

ADDIS ABABA UNIVERSITY
SCHOOL OF COMMERCE
DEPARTMENT OF PROJECT MANAGEMENT



**DETERMINANTS OF CONSTRUCTION PROJECTS DELAY:
CASE OF 20/80 CONDOMINIUM HOUSING CONSTRUCTION
PROJECTS, ADDIS ABABA**

**A project Submitted to the school of Commerce Graduate Studies of
Addis Ababa University for the Partial Fulfillment of the
Requirements for Master of Arts (MA) Degree in Project Management**

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DECLARATION

I declare that this thesis entitled “**DETERMINANTS OF CONSTRUCTION PROJECTS DELAY: CASE OF 20/80 CONDOMINIUM HOUSING CONSTRUCTION PROJECTS, ADDIS ABABA**” is my original work. And it has not been submitted partially or in full and presented by any other person anywhere and that all sources of materials used for this paper have been acknowledged.

Name of Researcher: Dawit Sene Signature: _____ Date: _____

STATEMENT OF CERTIFICATION

This is to certify that Dawit Sene Bekele has carried out this research work on the topic entitled “Determinants of Construction Delay: Case of 20/80 Condominium Housing Construction Projects” under my supervision. This work is original in nature and it is sufficient for submission for the partial fulfillment for the award of Degree of Masters of Art in Project and Management.

Dereje Teklemariam (PhD)

Signature _____

Date _____

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ABSTRACT

The main aim of the study is to investigate the determinants of construction projects delay: the case of 20/80 condominium housing construction Projects, Addis Ababa. Specifically the study aimed at testing the relationship between the independent variables (Construction material availability, construction project planning, contractor's experience, supervision of work, construction financial resource) and the dependent variable (construction project delay). In conducting this, the study adopted mixed method research approach with concurrent triangulative research design. The target populations of the study are all contractors, consultants, and clients of the 20/80 condominium housing projects that are currently under way in the 15 sites of Addis Ababa making a universe of 720 to which 251 were sampled. The selection of respondents was made using snow ball sampling technique. 239 questionnaires were distributed to the contractor respondents and made key informant interviews of clients and consultants for the balance. The data obtained was analyzed using quantitative analysis techniques. Both descriptive and inferential statistics were used to see the determinants of projects delay and following that hypothesis tests were made at 5% level of significance. The result indicates that construction material, supervision of work and financial resource had the greatest influence on the delay of the project under study as the influence was significant at 1% level of significance. Based on the findings, it is recommended that the Addis Ababa Housing Development Project Office and other stakeholders should monitor the quality and timely supply of materials; monitor and supervise the supply of adequate construction materials, set proper feedback channels, manage projects conducted in its jurisdictions properly and consider the experience of constructors setting minimum standards.

Keywords: *Construction projects delay, 20/80 Condominium housing construction projects, Construction material availability, construction project planning, contractor's experience, supervision of work, construction financial resource*

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The construction industry, like so many basic developed industries, is being transformed to meet the new demands of the twenty-first century. Project delivery concepts are changing- design-bid-build, in both the private and public sectors is now recognized as less than efficient when it comes to time and money, often-promoting litigation and restricting innovation (Levy, 2007).

Construction industry has complexity in its nature because it contains large number of parties as clients, contractors, consultants, stakeholders, shareholders and regulators (Kikwasi, 2012). Particularly in construction, there is a long history of project management and standard systems have been set up which have become comfortable, but have not always produced the best value for the client (Fewings, 2005). Most construction projects usually suffer delay and surpass the outlined contract sum (World Bank, 2014). The result of such overrun can at time lead to abandonment of a project. Ideally projects are supposed to run continuously without delays and the responsibilities to keep this in check lies squarely with the project manager and other stakeholders who are linked directly with the projects (Oyewobi, et al. 2011). In the same view, ensuring that the project is delivered on time is one of the most significant needs of the clients in construction industry (Latham, 1994). Moreover, completion of projects within the estimated time is an indicator of how efficient the construction industry is (Nedo, 1988).

