the potential risks associated with inadequate contract terms in real estate projects.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

CL2. Changes in government regulations has affected the construction project performance of the company.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

CL3. The contract document has been exposed to misinterpretation.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

CL4. Changes in local and national building regulations affect the real estate project timelines and cost.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

CL5. Property rights to land may limit the scope of investment.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

CL6. Because of contractual ambiguity, the institution is vulnerable to accusations.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

Resource factor

R1. There is a shortage of materials.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

R2. Inadequate investigation of the site before the design period.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

R3. Underestimation of the cost of the project.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

R4. Availability of skilled labor is critical factor in the organization.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

R5. There is Reliable access to construction materials for timely project completion.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

R6. Lack of experience in managing complex projects contributes to cost overruns and delays.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

Design factor

D1. Incomplete or inadequate architectural designs pose a risk to the real estate project.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

D2. There is an unrealistic period to design.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

D3. There are errors and omissions in the design.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

D4. Poor coordination of design team members

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

D5. It's important to consider the impact of design changes on project timelines and costs.

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

D6. Changes or variations are made at the request of a consultant

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree