Analysis of Risks in Residential Real Estate Development Projects of Addis Ababa

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ANALYSIS OF RISKS IN RESIDENTIAL REAL ESTATE DEVELOPMENT PROJECTS OF ADDIS ABABA

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION

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CONTENTS

ABBREVIATIONS/ACRONYMS

GDP – Gross Domestic Product

PFI - Privately Financed Infrastructure projects.

PMBOK – Project Management Book of Knowledge

PPP - Public–private Partnership Projects

RED – Real Estate Developer

RF – Risk Factor

R-I – Risk Impact

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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 the risks in real estate development projects in Addis Ababa, assessing their impact on project schedule and cost, and the interrelationship between the risk factors. Risk factors which could possibly occur in real estate development projects were identified from previous research works on similar issue. In addition, risks included in real estate purchase agreements which are being used in the market were reviewed and these factors were measured with a questionnaire survey. The identified risk factors were threefold, namely economic and financial, technical and environmental, legal, contractual and political. Questionnaires were collected from private residential real estate development companies in Addis Ababa, Ethiopia in order to assess the likelihood of occurrence and impact of the identified risk factors. The significance of the interrelationship between these factors was also assessed. The risk impact assessment was conducted by developing a risk significance index and the significance interrelationship was identified by the use of correlation analysis. The results show that economic and financial factors have greater impact on project objectives. It was also found that Economic and financial risks have significant correlation with each other. Developers can foresee the occurrence of these risks and can assess their impact. This makes the risk response planning easier for developers. Therefore, it is recommended that developers plan ahead on how to respond towards such factors. Technical and environmental risks are also found to have a significant impact on project objectives. Most of these factors are internal factors for developers and the developers can foresee and control the possibility of their occurrence. Developers are responsible for these factors and they are obligated to absorb them. This will affect their schedule and will incur cost. Hence, developers should work towards minimizing the probability of occurrence and impact 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: *Purchase agreement, Real estate, Risk, Risk analysis, Risk identification, Risk impact, Risk response.*

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Real estate development is considered one of the sectors with transaction of billions of birr in the market in Ethiopia. A number of investors have involved in the development of real estate in Ethiopia. According to the data from Addis Ababa City Administration Land Management and Construction Licensing Authority which was collected in the 2011/2012 fiscal year, 124 investors have received business licenses to work in the real estate development sector of Addis Ababa (የቤቶች ልማት, 2012).

Residential real estate development contributes to the economy of the country and in alleviating housing problem. However, researches concerning real estates in Ethiopia mainly in Addis Ababa show that the real estate development sector faces different problems and challenges. Problems that exist in the real estate development make the environment susceptible to uncertainty.

An uncertain environment involves risk and compared with many other industries, the construction industry is subject to more risks due to the unique features of construction activities (Akintoye & MacLeod, 1997; Flanagan & Norman, 1993; Smith, 2003). In construction projects, risk may be defined as the likelihood of a detrimental event occurring to the project. Since the objectives of construction projects are usually stated as targets established for function, cost, time and quality, the most important risks in construction are the failure to meet these targets (Baloi & Price, 2003).

Risks and uncertainties are associated with all projects in real estate development like any other construction and commercial activity. These risks and uncertainties can strongly influence all related progresses at all stages of the entire lifecycle of properties (Chen & Khumpaisal, 2009). However, risks are not always associated with negative outcomes (Baloi & Price, 2003).

Risk management has become increasingly important for any commercial organizations operating in today's environment (Groton, Smith, & Risk Allocation Sub-Committe, 2010; Mead, 2007; Wiegelmann, 2012) where risks are inherent (Mead, 2007). It is important that risks are identified, understood, anticipated, assessed, analyzed, and to learn to manage risks (Groton et al., 2010; Wiegelmann, 2012). "Failure to accurately to identify and make appropriate allowance for risks

being assumed under complex commercial and contractual arrangements can have terrible consequences." (Mead, 2007) As part of risk management process, risk analysis establishes the probabilities of occurrence of adverse events and measures of the potential impact of risk event outcomes (Edwards & Bowen, 1998).

Risks which exist in real estate development have impacts and developers need to manage risks and minimize their impact on project objectives and their business as a whole. It is important to know what risks exist in the real estate development projects and their impact on project objectives. The motive of this research is to identify the major risk factors existing in real estate development projects of Addis Ababa and examine the impact of risk factors on project schedule and cost.

1.2 Statement of the Problem

Risks affect projects objectives such completion with the estimated time and budget. Non-delivery of housing projects on time and adjustment price of housing units are one of the basic problems residential real estate developers are facing. These two are major problems and highly affect the trustworthiness of developers. These problems could be caused due to many affecting factors which exist in real estate development business. Uncertainty caused by such factors can be minimized by identifying the causes and by planning towards mitigating the risks involved due to the uncertainty. However, the researcher could not find any research paper on risks involved in real estate development projects in Ethiopia. Therefore, this study aims at identifying the risks in real estate development projects in Addis Ababa, their impact on projects schedule and cost, and assessing the interrelationship between the risk factors.

1.3 Research Questions

Research questions are formulated as follows.

1. What are the different risk factors related to residential real estate development projects?
2. What are the risk factors included in real estate purchase agreements of local residential real estates in Addis Ababa?
3. Which risk factors have a greater impact on residential real estate development project schedule and cost?
4. Which factors are strongly correlated with each other?

1.4 Objectives of the Study

i. General Objective

The main goal of this research is to identify the risks in real estate development projects in Addis Ababa, their impact on project schedule and cost, and assess the interrelationship between the risk factors.

ii. Specific Objectives

The specific objectives are listed below.

1. Identify risk factors from previous researches done on real estate development in Ethiopia and real estate purchase agreements currently being used.
2. Identify risk factors from real estate purchase agreements currently being used.
3. Rank the risk factors according to their impact on project schedule.
4. Rank the risk factors according to their impact on project cost.
5. Assess the strength of the correlation between risks in real estate development projects.

1.5 Significance of the Research

Real estate development as a business venture dates back about quarter of a century in Ethiopia and the industry is suffering from various difficulties due to different factors. Risks associated to Real Estate Developments affect projects negatively and this is not an issue that can be ignored. It is important to have relevant information on project risks for real estate developers. Therefore, this study will be a stepping stone by giving a broader insight on risks and their impact on project objectives, mainly cost and schedule. It is believed this could help the companies move towards a better risk management practice.

1.6 Scope of the Research

This research deals with risks in private real estate purchase contracts by focusing on residential real estate development firms working in Addis Ababa, Ethiopia. Real estate agents and developers who sell houses or apartments after construction is completed are not included in the study.

1.7 Limitation of the Research

Risks associated to real estate development projects are wide-ranging. This research id delimited to construction related risks in residential real estate development projects.

1.8 Organization of the Research

This thesis is divided into five chapters. Chapter One is an introduction of the research and Chapter Two is the review of previous research works. Chapters Three presents design of the research, and the methods applied for data collection and analysis. Chapter Four covers results and discussion and last chapter covers the main conclusions and recommendations of the research.

CHAPTER TWO: LITERATURE REVIEW

This chapter presents a thorough conceptual and empirical review of relevant literature on real estate development, risk management and risk allocation. The chapter consists of four sections. The first section defines real estate development. The second section defines and discusses risk and risk management, and risk allocation. The third section covers risks in real estate development projects in general and in real estate development projects in Addis Ababa, Ethiopia. Lastly the gap in reviewed literature is discussed.

2.1 Real Estate Development

As Khedekar and Dhawale (2015) put it, the term real estate stands as land, including the air above and the ground below it and any buildings or structures on it. It covers residential housing, commercial offices trading spaces such as theatres, hotels and restaurants, retail outlets, industrial buildings such as factories and government buildings (Khedekar & Dhawale, 2015). Real estate involves the purchase, sale, and development of land, both residential and non-residential buildings. The main players in real estate market are the developers, builders, real estate agents, tenants, buyers, etc. (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." (Truneh, 2013)

Real estate development is linked with specialization in the sense that a person develops land and property for sale or rent (Truneh, 2013). As Wiegelmann (2012) cited Wilkilson and Reed (2008:2) adopted the definition that real estate development is "a process that involves changing or intensifying the use of land to produce buildings for occupation".

A developer can be defined as the person or firm that is actively involved in the development process and takes the risks and receives the rewards of development (Truneh, 2013). Developers can be distinguished by their product categories which are residential, commercial and special use (Wiegelmann, 2012).

2.2 Risk and Risk Management

2.2.1 Definition of Risk

Risk has been defined differently in reviewed literatures. Most definitions of risk have focused on the negative side of risks such as losses or damages which is the downside of it (Schieg, 2006). This definition which signify the negative aspect has been connoted as a traditional view of risk (Hillson, 2002; Khedekar & Dhawale, 2015; P. Simon, and, & Newland, 1997; Teneyuca, 2001; Wiegelmann, 2012; Zhang, Zhang, & Gao, 2006).

Some literatures encompassed both the possibility of downside/loss and upside risk /gain, i.e. uncertainties that could have a beneficial effect on achieving objectives (A. Faridi & El-Sayegh, 2006; El, El Nawawy, & Abdel-Alim, 2015; Hillson, 2002; Lam, Wang, Lee, & Tsang, 2007; PMI, 2013; Renuka, Umarani, & Kamal, 2014; Stephen Ward & Chapman, 2003; Wiegelmann, 2012; Williams, 1995). Schieg (2006) presented a theoretical meaning of risk, as a positive or negative deviation of a variable from its expected value. Fisk and Reynolds (2011) put a similar meaning of risk.

Risk and uncertainty might be found being used interchangeable in different literatures. However, PMBOK describes risk through the notion of uncertainty, risk has its origins in the uncertainty present in all projects. “Project risk is 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” (PMI 2013: 310) which shows these two phenomena are not synonymous.

According to Al-Bahar (1990), uncertainty represents the probability that an event occurs which entails how likely an event is to occur, i.e., the chance of the event occurring. Renuka et al. (2014) Alsalman (2012) and Al-Bahar (1990) defined risk as exposure to the consequences of uncertainty. Similarly, Khedekar and Dhawale (2015) defined risk as exposure to the possibility loss or gain, as a consequence of the uncertainties associated with pursuing a particular course of action. Olsson (2007) and Hillson (2004) put risk as a measurable uncertainty and uncertainty as an immeasurable risk, which implies that, when measurable, an uncertainty is to be considered as risk. Byrne (1996) defines risk as a term appropriate for situations where it is possible to define probability distributions for probable outcomes and uncertainty as a term that better suits situations where such probability distributions cannot be made. This definition clearly indicates the

distinction between risk and uncertainty, stating risk is measurable and quantifiable, and that uncertainty is not measurable and cannot be quantified (Alsalman, 2012). These definitions highlight the distinction between the two terms which is related to its quantification (KarimiAzari, Mousavi, Mousavi, & Hosseini, 2011; Wiegelmann, 2012).

2.2.2 Risk Management

Risk management is defined in different ways by authors. Edwards and Bowen (1998) and El et al. (2015) defined risk management as a systematic approach to dealing with risk. According to T. Uher (2003) risk management is "a systematic way of looking at areas of risk and consciously determining how each should be treated. It is a management tool that aims at identifying sources of risk and uncertainty, determining their impact, and developing appropriate management responses. " Risk management is also defined as a scientific approach of identifying, anticipating and minimizing the possible adverse impacts on the projects (Koirala, 2014).

Risk management is also presented as a process in reviewed literature. To name a few, Koirala (2014) defined risk management as a set of processes concerned with conducting risk management planning, risk identification, risk analysis, response planning, and monitoring and control on a project. Thompson and Perry (1992) and El et al. (2015) presented risk management as a systematic process of identifying, analyzing, and responding to project risk, and it includes maximizing the probability and consequences of positive attributes and minimizing the probability and consequences of attributes adverse to project objectives.

A risk management process typically comprises establishment of context, risk identification, risk analysis, risk evaluation and risk response (Berkeley, Humphreys, & Thomas, 1991; Edwards & Bowen, 1998; Flanagan & Norman, 1993; Lam et al., 2007; Lyons, 2003; Mead, 2007; Perry & Hayes, 1985; Uff & Odams, 1995; Wiegelmann, 2012; Wysocki, 2011). It establishes a strategy to avoid losses and use available chances or rather chances potentially arising from risks and influence risk decision-making (Baloi & Price, 2003; Edwards & Bowen, 1998; Flanagan & Norman, 1993; Raftery, 1994; Schieg, 2006). This means recognizing potential risks and circumventing a threat by averting, evading or reducing their negative effects (Mead, 2007; Schieg, 2006) and realizing potential opportunities (Mead, 2007).

Zavadskas, Turskis, and Tamošaitiene (2010) share a similar view that risk management is a process of defining sources of uncertainty (risk identification), estimating the consequences of uncertain events/conditions (risk analysis), and generating response strategies in the light of expected outcomes and finally, based on the feedback received on actual outcomes and risks emerged, carrying out identification, analysis and response generation steps repetitively throughout the life cycle of an object to ensure that the project objectives are met.

Each PMI knowledge area in itself contains some or all of the project management processes. For example, project risk management includes (PMI, 2008):

- Risk management planning;
- Risk identification;
- Risk analysis;
- Risk response planning;
- Risk monitoring and control.

i. 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).

ii. Risk Identification

Risk identification is the first and perhaps the most important step in the risk management process (Wang & Chou, 2003) for the very reason that, without identifying a risk, it is impossible to analyze, assess, or control it (Wiegelmann, 2012). Risks should be identified if they are to be. In practice, the primary aim should be to identify the key, critical, important risks in the project so that they can be analyzed and an appropriate response can be determined because considering every risk is wasteful, inefficient and doomed to failure (Andi, 2006).

Risk identification attempts to identify the source and type of risks including the recognition of potential risk event conditions in the construction project and the clarification of risk

responsibilities (Wang & Chou, 2003). Risk identification develops the basis for the next steps: analysis and control of risk management (Carbone & Tippett, 2004).

iii. 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).

iv. 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 actions 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 (Gehner et al., 2006).

Risk response is a decision supported by a risk analysis (Gehner et al., 2006). The decision is based is on the willingness to knowingly take risks (M. Simon, Houghton, & Aquino, 2000). 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). According to (Chapman, 1997), mitigating actions are normally based on classical approaches such as: risk avoidance/ mitigation, risk sharing, risk transfer or risk acceptance providing a suitable contingency. Once risk is accepted, there are three main approaches for risk allocation, either to retain the risk, transfer it or share it (Alsalman, 2012).

The risk mitigation actions are discussed here below.

a) Risk avoidance

Risk avoidance, 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). 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 (Wiegelmann, 2012).

b) 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).

c) 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 on to 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).

d) Risk retention

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).

v. 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).

2.3.3 Risk Allocation

Risk exists wherever the future is unknown (Fisk & Reynolds, 2011). The nature and extent of risks may change, new risks may emerge and existing risks may change in importance and any such changes may also aggravate or ease some other risks as a project progresses. (M. Motiar & M.M, 2002). Managing risks systematically and proactively is important (Kumaraswamy, Dulaimi, Love, & Motair, 2001).

Risks play a significant role in business decision making (Taroun, 2014; Wiguna, Scott, & Khosrowshahi, 2005). Risks should be identified and a way to determine how to deal with those risks and the changing environment of risk by planning the risk response should be planned (Mubarak, 2015). Risk allocation is a major process of the risk response (Alsalman, 2012) .

Risk allocation always occurs in any situation where more than one party is responsible for the implementation of a project (ACEC, 2005; Zaghloul & Hartman, 2003). Risk allocation is a

process of identifying risks and determining how they fair share among project stakeholders (Kia & Tohidi, 2002). It is the decision of which party or parties should bear the consequences of risks, if they occur in the project (Uff & Odams, 1995; Wibowo & Mohamed, 2008). The risk allocation process can be performed qualitatively and quantitatively (Rouhparvar, Zadeh, & Nasirzadeh, 2014).

Risk allocation is an important issue (El-Sayegh, 2008; Zaghloul & Hartman, 2003). It can affect the success of the project by impacting project performance and the total construction costs (Kia & Tohidi, 2002; Lam et al., 2007; Levitt, Logcher, & Ashley, 1980; Zaghloul & Hartman, 2003). A fair risk allocation is essential for the successful completion of a project (Mubarak, 2015; Roumboutsos & Anagnostopoulos, 2008; Zayed, Amer, & Pan, 2008). It is the goal of risk management to minimize the total cost of risk to a project, not necessarily the costs to each contracting party separately (Alsalman, 2012; CII, 1993). Companies can expect that their projects will have fewer claims, reduced costs and timely completion by advocating fair risk allocation (Groton, Smith, & Risk Allocation Sub-Committe, 2010; Kia & Tohidi, 2002; Rahiman, 2006; Zaneldin, 2006).

Risk allocation is done in three approaches; by retaining, transferring, and/or sharing of risks (Alsalman, 2012). Mostly, risk allocation is conducted through contract in construction industry (Alsalman, 2012; F Nasirzadeh, Rouhparvar, Zadeh, & Rezaie, 2015). The fundamental function of contract conditions would be to allocate obligations to each of the contracting parties (T. E. Uher & Davenport, 2009) with contractual provisions and clauses (Alsalman, 2012). Common contractual clauses used to distribute risk include indemnification provisions, warranties, schedule-related requirements (including the imposition of liquidated damages), and the ability to withhold payment (DLAPiper, 2015).

Willingness of a party and awareness to bear the risk will affect its response to risk (SC Ward, Chapman, & Curtis, 1991). However, the decision itself depends on the level of information regarding future situation and on the risk appetite of the company since it is a key factor in evaluating strategic options. According to COSO (2009), risk appetite is the degree of uncertainty an enterprise is willing to accept. Risk appetite of an organization varies with its strategy as well as evolving conditions in its industry and markets (Wiegelmann, 2012).

2.3 Risk in Real Estate Development Projects

2.3.1 Risk in Real Estate Projects in General

Risk management has become increasingly important for any commercial organizations operating in today's environment (Groton et al., 2010; Mead, 2007; Wiegelmann, 2012) where risks are inherent (Mead, 2007). It is important that risks identified, understood, anticipated, assessed, analyzed, and to learn to manage risks (Groton et al., 2010; Wiegelmann, 2012). "Failure to accurately identify and make appropriate allowance for risks being assumed under complex commercial and contractual arrangements can have terrible consequences" (Mead, 2007).

The construction business is risky like any other business (El-Sayegh, 2008; Taroun, 2014). Risks are inherent in all construction projects (Dey & Ogunlana, 2004; El-Sayegh, 2008; M. Motiar & M.M, 2002) because the construction industry is one of the most dynamic, risky, challenging, and rewarding fields (Kangari, 1995; Sterman, 1992; TE Uher & Loosemore, 2004; Zeng, An, & Smith, 2007). Flanagan and Norman (1993) argued that the construction industry is subject to more risks and uncertainties than any other industry. Dey and Ogunlana (2004) share the same opinion.

There is no risk free construction project (Lam et al., 2007). Construction projects are always unique (Oyegoke, 2006; Pheng & Chuan, 2006) and are built only once (Zavadskas et al., 2010). In addition, construction involves numerous stakeholders and long production durations (Zou, Zhang, & Wang, 2007) which increase the susceptibility for uncertainty.

The outcomes of all construction projects can potentially be affected adversely by a large number of risks (Loosemore & McCarthy, 2008). The construction process is complex and characterized by a number of uncertainties which make many construction projects fail to achieve their time, cost and quality goals (Baloi & Price, 2003; Banaitiene & Banaitis, 2012; Mohammad & Jamal, 1991; Zavadskas et al., 2010; Zeng et al., 2007; Zhang et al., 2006). Project risks may even cause construction project a total failure (Banaitiene & Banaitis, 2012).

Risks and uncertainty are inevitable in the construction industry. Incorporating risk management concepts into construction practice is important for managing uncertainty and risk (KarimiAzari et al., 2011), for the enhancement the performance of a project (Farnad Nasirzadeh, Afshar, & Khanzadi, 2008) and for the successful delivery of a project (Zou, Zhang, & Wang, 2006).

However the construction industry is not with a good reputation of coping with risk. Many projects fail to meet deadlines, cost targets, and specifications (Dey & Ogunlana, 2004).

The real estate development business shares the risky nature of construction as well. Risks and uncertainties are associated with all projects in real estate development like any other commercial activity. As mentioned earlier, these risks and uncertainties can strongly influence all related progresses at all stages of the entire lifecycle of properties (Chen & Khumpaisal, 2009).

Wiegelmann (2012) says as best applied to the real estate development industry, the definition of risk is but not limited to an element of uncertainty aligned with expectations and objectives of a real estate development organization within a specified time horizon and budget differentiating between negative (threat) and positive (opportunity) aspects of risk. Yet, it is the downside of risk this research is concerned with.

2.3.2 Risks in Real Estate Development Projects in Addis Ababa

Real Estate development is considered as one of the sectors with transaction of billions of birr in the market. However, researches concerning real estates in Ethiopia mainly in Addis Ababa show the real estate development sector faces different problems and challenges.

Eshete and Teshome (2015) examined the performance, challenges and prospects of real estate financing in Addis Ababa with a micro and macro outlook. The result of their research shows problems of land management, inadequate infrastructure, low construction capacity of developers or contractors hired for construction, poor borrowing capacity, price escalation, and low affordability are some of the challenges and shortcomings of real estate development in Addis Ababa. Kiros (2009) also assessed and described the factors affecting the real estate market and shares similar results with Eshete and Teshome. Kiros stated there exists a slow and insufficient supply of land, foreign currency shortage, shortage and price escalation of housing construction materials. In addition, inflation amd non-existence of long term housing finance were factors which affected the real estate sector. He outlined there is a considerable decline in sales and and that housing prices are less affordable in the market. Similarly, research done by Paulos (2011) on private residential real estate developers shows price escalation and devaluation of birr are major challenges.

Findings of Paulos (2011) also show that there is a delay in handing over which was a point most of real estate developers which were study subjects of his research agreed. Price escalation and shortage of construction materials, and lack of adequate finance were the major causes to the delay. Adverse climatic conditions and unavailability of skilled labor were also found to be significant causes of delay.

Non-delivery of housing projects on time is one of the major problems affecting trustworthiness of real estate developers (Bewket, 13 January 2014; Muluken, 15 April 2013). Only 15 of them have completed the houses and transferred houses to the hands of their clients and four of them were kicked out while the rest are still with incomplete houses for up to ten years (Bewket, 13 January 2014).

As per the report of Land Administration and Building Permit Authority of the City Administration, the usual excuses mentioned as major challenges by developers are delay in handing over the site on the part of the City Administration, delay in provision of infrastructure, price escalation of building materials and lack of loan finance (Truneh, 2013). According to experts and developers, the major problems were delays in the original timetable due to lack of available accessible land, finances obtained from clients for housing projects being used for other purposes and the shortage of experienced and organized professional teams to handle such huge investments (Muluken, 15 April 2013).

Delays affect not only the clients but also developers themselves since delay causes rise in initial cost which was originally estimated by the contractors for a specific project in relation to inflation, foreign currency exchange and other issues. Still, clients mostly become the primary victims of the delay incurred since they are definitely expected to cover the additional cost. Whereas, real estate developers also argue that some of them may become bankrupt, forcing them out of the market. Insufficient funds is also an issue which contributed in a major way to delays for long periods because customers are the only sources of finance in real estate projects (Muluken, 15 April 2013).

According to the findings Paulos (2011), time extension is not the only issue in client-developer contractual relationship. Price adjustment is found to be what most developers do considering price

escalation of some construction inputs and devaluation of birr. Most of these developers make engineers approve the adjustment and few of them get approval from consultants. However, customers usually refuse to accept the adjustment as some developers stated. This is another cause of delay in handing over. Price adjustment as a result of escalating prices construction materials affects not only for new orders to come, but also the ability of customers/buyers to pay remaining installment payments (Kiros, 2009). Price adjustment might lead to terminations of contract before delivering the homes unless clients agree to new terms and conditions which include a new price and can result in customers taking their seller to court to get the homes they had paid for (Tadeos, Jul 14, 2012). Developers who faced shortage of finance to complete projects caused terminations of contract for customers who do not agree to new terms and conditions which include new price (Selam, 2016).

All the problems discussed in this section are challenges to the real estate development projects. Problems that exist in the real estate development make the environment susceptible to uncertainty. An uncertain environment involves risk, and risks should be identified and their impact has to be assessed in order to make decisions which help minimize their impact. Researches and reports on problems related to real estate development projects in Addis Ababa have identified possible risk factors. These risk factors are summarized as follows.

Table 1 Risks in real estate development projects in Addis Ababa

No.	Risk Factor	Author
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 shortage	Kiros (2009), Muluken (15 April 2013)
4	Shortage 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)

2.4 Gap in Reviewed Literature

Researches concerning real estates in Ethiopia mainly in Addis Ababa focused on problems and challenges the sector is facing. Non-delivery of housing projects on time is one of the major problems of real estate developers (Bewket, 13 January 2014; Muluken, 15 April 2013).

There exists problems of land management, inadequate infrastructure, low construction capacity of developers or contractors hired for construction, poor borrowing capacity, low affordability (Eshete and Teshome, 2015), price escalation, (kiros, 2009; Paulos 2011; Eshete and Teshome, 2015) slow and insufficient supply of land, foreign currency shortage, shortage of housing construction materials. In addition, inflation and non-existence of long term housing finance were factors which affected the real estate market (Kiros, 2009).

Problems that exist in real estate development make the business environment susceptible to uncertainty, and make projects involve risk. Risks and uncertainties are associated with all projects in private real estate development like any other commercial activity. Real estate developers need to manage these and other risks which are inherent in real estate development and minimize their impact on project objectives and their business as a whole.

Risk response strategies, whether through contractual risk allocation or other methods, require information that can support the decision. Risks should be identified and their impact has to be assessed in order to make decisions which help minimize their impact. The author believes researches done on problems, challenges and factors affecting the real estate development in Addis Ababa are relevant sources which help in having an insight on the risk factors which are affecting real estate development. However, the researcher could not find any research done on the impact of risk factors on private real estate projects. Therefore, this research aims to study the impact of risk factors on real estate development project schedule and cost, and the interrelationship between the risk factors.

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

The paper aims at analyzing the risks in residential real estate development projects in Addis Ababa by identifying the risk factors existing in real estate development projects, their impact on project objectives and their interrelationship. This chapter delineates the activities of the research, how the research was conducted and what steps were taken to realize the objectives of the study.

Given the objective of this study, risk factors were extracted from reviewed literature. In addition, risk factors included in residential real estate purchase agreements are collected. The likelihood of occurrence and the impact of the risk factor on project schedule and cost were measured through a structured questionnaire survey.

Risk significance index was established for each risk factor, the relative risk score of each risk factor is calculated, and the risk factors are ranked according to their score. Finally, the interrelationship between the risk factors is assessed with non-parametric correlation analysis. Findings of the survey are summarized and reported in the next chapter.

3.1 Research Design

This research measures the likelihood of occurrence of risks, their impact on project schedule and cost and identifies the interrelationship between the risk factors. The research is an explanatory one and questionnaire survey was chosen as the most effective method to measure the likelihood of occurrence of risks and their impact on project schedule and cost. The survey was conducted on residential real estate developers which delivered at least one housing project assuming they would have a relevant experience to share. The data collected with the questionnaire survey is quantitative in nature and the analysis is also quantitative.

3.2 Research Population

Compiling a potential list of market oriented private real estate developers registered and developing housing units in Addis Ababa was the first step in the data collection process. Real estates which delivered at least one housing project had to be selected assuming they would have a relevant experience to share. Thus, 74 were approached from a list of 134 real estates with addresses publicized on different online databases such as www.2merkato.com, Yellow Pages Africa and www.ethioconstruction.com. The rest 60 could not be approached with their given

address. Of the approached real estates, only 13 of them were found to satisfy the selection requirement, that they should have delivered at least one housing project which made the population size 13. All these 13 developers are included in the survey.

3.3 Types of Data and Tools of Data Collection

This section explains the selected data collection methods which are adopted in this research. During the study of relevant literature, lack of empirical data was noted within the context of the formulated issue. For this purpose, a standardized questionnaire survey was initiated in order to obtain the required data.

A questionnaire survey was chosen as the most effective method to meet the objective of this study through pursuing the experiences of professionals and practitioners involved in real estate development projects. This selected data collection tool is believed to be the most adequate for this research considering oral survey would not be feasible due to the fact that measuring the likelihood and impact of risk factors on schedule and cost would be too much to handle with an oral survey.

In order to develop the questionnaire risks were identified from two sources. Risks which possibly could occur in private residential real estate projects in Addis Ababa were identified from literature and also were extracted from real estate purchase agreements currently being used. Purchase agreements were collected form 7 real estate developers. All of them stated that they use a standard format of contract agreement. These documents basically include rights and obligations of both parties, the developer (seller) and the client (buyer). Clauses in these purchase agreements include definitions, price and details of the property, payment modalities, type, responsibilities of the two parties, service provisions, warranties, schedule related requirements, occurrence of dispute and dispute resolution mechanisms, handing over of the property, reasons for termination of contract and the procedures to be followed. Risks are allocated to a party with these clauses included in these purchase agreements. These allocated risks are extracted from the agreements. Total number of risk factors extracted from literature and purchase agreements are 26 in number.

The next step was obtaining data which allows prioritize the risk factors with regard to their impact on project schedule and cost. This was satisfied by collecting data from study subjects. This study is based on a survey conducted among private residential real estate developers. The questionnaire

used in this research had three sections. The first section explored a general organizational information on REDs and the second section explored about the survey respondents. The third section was the main section of the questionnaire in which risk factors were measured.

For the main section, respondents were asked to measure the probability of occurrence of risk factors, and their impact on project cost and schedule. They were asked to assign the likelihood of occurrence of risk factors by responding to a Likert agreement scale of 1 to 5, where 1= Very Unlikely (VU), 2 = Unlikely (U), 3 = Moderate (M), 4 = Likely (L) and 5 = Very Likely (VL). The scale used to measure impact of risk factors on project cost and schedule was also 1 to 5, where 1= Insignificant (I), 2 = Minor (MI), 3 = Moderate (MO), 4 = Major (Ma) and 5 = Catastrophic (C). A 5 scale Likert agreement was chosen assuming it would be easy for respondents to give their opinion in a structured way with options which are not too few or too many to choose between. A sample questionnaire is attached in Appendix D.

3.4 Data Collection Procedure

As explained earlier, the aim of data collection was to identify risk factors included in real estate purchase agreements, and to measure the occurrence and impact of identified risk factors. Purchase agreements were collected from real estate developers. Seven real estates agreed to give sample contract document and two of the real estates agreed to tell the contents of their standard contract agreement orally but enough information could not be gathered because there was a problem in remembering all the contents while listing.

The next task after preparing the questionnaire was a pilot testing and modification of the questionnaire which was done by obtaining insights from 1 project risk management expert and 1 contractor. Real estates were not included in the pilot test because the population size is small and it would have been at the cost of losing a participant.

3.5 Data Processing and Methods of Analysis

3.5.1 Data Processing

It was stated before that the study used two data collection methods or sources, purchase agreements and questionnaire survey. On the questionnaire survey, a total of 13 survey questionnaires were distributed. One of the real estates could not participate in the survey stating the firm has no relevant experience in risk management and one real estate stated they cannot give

data because they don't practice risk management in a level which enables them give data for the research. All the rest 11 developers were willing to participate in the survey and responded to the questionnaires even if there were some incomplete parts.

It was asked if the developers assess risks in managing their projects. None of the developers assess risks as the respondents replied. Profile of the real estate developers and the respondents are included in Appendix B and C respectively.

The processing of data began with entering the responses from the survey questionnaires into a Microsoft Excel work book. Reliability checks for the internal consistency of the scales used in the questionnaire is conducted by estimating a reliability coefficient. Cronbach's alpha can be used to check internal consistency (Saraph, 1989). Therefore, the reliability of the questionnaire was calculated with Cronbach's α. The rule of thumb for the test is that α should be 0.8 or above (Bryman, 2005).

The reliability test was conducted with IBM SPSS 21. The questionnaire was used to measure likelihood of occurrence, and impact on project schedule and cost. The results of each measures are 0.882, 0.850 and 0.885. It can be concluded that the reliability of the questionnaires are acceptable. There was no need for elimination of questions since the results are acceptable. Data from the survey were summarized and are presented with tables in Appendix E.

3.5.2 Methods of Data Analysis

3.5.2.1 Risk Ranking

Eight questionnaires were completed from the distributed ones. The questionnaire survey includes data on the likelihood of occurrence of each risk, level of impact of each risk on project schedule and cost. Risk factors in which most respondents did not complete their evaluation are not included in the analysis.

The data is analyzed using the method developed by *Shen, Wu, and Ng (2001)* which helps establish risk significance index to assess the relative significance among risks by calculating a significance score for each risk.

The significance score for each risk assessed by each respondent can be obtained through the model

$$S^i_j = \alpha^i_j * \beta^i_j \quad \text{..... Equation no. 1 (Shen et al., 2001)}$$

where S^i_j = significance score assessed by respondent j for risk i; α^i_j = probability of occurrence of risk i, assessed by respondent j; and β^i_j = degree of impact of risk i, assessed by respondent j.

By averaging scores from all 8 responses, the average significance score for each risk, that is the risk index score can be obtained and can be used to rank among all risks (Shen et al., 2001).

The risk index score can be can be calculated as follows.

$$RS^i = \frac{\sum_{j=1}^{8} S^i j}{8} \quad \text{..... Equation no. 2 (Shen et al., 2001).}$$

where RS^i = index score for risk i; and S^i_j = significance score assessed by respondent j for risk i.

The scales used in this research are five-point scales for α (very unlikely, unlikely, moderate, likely and very likely) and β (insignificant, minor, moderate, major and catastrophic). Both likelihood of occurrence and impact have five values which give a 5*5 matrix. Therefore, the minimum value of the multiplication is 1 and maximum value is 25. The risk index score value has to be divided by 25 in order to obtain the relative value. The result is included in Chapter 4 and a numerical example is included here below in Table 2.

Table 2 Numerical example for risk significance score calculation

Respondents	**R_1**	**R_2**	**R_3**	**R_4**	**R_5**	**R_6**	**R_7**	**R_8**
Response (Likelihood of Occurrence - α)	5	4	4	4	3	2	4	2
Response (impact on schedule – β_1)	4	4	4	4	1	1	4	4
α*β	20	16	16	16	3	2	16	8
Sum	97							
Average Value = (Σα*β)/8	12.125							
Risk Magnitude = Average value/25	0.485							

By adopting this method, the index scores are calculated for all risks. The analysis was conducted with the use of Microsoft Excel. The results are included in chapter 4.

3.5.2.2 Interrelationship between Risk Factors

The correlation between the identified risk factors is tested to determine strength and the direction of the relationship between the risk factors. Correlation coefficients are calculated to measure strength of a relationship.

The correlation analysis is conducted using the data on impact of risk factors. Impact is considered as an ordinal variable in the analysis. This means it is between two ordinal values that the correlation is to be tested. It is suggested that Spearman's rho or Kendall's tau and their associated significance tests are applied between ordinal variables. These coefficients will vary between −1 and +1. They provide information on the strength and direction of relationships (Bryman, 2005).

Spearman's rho (ρ) is more commonly used in reports of research findings, and therefore, it is applied in this research. IBM SPSS 21 was used for the correlation analysis. The outputs of the analysis are included in Appendix F and the results are presented in chapter 4.

3.6 Ethical Considerations

The researcher is responsible for maintaining the confidentiality of the data and for any errors that might have been committed in this study. The researcher would like to state that identity of respondents and data collected form any real estate developer is not and will not be exposed.

CHAPTER FOUR: RESULTS AND DISCUSSION

The previous chapter covered the analysis methods and the steps followed. This chapter presents, discusses, and summarizes the results of the research.

4.1 Risk Ranking

The first specific objective of this research is to identify the risk factors included in purchase agreements currently being used by private residential real estate developers. Purchase agreements were collected from developers as stated in chapter three. Seven agreements were reviewed and 21 risk factors were identified. This does not mean all the 21 risk factors are included in all reviewed purchase agreements. The identified risk factors are included here below. The identified risk factors are categorized into three categories namely, economic and financial, environmental and technical, legal, contractual and political considering their nature.

The questionnaire survey included 26 risk factors to be measured by respondents. The responses from the survey questionnaires on likelihood of occurrence of risks, and impact on project time and cost were analyzed with the use of a statistical method which establishes a risk significance index for the considered risk factors as shown in sub-section 3.4.2. The risk magnitude for each risk factor is calculated and risks are ranked according to their score. The results of the analysis are shown here below in Table 4.1, and Figure 4.2 and 4.3.

With regard to impact on project schedule, the top five risks are; not meeting milestone deadline, construction material price escalation, exchange rate fluctuation, inflation, and change in client's interest. In the case of project cost, inflation, construction price escalation, exchange rate fluctuation, not meeting milestone deadline and increase in customs are the top ranked risks. Generally looking at the prioritization of the factors, economic and financial factors have greater impact on project objectives as compared to the other two categories.

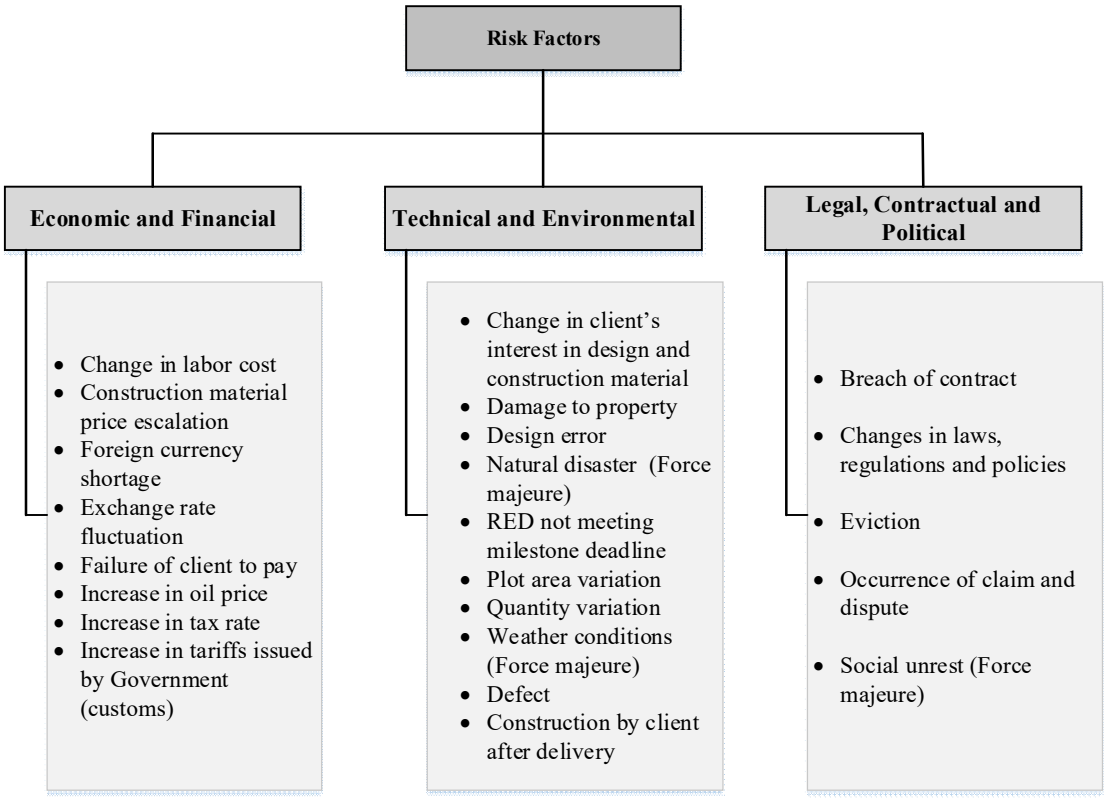

Figure 1 Risk factors identified from private residential real estate purchase agreements

Inflation, construction price escalation, exchange rate fluctuation, not meeting milestone deadline and increase in customs are top ranked in both cases. Plot area variation is with the lowest impact in both cases. Natural disasters are also found to have low impact next to plot area variation. Damage to property and design error also have low impact on the considered project objectives.

Table 3 Risk factors ranked according to their impact on project schedule and cost

Impact on project schedule				Impact on project cost			
Rank	**No.**	**Risk Factor**	**Risk Magnitude**	**Rank**	**No.**	**Risk Factor**	**Risk Magnitude**
1	RF 17	Not meeting milestone deadline	0.555	1	RF 14	Inflation	0.605
2	RF 8	Construction material price escalation	0.52	2	RF 8	Construction material price escalation	0.565
3	RF 11	Exchange rate fluctuation	0.485	3	RF 11	Exchange rate fluctuation	0.54
4	RF 14	Inflation	0.48	4	RF 17	Not meeting milestone deadline	0.53
5	RF 5	Change of client's interest in design	0.47	5	RF 13	Increase in customs	0.47
6	RF 3	Availability of material	0.45	6	RF 6	Changes in labor costs	0.435
7	RF 12	Failure of clients to pay	0.445	7	RF 3	Availability of material	0.415
8	RF 4	Breach of contracts	0.435	8	RF 12	Failure of clients to pay	0.41
8	RF 18	Occurrence of dispute	0.435	8	RF 15	Increase in oil price	0.41
9	RF 20	Quantity variations	0.43	8	RF 18	Occurrence of dispute	0.41
10	RF 1	Availability of infrastructure	0.41	9	RF 4	Breach of contracts	0.395
11	RF 13	Increase in customs	0.4	10	RF 5	Change of client's interest in design	0.39
12	RF 6	Changes in labor costs	0.395	10	RF 21	Tax rate increase	0.39
12	RF 7	Changes in laws, regulations, and policies	0.395	11	RF 20	Quantity variations	0.38
13	RF 15	Increase in oil price	0.365	12	RF 1	Availability of infrastructure	0.37
14	RF 9	Damage to property	0.35	13	RF 9	Damage to property	0.355
14	RF 22	Weather conditions	0.35	13	RF 22	Weather conditions	0.355
15	RF 10	Design error	0.33	14	RF 7	Changes in laws, regulations, and policies	0.34
16	RF 21	Tax rate increase	0.305	15	RF 2	Availability of local labor	0.29
7	RF 2	Availability of local labor	0.285	16	RF 10	Design error	0.255
18	RF 16	Natural disaster	0.24	17	RF 16	Natural disaster	0.24
19	RF 19	Plot area variation	0.17	18	RF 19	Plot area variation	0.185

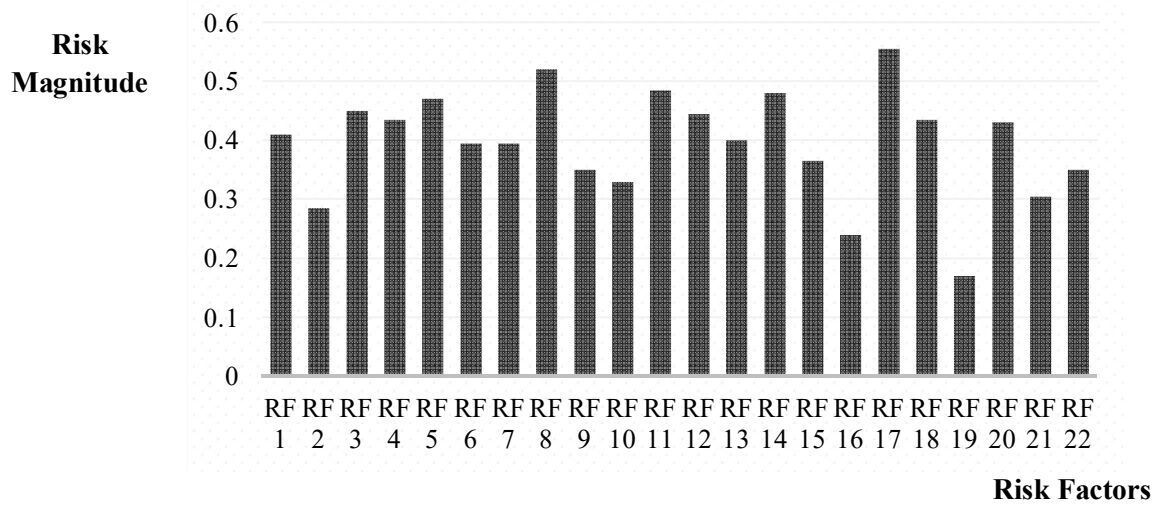

Figure 2 Impact on project schedule

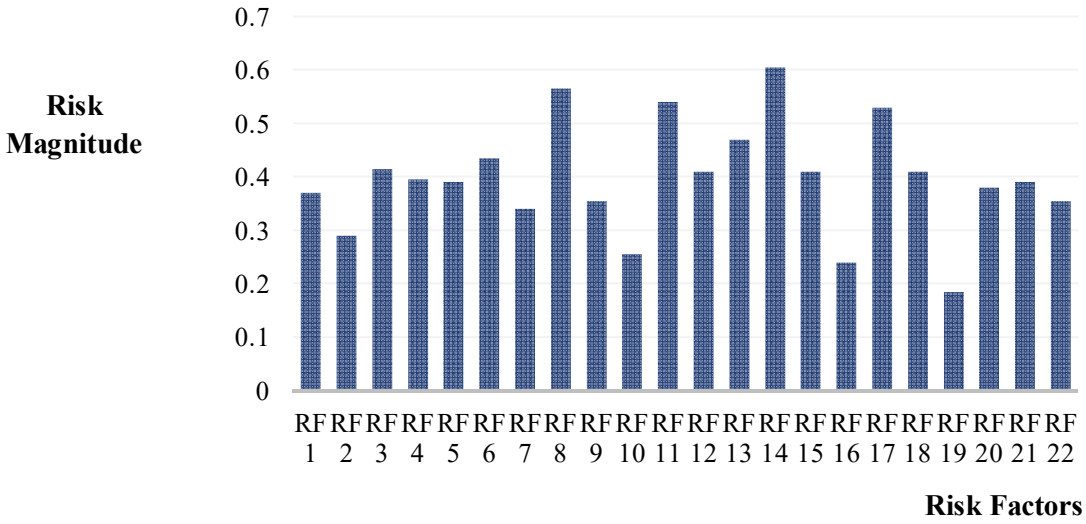

Figure 3 Impact on project schedule

4.2 Correlation Analysis

Knowing which factors have what type of impact on project objectives is very important in managing project risk. Having more information on the risks helps have a wider insight of the factors. For this purpose, the risk factors' interrelation is assessed. As stated in chapter three, a non-parametric analysis is conducted to identify the significance of the interrelationship between risk factors. A correlation coefficient that is Spearman's rho (ρ) is calculated. The results are presented in Table 4.2 and 4.3.

The correlation analysis is conducted with regard to the risk factors' impact on project cost and schedule. As it can be seen from the Table 4.2, there are risk factors with significant correlations. All the significant correlations are positive correlations. Figure 4.4 and 4.5 show economic and financial factors with significant correlation. The factors with significant correlation are construction material price escalation, exchange rate fluctuation, increase in oil price, customs and tax rate, inflation, and change in labor cost. Here it has to be noted that most of these factors are top ranked risks except increase in oil price and tax rate increase.

Similarly, the correlation between technical and environmental factors is shown in Figure 4.6 and 4.7 here below. Factors with significant correlation are availability of infrastructure, damage to property, quantity variations and change of clients' interest in design.

As shown in figure 4.4, the factors with significant correlation with regard to impact on project schedule are construction material price escalation, exchange rate fluctuation, increase in oil price, customs and tax rate, inflation, and change in labor cost. Construction material price escalation was found to have significant correlation with all these factors except tax rate increase. Exchange rate fluctuation was also found to have correlation with these factors except with change in labor cost. With regard to impact on project cost, construction material price escalation was found to be significantly correlated with increase in oil price. Increase in oil price has correlation with inflation, exchange rate fluctuation, increase in customs and tax rate increase in addition. From the figures presented in the above, it can be seen that economic factors are correlated among each other more in the case of project schedule rather than in the case of project cost.

The correlations between technical and environmental factors shown in Figure 4.6 and 4.7. show similarity. The similarity is in the factors which are correlated to each other. In both cases damage to property has a significant correlation with availability of infrastructure and quantity variations. Likewise, quantity variation has significant correlation with availability of infrastructure and damage to property. Availability of infrastructure is correlated with quantity variation and damage to property in the case of impact on project schedule, additionally with change in clients' interest in the case of impact on project cost.

Table 4 Correlation between economic and financial factors with regard to their impact on project schedule and cost

Economic and Financial											
Risk Factors	Availability of local labor	Availability of material	Changes in labor costs	Construction material price escalation	Exchange rate fluctuation	Failure of client to pay	Increase in customs	Inflation	Increase in oil price	Tax rate increase	**Impact on schedule**
Availability of local labor		.464	.064	-.170	.065	.300	-.212	-.021	-.053	-.179	
Availability of material	.379		-.447	-.331	.073	.373	-.407	-.071	-.193	-.029	
Changes in labor costs	.338	-.141		.858**	.715*	-.014	.752*	.574	.769*	.707*	
Construction material price escalation	-.120	.433	0.530		.866**	.283	.778*	.803*	.795*	.821*	
Exchange rate fluctuation	-.068	.068	0.327	0.551		.291	.719*	.873**	.816*	.719*	
Failure of client to pay	.760*	.356	0.225	0.042	.113		-.214	.476	.030	.185	
Increase in customs	-.494	-.247	0.365	0.581	.586	-.523		.492	.894**	.647	
Inflation	-.068	.068	0.327	0.551	1.000**	.113	.586		.624	.449	
Increase in oil price	-.247	-.055	0.514	.774*	.809*	.052	.770*	.809*		.654	
Tax rate increase	-.494	-.247	0.365	0.581	.586	-.523	1.000**	.586	.770*		
	Impact on cost										

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

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

Table 5 Correlation between technical and environmental factors with regard to their impact on project schedule and cost

Technical and Environmental										
Risk Factors	Availability of infrastructure	Change of client's interest in design	Damage to property	Design error	Natural disaster	Not meeting milestone deadline	Plot area variation	Quantity variations	Weather conditions	
Availability of infrastructure		-.511	.762*	-.428	.258	.682	.117	.908**	.074	**Impact on schedule**
Change of client's interest in design	.733*		-.047	-.014	.108	-.176	-.359	-.169	-.437	
Damage to property	.769*	.431		-.440	.160	.340	-.226	.821*	-.449	
Design error	.354	.000	.086		.414	-.214	.354	-.654	.074	
Natural disaster	-.634	-.248	-.427	-.535		.532	.226	.135	.021	
Not meeting milestone deadline clause	.370	.589	.325	.177	.110		.510	.622	.235	
Plot area variation	.181	.302	.117	-.488	-.122	-.363		-.113	.630	
Quantity variations	.878**	.642	.915**	.000	-.340	.338	.298		-.064	
Weather conditions	.098	.539	-.338	-.181	.155	.259	-.062	-.069		
	Impact on cost									

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

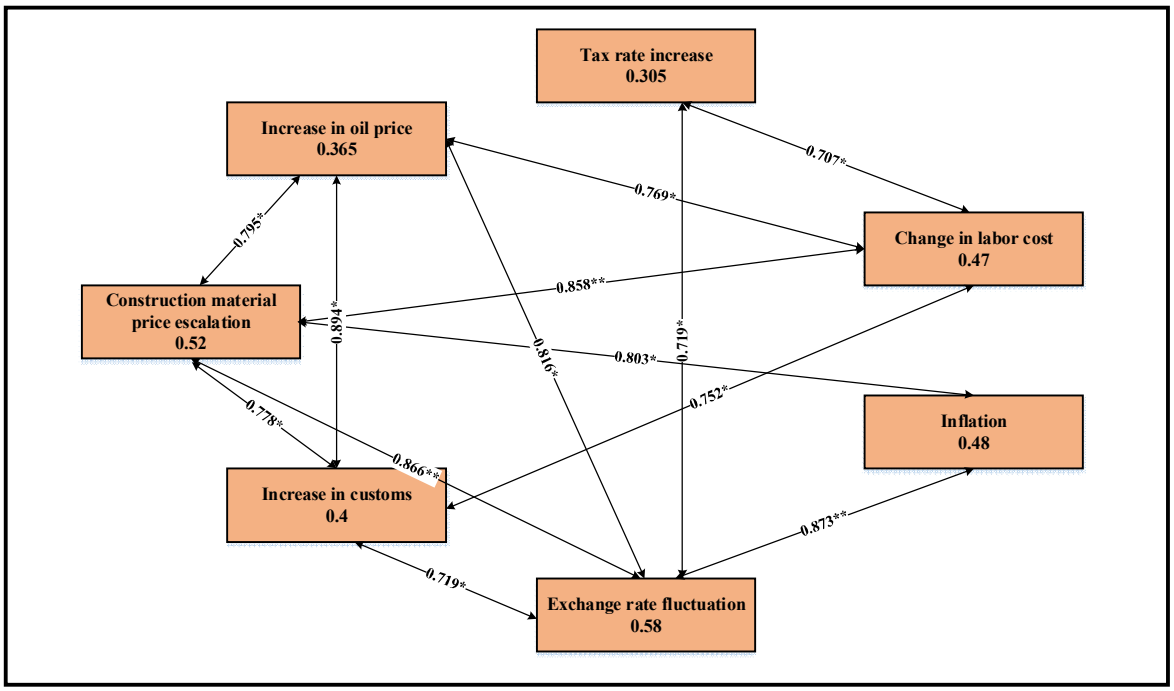

Figure 4 Correlation between economic and financial factors with regard to impact on project schedule

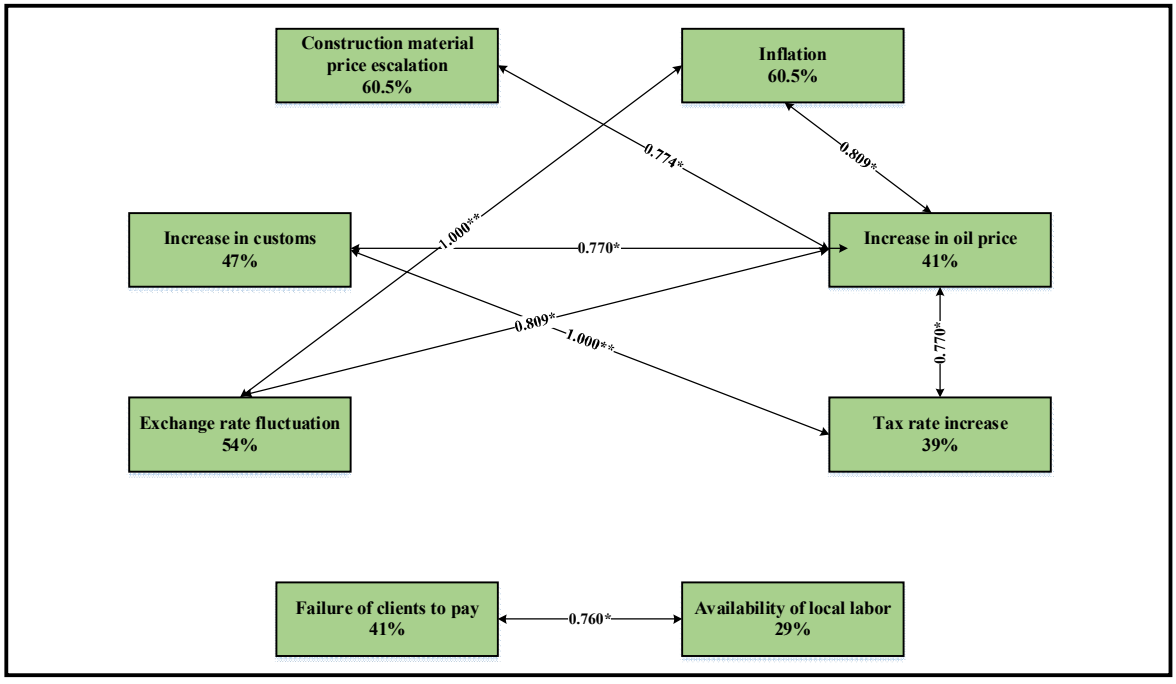

Figure 5 Correlation between economic and financial factors with regard to impact on project cost.

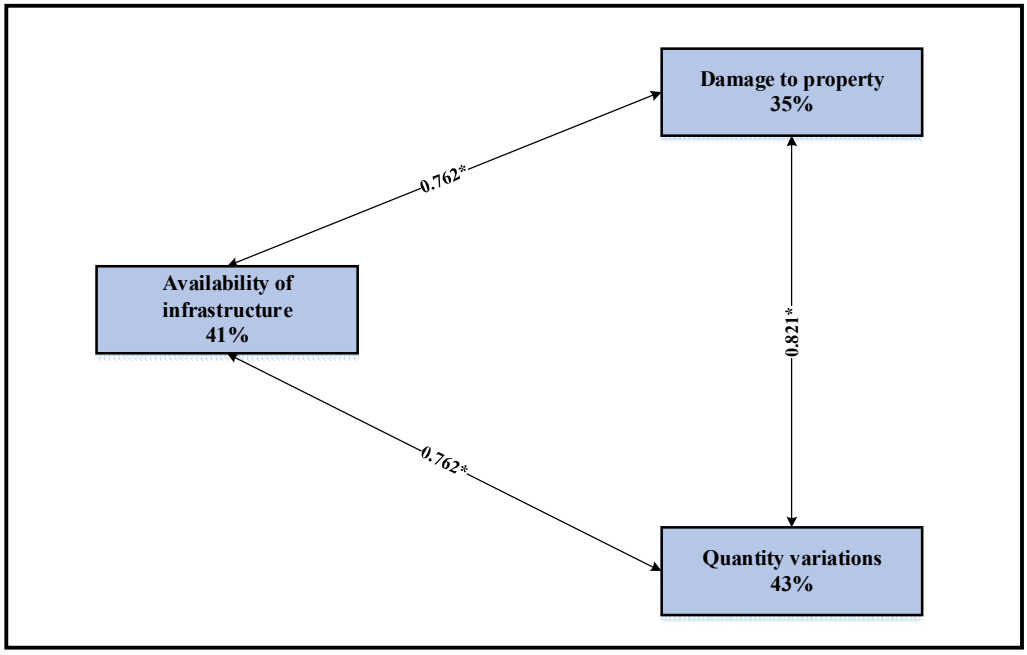

Figure 6 Correlation between technical and environmental factors with regard to impact on project schedule

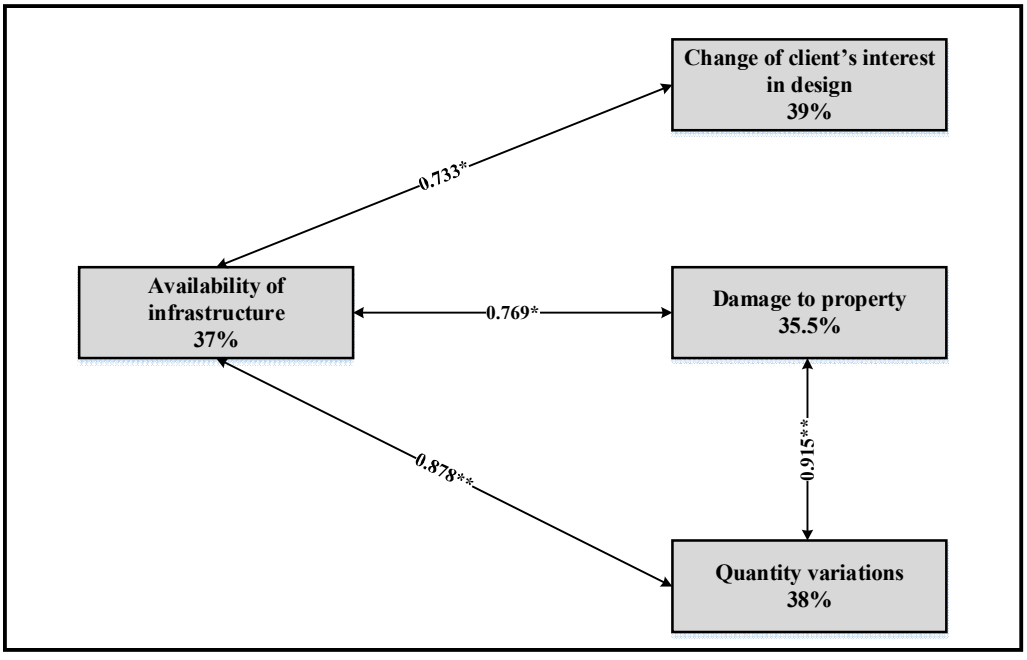

Figure 7 Correlation between technical and environmental factors with regard to impact on project cost

4.3 Summary and Discussion of Results

Completing a project with the stipulated cost and time are key success indicators of project management. Residential real estate development projects in Addis Ababa are facing problems and the problems involved in real estate development projects are creating an uncertain environment which involves risk. If these risks are not mitigated properly, the probability of successful completion of the project within the planned time and cost frame will reduce. These project objectives are interrelated where each of them are affecting and affected by the others.

The proper understanding of this risk profile is essential in order to come up with the proper risk response strategies to minimize the negative impact. This research identified risk factors related to real estate development from literature and from purchase agreements. The purpose of this investigation is not only to provide a list of risks but also to identify the key risks that can significantly influence the delivery of real estate development projects. Therefore, the identified factors' impact was assesses and the risk are ranked according to their impact on project objectives, schedule and cost. The risks explored in the survey included 26 risks and the analysis was carried out for the 22 risks due to incomplete response in the rest four.

As stated earlier, the top five risks with regard to impact on project schedule are; not meeting milestone deadline, construction price escalation, exchange rate fluctuation, inflation, and change in client's interest. In the case of project cost, inflation, construction price escalation, exchange rate fluctuation, not meeting milestone deadline and increase in customs are the top ranked risks.

It has been discussed that risk can be transferred, accepted, managed, minimized, or shared, but cannot be ignored. The decision is based on the willingness to knowingly take risks. Risks that exist in real estate development need to be addressed considering the risk appetite of the developer since the developer is the one which handles the project. However, it is not an easy decision because the risks are interrelated and they need to be managed considering their correlation. More information is helpful in making such decisions.

A correlation analysis is conducted in this research in order to show the factors which are strongly correlated with each other so that the profile of risks can be understood better. For example, factors with strong correlation show that when there is an increase in one Factor X, there is going to be increase in Factor Y in which Factor X has significant correlation with.

Economic and financial factors have greater impact on project objectives as compared to the other two categories. These factors have significant correlation with each other especially with regard to project schedule. Eight factors are found to have significant correlation in this category. Construction material price escalation is correlated with five factors in the case of schedule and with one factor in the case of project cost. Correlated factors could be factors with lower impact on project objectives but change in these factors is a warning sign for a possibility of change in a significantly correlated factor with high impact on project objective. This is an input in addition to the risk-impact magnitude for developers and project managers in selecting risk responses. Significantly correlated factors need to be treated together because mostly correlated factors could have similar causes or could be controlled by one project stakeholder.

One of the basic methods risks are treated is the use of clauses in purchase agreements that deal with risk and allocating risk to a party that is in the best position to control and manage the risk. Knowing the profile of risks is important for developers so that they include variation clauses that accommodate changes in this factors because the current business environment is dynamic in nature. Real estate development shares the risky behavior of construction industry because all construction projects have their own unique features. In order for the developers to include risk factors in purchase agreements, they have to consider the impact on project schedule and cost, and the risks have to be assigned as a responsibility of a party putting these in to consideration. They have to decide whether these factors can be sustained with their risk appetite. Of course, they should not allocate them to a party that is not in the best position to manage, reduce or control the risks. Transferring them unfairly will have an indirect impact on their project objectives and this will affect them negatively.

The surveyed companies do not assess risks. This should not be the practice in these companies since there exist risks and they cannot be ignored. Considering the points stated can greatly support the process of risk management. Identification of risk factors and analyzing their impact should be a continuous activity of the risk management process of real estate development projects. Because, this helps in coping with the dynamic nature of the business and such projects.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

The aim of this research was to identify the risks in real estate development projects in Addis Ababa, their impact on projects schedule and cost, and assess the interrelationship between the risk factors, and provide information that can be used by real estate developers in managing the risks. The findings of the study were summarized in the previous chapter. This chapter presents conclusions and recommendations.

5.1 Conclusions of the Study

1. Not meeting milestone deadline, construction price escalation, exchange rate fluctuation and inflation have high impact on surveyed private residential real estate development projects' time and cost. Except for meeting milestone deadline, the factors with high impact are economic and financial. It is concluded that economic and financial factors have greater impact on project objectives.

2. Risk factors were identified from literature and from reviewed purchase agreements. However, not all identified factors were found to be comprised in purchase agreements including the severe risk factors and it is concluded that some purchase agreements currently being used lack completeness. This means that the responsible party for some events that possibly could occur is not known. This could lead to dispute when events not included in the agreements occur and the dispute could lead to termination of contract. This might not be a problem to the developer since the property can be sold to another buyer. However, it is disadvantageous to the client and very disappointing. This is critical because it affects the trustworthiness of developers.

3. Economic and financial risks have significant correlation with each other. As stated in the above, these factors have a great impact on project objectives. The research concludes this factors need to be monitored with attention.

5.2 Recommendations of the Study

1. Economic and financial risks are external to developers. However, the profile of these factors can be known by studying their past trend. Developers can foresee the occurrence of these risks

and can assess their impact. This makes the risk response planning easier for the developers. Therefore, it is recommended that developers plan ahead on how to respond towards such factors. The response could be building a reasonable time and cost contingency, including a variation clause in purchase agreements regarding these factors or allocating the risks to clients. The effectiveness and efficiency of these options has to be checked first and developers can apply the optimal response strategy.

2. Most of the technical risks included in this study are internal factors and the developers can foresee and control the possibility of their occurrence. Such factors are the responsibilities of developers and developers are obligated to absorb them. This will affect their schedule and will incur cost. Therefore, it is recommended that developers work towards minimizing the probability of occurrence and impact these factors.

3. Identification of risk factors and analyzing their impact are important in managing a project in an uncertain environment. As it can be understood from the findings of the study, these steps contribute to certainty in the possible occurrences that could negatively affect project outputs. Residential real estate 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.

5.3 Limitations of the Study

The research contributes by laying a ground for future research works on risk management in residential real estate projects. The limitation of the study is that the research relied merely on the opinions of developers. This is due to unavailability of quantitative data registered for long period which at least shows the experience of the developers on risk events.

5.4 Future Research Direction

It would be beneficial if researches on risks on real estate development projects in Ethiopia are conducted with quantitative data taken from live projects so that more information on nature and

impact of risks leading to better risk management could be obtained. In addition, since this research focused on construction related risks, including other risks in future research works is recommended.

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APPENDIX A – Research Population

- Aser Real Estate
- Ayat Real Estate Development Enterprise
- AZ Real Estate
- Country Club Developers Real Estate PLC
- Enyi Real Estate
- Flintstone Engineering
- Gift Real Estate
- Haile & Alem International PLC
- Nasew Real Estate PLC
- Sunshine Real Estate
- Tracon Trading PLC
- Yotek Construction
- Zenebe Firew Real Estate

APPENDIX B – Organizational Information of Surveyed Real Estate Developers

No.	Developer	Experience in the Real Estate Development	Number of Executed Projects in the Last 5 Years	Type of Projects	Whether the RED Assesses Risk	Risk Assessment Method
1	RED 1	5 -10 Years	1 project with different phases	Villa and Apartment	Yes	Checking primarily estimated against actual selling price (cost overrun), by checking demand on market on both quality and price of house
2	RED 2	5 -10 Years	4 - 5 projects	Villa and Apartment	No	
3	RED 3	5 -10 Years	7 - 9 projects	Villa	No response	
4	RED 4	3 - 5 Years	2 projects or less	Villa and Apartment	Yes	Studying the real estate market based on customers interest in the type and design purpose of the house built in Addis Ababa
5	RED 5	5 -10 Years	5 - 7 projects	Villa and Apartment	Yes	
6	RED 6	12 Years	25 projects		No	
7	RED 7	No response				
8	RED 8	5 -10 Years	2 projects or less	Villa and Apartment	Yes	
9	RED 9	Could not be approached for data collection				
10	RED 10	No response				
11	RED 11	5 -10 Years	3 - 5 projects	Apartment	No	
12	RED 12	5 -10 Years	3 - 5 projects	Villa and Apartment	Yes	checking primarily estimated against actual selling price (cost overrun)
13	RED 13	> 10 Years	3 - 5 projects	Villa and Apartment	No	

APPENDIX C – Respondents' Profile

No.	Developer	Position	Educational Background	Work Experience in Real Estate Development (including construction industry)
1	RED 1	Construction Department Head	B.Sc. in Civil Engineering	21 Years
2	RED 2	Technical Manager	M.Sc. In Civil Engineering	15 Years
3	RED 3	Architect	M.Sc. In Architecture	5 -10 Years
4	RED 4	Project Coordinator	B.Sc. in Civil Engineering	5 -10 Years
5	RED 5	Architect	B.Sc. In Urban Planning and Architecture	1 - 3 Years
6	RED 6	Project Manager	B.Sc. in Civil Engineering	5 -10 Years
7	RED 8	Senior Office Engineer	B.Sc. in Civil Engineering	5 -10 Years
8	RED 11	Site Engineer	B.Sc. in Civil Engineering	1 - 3 Years
9	RED 12	Design and Supervision Department Head	M.Sc. In Civil Engineering (Structural)	5 -10 Years
10	RED 13	Senior Marketing Officer	Diploma in Marketing	5 -10 Years

APPENDIX D – Survey Questionnaire

Cover letter

February 15, 2016

Dear Sir or Madam,

I am a graduate student in Business Administration at St. Mary's University. I am conducting a survey on risks that exist in private real estate development projects for my graduate thesis work.

I would like to invite you to take part in this research. With your participation, I hope I will understand, identify, and prioritize the major risk factors in the sector. I am asking you to look over the questionnaire and, if you choose to do so, please complete the questionnaire.

The survey might take about 20 minutes of your time. Your answers are anonymous, DO NOT put your name on the survey. All answer will be kept confidential. Only group results will be presented or documented, not individual answers. Your help with this research is strictly voluntary. You do not have to answer any questions you don't want to. Return of an answered survey will indicate your consent to participate in this study.

If you have questions or concerns, please contact me at (+251) 911861232, milkahag@gmail.com. If you have any questions regarding your rights as a research participant, please contact the School of Graduate Studies through (+251) 11-5-54-66-69. Thank for your time and consideration.

Sincerely,

Milka Hagos

Post-Graduate Student

GUIDELINES FOR COMPLETING THE QUESTIONNAIRE

- Only one answer is required for each question
- For questions which require an opinion, there is a grid of boxes to show grades of opinion. Please mark the box which most closely fits your opinion.
- If you do not understand a question or it is unclear please omit the question and move on to the next.

1. Risk

Risk is an uncertain event or condition, if it occurs, has an effect on at least one project objective. Objectives can include cost, time scope and quality. A risk may have one or more causes and, if it occurs, it may have one or more impacts. A cause may be a requirement, assumption, constraint, or condition that creates the possibility of negative or positive outcomes.

2. Risk Management

Risk management includes the process of conducting risk management planning, identification, analysis, response planning, and monitoring and control on a project. The objectives of project risk management are to increase the probability and impact of positive events, and decrease the probability and impact of negative events in the project.

3. Risk Assessment

The risk assessment helps in risk management by measuring, conducting quantitatively and qualitatively in order to estimate the significance level of the industrial risk factors to the project and then to estimate of the risk of the potential factors to project success.

PART I: ORGANIZATIONAL INFORMATION

1. **Experience of the organization in real estate development (Years)?**

   1 year or less ☐ 1 – 3 years ☐

   3 – 5 years ☐ 5 – 10 years ☐

   Other _____

2. **Number of executed projects in the last 5 years**?

   2 Projects or less ☐ 3 - 5 Projects ☐

   5 - 7 Projects ☐ 7 - 9 Projects ☐

   Other _____

3. **Type of project (mark both boxes if your company delivers both)**

   Villa ☐

   Apartment ☐

4. **Does your company assess project risk?**

   Yes ☐ No ☐

   If your answer is yes, please list down the techniques you use for assessment.

_____

_____

_____

_____

_____

_____

PART II RESPONDENT'S PROFILE

1. **The position of the respondent?**

Sales Person ☐ Office Engineer ☐

Project Manager ☐ Architect ☐

Other _____

2. **Experience and Educational Qualifications**

Education level: _____

Working Experience in years (In the sector): _____

1 year or less ☐ 1 – 3 years ☐

3 – 5 years ☐ 5 – 10 years ☐

Other _____

Working Experience in years (In current position): _____

1 year or less ☐ 1 – 3 years ☐

3 – 5 years ☐ 5 – 10 years ☐

Other _____

3. **Professional background**

Civil Engineer ☐ Architect ☐

Quantity Surveyor ☐ Other _____

PART III - MEASUREMENT OF RISK FACTORS' LIKELIHOOD OF OCCURRENCE AND IMPACT

Please forward your opinion according to the instruction given below.

For likelihood of occurrence

1 = Very Unlikely
2 = Unlikely
3 = Moderate
4 = Likely
5 = Very Likely

For Impact Assessment

1 = Insignificant
2 = Minor
3 = Moderate
4 = Major
5 = Catastrophic

No	Risk Factors	Likelihood of Occurrence						Impact on Project Schedule						Impact on Project Cost				
		1	2	3	4	5		1	2	3	4	5		1	2	3	4	5
1	Availability of infrastructure																	
2	Availability of local labor																	
3	Availability of material																	
4	Changes in labor costs																	
5	Construction material price escalation																	
6	Exchange rate fluctuation																	
7	Failure of client to pay																	
8	Increase in customs																	
9	Inflation																	
10	Increase in oil price																	
11	Tax rate increase																	
12	Foreign Currency Shortage																	
13	Change of client's interest in design																	
14	Damage to property																	
15	Design error																	

No	Risk Factors	Likelihood of Occurrence						Impact on Project Schedule						Impact on Project Cost				
		1	2	3	4	5		1	2	3	4	5		1	2	3	4	5
16	Natural disaster																	
17	Not meeting milestone deadline clause																	
18	Plot area variation																	
19	Quantity variations																	
20	Weather conditions																	
21	Defect																	
22	Breach of contracts																	
23	Changes in laws, regulations and policies																	
24	Occurrence of claim and dispute																	
25	Eviction																	
26	Social unrest																	

APPENDIX E - Responses and Reliability Test

Table E 1.1 - Response on Likelihood of Occurrence

No.	Risk Factor	RED 1	RED 3	RED 4	RED 5	RED 6	RED 8	RED 11	RED 13
1	Exchange rate fluctuation	5	4	4	4	3	2	4	2
2	Tax rate increase	3	2	2	5	4	3	2	2
3	Increase in customs	3	4	2	4	5	3	4	3
4	Increase in oil price	4	4	3	1	3	4	4	2
5	Inflation	4	4	4	5	4	4	4	2
6	Construction material price escalation	4	4	4	5	4	4	4	1
7	Changes in labor costs	3	3	4	4	4	5	3	1
8	Financial failure of clients to pay	3	3	4	5	3	3	3	2
9	Weather conditions	2	2	3	4	3	4	2	2
10	Natural disaster	1	2	1	4	2	2	2	1
11	Change of client's interest in design	4	4	3	4	5	2	4	3
12	Quantity variations	4	3	2	5	3	2	3	4
13	Damage to Structure	2	3	1	5	1	2	3	2
14	Not meeting milestone deadline clause	2	4	4	5	4	4	4	2
15	Occurrence of dispute	2	2	2	5	4	5	2	2
16	Breach of contracts	2	2	2	4	4	4	2	3
17	Changes in laws, regulations, and policies	2	3	2	4	3	2	3	3
18	Plot area variation	3	2	2	3	3	3	4	3
19	Design error	3	2	2	3	4	3	3	4
20	Availability of infrastructure	4	3	2	5	3	1	3	3
21	Availability of local labor	2	3	4	5	1	2	3	2
22	Availability of material	2	3	4	5	3	4	3	2

Table E 1.2 - Response on Impact on project Schedule

No.	Risk Factor	RED 1	RED 3	RED 4	RED 5	RED 6	RED 8	RED 11	RED 13
1	Exchange rate fluctuation	4	4	4	4	1	1	4	4
2	Tax rate increase	3	4	4	3	2	1	2	3
3	Increase in customs	3	4	4	3	2	1	4	2
4	Increase in oil price	3	4	4	4	1	1	4	3
5	Inflation	4	3	4	4	1	1	4	4
6	Construction material price escalation	4	4	5	4	2	1	4	4
7	Changes in labor costs	2	4	5	3	2	1	4	4
8	Failure of client to pay	4	3	4	4	1	4	3	4
9	Weather conditions	4	3	3	4	3	3	2	3
10	Natural disaster	4	4	5	2	4	5	2	1
11	Change of client's interest in design	3	2	3	3	4	4	4	3
12	Quantity variations	2	3	5	4	2	4	3	4
13	Damage to property	2	4	5	3	2	5	4	5
14	Not meeting milestone deadline	3	4	5	5	2	5	3	2
15	Occurrence of claim and dispute	3	3	5	5	2	4	4	2
16	Breach of contracts	3	3	5	5	3	4	4	3
17	Changes in laws, regulations and policies	3	4	5	5	1	5	3	3
18	Plot area variation	2	2	1	2	1	2	1	1
19	Design error	3	4	2	2	4	3	2	2
20	Availability of infrastructure	3	4	5	4	1	4	3	4
21	Availability of local labor	2	3	2	2	1	4	3	4
22	Availability of material	4	4	2	4	3	4	3	4

Table E 1.3 - Response on Impact on project Cost

No.	RED 1	RED 3	RED 4	RED 5	RED 6	RED 8	RED 11	RED 13
1	3	4	4	5	3	4	4	4
2	3	4	4	4	3	3	3	3
3	3	4	4	4	3	3	3	3
4	3	4	4	5	1	4	3	3
5	3	4	4	5	3	4	4	4
6	4	4	4	5	3	4	2	4
7	3	4	4	3	2	4	2	4
8	4	3	2	3	1	5	4	4
9	4	3	3	3	2	4	4	3
10	3	4	3	2	4	4	4	2
11	3	2	4	3	1	4	3	3
12	2	3	4	3	2	4	2	4
13	2	4	5	4	3	4	3	5
14	3	4	5	4	2	4	4	2
15	3	3	5	4	2	4	4	2
16	3	3	5	3	3	4	4	3
17	3	3	5	3	1	5	3	3
18	2	1	2	1	2	2	1	2
19	2	2	2	3	2	2	2	2
20	3	3	4	4	1	4	2	4
21	3	3	2	2	2	3	3	4
22	4	3	2	4	3	3	3	4

Table E 2.1 Reliability Test - Cronbach's α

Risk Factors	Likelihood of Occurrence		Impact on Project Schedule		Impact on Project Cost	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Availability of infrastructure	3.00	1.195	3.5	1.1952	3.125	1.126
Availability of local labor	2.75	1.282	2.625	1.0607	2.75	0.7071
Availability of material	3.25	1.035	3.5	0.7559	3.25	0.7071
Breach of contracts	2.88	.991	3.75	0.8864	3.5	0.7559
Change of client's interest in design	3.63	.916	3.25	0.7071	2.875	0.991
Changes in labor costs	3.38	1.188	3.125	1.3562	3.25	0.8864
Changes in laws, regulations and policies	2.75	.707	3.625	1.4079	3.25	1.2817
Construction material price escalation	3.75	1.165	3.5	1.3093	3.75	0.8864
Damage to property	2.38	1.302	3.75	1.2817	3.75	1.0351
Design error	3.00	.756	2.75	0.8864	2.125	0.3536
Exchange rate fluctuation	3.50	1.069	3.25	1.3887	3.875	0.6409
Failure of client to pay	3.25	.886	3.375	1.0607	3.25	1.2817
Increase in customs	3.50	.926	2.875	1.126	3.375	0.5175
Inflation	3.88	.835	3.125	1.3562	3.875	0.6409
Increase in oil price	3.13	1.126	3	1.3093	3.375	1.1877
Natural disaster	1.88	.991	3.375	1.5059	3.25	0.8864
Not meeting milestone deadline clause	3.63	1.061	3.625	1.3025	3.5	1.069
Occurrence of claim and dispute	3.00	1.414	3.5	1.1952	3.375	1.0607
Plot area variation	2.88	.641	1.5	0.5345	1.625	0.5175
Quantity variations	3.25	1.035	3.375	1.0607	3	0.9258
Tax rate increase	2.88	1.126	2.75	1.0351	3.375	0.5175
Weather conditions	2.75	.886	3.125	0.6409	3.25	0.7071

Table E 2.2 Reliability Test - Cronbach's α if an item is deleted

Likelihood of Occurrence				Impact on Project Schedule				Impact on Project Cost			
Mean	Variance	Total Correlation	Cronbach's Alpha	Mean	Variance	Total Correlation	Cronbach's Alpha	Mean	Variance	Total Correlation	Cronbach's Alpha
65.25	137.071	.459	.878	66.7500	125.357	.907	.823	67.6250	91.411	.894	.866
65.50	136.857	.429	.879	67.6250	145.696	.166	.852	68.0000	110.571	.058	.890
65.00	133.714	.692	.871	66.7500	153.929	-.183	.859	67.5000	114.571	-.208	.896
65.38	139.982	.443	.878	66.5000	138.286	.576	.839	67.2500	104.500	.444	.882
64.63	143.696	.311	.882	67.0000	161.714	-.620	.868	67.8750	94.696	.842	.869
64.88	136.411	.488	.877	67.1250	132.125	.549	.838	67.5000	98.571	.714	.874
65.50	141.143	.578	.876	66.6250	123.982	.801	.825	67.5000	88.857	.887	.865
64.50	130.571	.730	.869	66.7500	130.786	.620	.835	67.0000	102.571	.477	.881
65.88	130.696	.637	.872	66.5000	136.000	.449	.842	67.0000	99.714	.539	.879
65.25	152.786	-.107	.890	67.5000	164.000	-.604	.872	68.6250	110.268	.207	.886
64.75	145.071	.200	.885	67.0000	128.571	.653	.833	66.8750	102.982	.656	.878
65.00	134.571	.778	.870	66.8750	132.411	.718	.833	67.5000	99.714	.413	.885
64.75	140.500	.456	.878	67.3750	136.268	.515	.840	67.3750	107.125	.423	.883
64.38	134.839	.816	.869	67.1250	130.411	.608	.835	66.8750	102.982	.656	.878
65.13	164.125	-.486	.905	67.2500	127.357	.744	.829	67.3750	90.839	.869	.866
66.38	129.411	.930	.864	66.8750	153.268	-.120	.870	67.5000	118.571	-.385	.904
64.63	132.839	.711	.870	66.6250	130.554	.632	.834	67.2500	97.071	.651	.875
65.25	128.786	.641	.872	66.7500	131.357	.667	.833	67.3750	97.411	.640	.875
65.38	148.839	.135	.884	68.7500	148.500	.175	.850	69.1250	113.268	-.146	.892
65.00	141.714	.348	.881	66.8750	133.554	.669	.834	67.7500	97.643	.734	.873
65.38	129.125	.819	.866	67.5000	136.286	.567	.838	67.3750	107.125	.423	.883
65.50	138.286	.589	.875	67.1250	149.554	.071	.853	67.5000	105.429	.413	.882

		N	%
Cases	Valid	8	100.0
	Excluded[a]	0	0.0
	Total	8	100.0

Reliability Statistics

Cronbach's Alpha	Likelihood of Occurrence	Impact on Project Schedule	Impact on Project Cost
	.882	.850	.885
No of Items	22	22	22

APPENDIX F - Nonparametric Correlation Analysis

Table F1.1 - Correlation between economic and financial factors with regard to project schedule

			Availability of local labor	Availability of material	Changes in labor costs	Construction material price escalation	Exchange rate fluctuation	Failure of client to pay	Increase in customs	Inflation	Increase in oil price	Tax rate increase
Spearman's rho	Availability of local labor	Correlation Coefficient	1.000	.464	.064	-.170	.065	.300	-.212	-.021	-.053	-.179
		Sig. (2-tailed)		.247	.881	.688	.878	.471	.615	.960	.900	.671
	Availability of material	Correlation Coefficient	.464	1.000	-.447	-.331	.073	.373	-.407	-.071	-.193	-.029
		Sig. (2-tailed)	.247		.267	.424	.864	.363	.318	.867	.647	.947
	Changes in labor costs	Correlation Coefficient	.064	-.447	1.000	.858**	.715*	-.014	.752*	.574	.769*	.707*
		Sig. (2-tailed)	.881	.267		.006	.046	.973	.032	.137	.026	.050
	Construction material price escalation	Correlation Coefficient	-.170	-.331	.858**	1.000	.866**	.283	.778*	.803*	.795*	.821*
		Sig. (2-tailed)	.688	.424	.006		.005	.496	.023	.016	.018	.013
	Exchange rate fluctuation	Correlation Coefficient	.065	.073	.715*	.866**	1.000	.291	.719*	.873**	.816*	.719*
		Sig. (2-tailed)	.878	.864	.046	.005		.484	.044	.005	.013	.044
	Failure of client to pay	Correlation Coefficient	.300	.373	-.014	.283	.291	1.000	-.214	.476	.030	.185
		Sig. (2-tailed)	.471	.363	.973	.496	.484		.611	.233	.944	.660
	Increase in customs	Correlation Coefficient	-.212	-.407	.752*	.778*	.719*	-.214	1.000	.492	.894**	.647
		Sig. (2-tailed)	.615	.318	.032	.023	.044	.611		.215	.003	.083
	Inflation	Correlation Coefficient	-.021	-.071	.574	.803*	.873**	.476	.492	1.000	.624	.449
		Sig. (2-tailed)	.960	.867	.137	.016	.005	.233	.215		.099	.264
	Increase in oil price	Correlation Coefficient	-.053	-.193	.769*	.795*	.816*	.030	.894**	.624	1.000	.654
		Sig. (2-tailed)	.900	.647	.026	.018	.013	.944	.003	.099		.079
	Tax rate increase	Correlation Coefficient	-.179	-.029	.707*	.821*	.719*	.185	.647	.449	.654	1.000
		Sig. (2-tailed)	.671	.947	.050	.013	.044	.660	.083	.264	.079	

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

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

Table F 1.2 - Correlation between economic and financial factors with regard to project cost

			Availability of local labor	Availability of material	Changes in labor costs	Construction material price escalation	Exchange rate fluctuation	Failure of client to pay	Increase in customs	Inflation	Increase in oil price	Tax rate increase
Spearman's rho	Availability of local labor	Correlation Coefficient	1.000	.379	.338	-.120	-.068	.760*	-.494	-.068	-.247	-.494
		Sig. (2-tailed)		.355	.413	.778	.873	.029	.214	.873	.556	.214
	Availability of material	Correlation Coefficient	.379	1.000	-.141	.433	.068	.356	-.247	.068	-.055	-.247
		Sig. (2-tailed)	.355		.739	.284	.873	.386	.556	.873	.897	.556
	Changes in labor costs	Correlation Coefficient	.338	-.141	1.000	.530	.327	.225	.365	.327	.514	.365
		Sig. (2-tailed)	.413	.739		.176	.430	.591	.374	.430	.193	.374
	Construction material price escalation	Correlation Coefficient	-.120	.433	.530	1.000	.551	.042	.581	.551	.774*	.581
		Sig. (2-tailed)	.778	.284	.176		.157	.921	.131	.157	.024	.131
	Exchange rate fluctuation	Correlation Coefficient	-.068	.068	.327	.551	1.000	.113	.586	1.000**	.809*	.586
		Sig. (2-tailed)	.873	.873	.430	.157		.789	.127		.015	.127
	Failure of client to pay	Correlation Coefficient	.760*	.356	.225	.042	.113	1.000	-.523	.113	.052	-.523
		Sig. (2-tailed)	.029	.386	.591	.921	.789		.184	.789	.903	.184
	Increase in customs	Correlation Coefficient	-.494	-.247	.365	.581	.586	-.523	1.000	.586	.770*	1.000**
		Sig. (2-tailed)	.214	.556	.374	.131	.127	.184		.127	.025	
	Inflation	Correlation Coefficient	-.068	.068	.327	.551	1.000**	.113	.586	1.000	.809*	.586
		Sig. (2-tailed)	.873	.873	.430	.157		.789	.127		.015	.127
	Increase in oil price	Correlation Coefficient	-.247	-.055	.514	.774*	.809*	.052	.770*	.809*	1.000	.770*
		Sig. (2-tailed)	.556	.897	.193	.024	.015	.903	.025	.015		.025
	Tax rate increase	Correlation Coefficient	-.494	-.247	.365	.581	.586	-.523	1.000**	.586	.770*	1.000
		Sig. (2-tailed)	.214	.556	.374	.131	.127	.184		.127	.025	

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

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

Table F 1.5 - Correlation between legal, contractual and political factors with regard to project schedule

			Breach of contracts	Changes in laws, regulations and policies	Occurrence of claim and dispute
Spearman's rho	Breach of contracts	Correlation Coefficient	1.000	.757*	.949**
		Sig. (2-tailed)		.030	.000
		N	8	8	8
	Changes in laws, regulations and policies	Correlation Coefficient	.757*	1.000	.821*
		Sig. (2-tailed)	.030		.013
		N	8	8	8
	Occurrence of claim and dispute	Correlation Coefficient	.949**	.821*	1.000
		Sig. (2-tailed)	.000	.013	
		N	8	8	8

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

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

Table F 1.6 - Correlation between legal, contractual and political factors with regard to project cost

			Breach of contracts	Changes in laws, regulations and policies	Occurrence of claim and dispute
Spearman's rho	Breach of contracts	Correlation Coefficient	1.000	.754*	.799*
		Sig. (2-tailed)		.031	.017
		N	8	8	8
	Changes in laws, regulations and policies	Correlation Coefficient	.754*	1.000	.756*
		Sig. (2-tailed)	.031		.030
		N	8	8	8
	Occurrence of claim and dispute	Correlation Coefficient	.799*	.756*	1.000
		Sig. (2-tailed)	.017	.030	
		N	8	8	8

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

DECLARATION

I certify that this thesis, prepared under the guidance of my advisor Dr. Elias Nour, is my own work**,** except where indicated by referencing.

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MILKA HAGOS

ENDORSEMENT

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

…….

Elias Nour (PhD)

Advisor