Zewdu (2014) noted that Ethiopian construction sector has shown a remarkable growth and given high prominence. It further added that that the contribution of the industry sector (which is 21.2%) and particularly that of the construction sector to the national economy is given high prominence and is mainly driven by the energetic performance of the construction sub-sector. However, he pointed that several defects have been eminent in the sector demanding an immediate action.

Ethiopia's urban centers are characterized by poorly developed economic base. Like most urban centers of developing countries, most cities and towns in Ethiopia face a plethora of problems, including an acute and ever-worsening housing shortage (Deribie, 2013). To this effect, UN-HABITAT (2011) asserts the City government launched the Addis Ababa Integrated Housing Development Program (AAIHDP) in 2004 E.C to alleviate the housing shortage. The program comprises of four different schemes based on percent of advance payment modalities such as 10/90, 20/80, 40/60 and housing association with targeted population of low-income, lower-middle income, upper-middle income and high income respectively. Likely, their payment modalities are 10% advance and 90% long-term loan, 20% advance and 80% long-term loan, 40% advance and 60% long-term loan and 100% advance respectively.

Consequently, there is nothing to deny the program's essentiality and the urgent need to deliver built houses as quick as possible. Despite various efforts taken by stakeholders of the construction industry, the concern of delay has been a major issue. Specifically, the 20/80 housing scheme started in 2014 and 2015 is delayed due to different delay factors while the registered city dwellers are saving their money for the housing by deducting from their basic livelihood. Aibinu and Jagboro (2002) state that construction delay has become endemic in Nigeria, Sudan, Uganda, Eritrea etc. and found out that it had significant impact on completion cost and time of 61 building projects studied.

The subject of completion is, thus, a universal concern that affects all parties of a construction project (Musa, 2012). It is therefore, in the interest of this study to address the determinants of construction projects delays in the case of the 20/80 condominium housing projects in Addis Ababa.

1.2 Statement of the Problem

Delays and their resulting costs is probably the most fertile field in which complicated contractual disputes grow and proliferate under a building and construction contract. The events, which can cause a delay of some kind during the course of a project, are always many and various, and are often weird and wonderful. These events may be due to acts or omissions by the contractor: acts or omissions by the owner or the owner's agents; or other events beyond the contractor's control (Goldfayl, 2004).

Timely and with budget completion of a construction project is frequently seen as a major criterion of project success by clients, contractors, consultants and related stakeholders (Zewdu, 2014; Ibrahim and Nabil, 2013; Abadir and Yimam, 2011; Chabota et al., 2008).

Delay in condominium construction projects has been a major issue in the Ethiopian construction industry over the past decades. Finalizing and transferring the housing units to beneficiaries took quite longer period, which asserts that construction delays as a major issue facing the integrated housing development program of Ethiopia- condominium housing construction projects. Likely, the productivity of the construction phase has not been as efficient as planned during the program's implementation thus far due to gross material shortages, a lack of adequate infrastructure, and poor construction management delaying completion by as much as a year on some sites. Approximately 50 per cent of condominium sites are behind schedule because of delays in the building of infrastructure.

(UN-HABITAT, 2011: 48)

Asrat, (2017) disclosed that more than 1.1 million house seekers (140,000 people under 40/60, and over 700,000 people under 20/80) were registered for the housing program while only over 175,000 houses are transferred to residents in the 12 years history of condominium houses construction of the city administration. A report made by Capital News Paper (2016) remarked that there were over 130,000, 20/80 houses already in progress across several corners of the city. Yet, it added that several houses were lagging behind schedule, often blamed on power interruption, poor capacity of some contractors and mismanagement in supervision and procurement procedures.

Getnet (2017) reported the same that 130,000, 20/80 condominium units were under construction on different sites. However, it added that due to poor capacity of contractors and consultants, and inadequate government supervision, most of the projects were behind schedule. Moreover, it pointed out that only 1,292 housing units were then nearing completion-revealing delay in the rest of the housing units.

Addis Ababa housing development project office (2017) revealed that from the 20/80 housing development program under construction were 52,651 units, which were started in 2014 and 41,421 housing units, which were started in 2015/2016. Under the normal circumstance, the office planned construction time for G+7 and G+4 building are 24 months and 18 months

respectively. However, the aforementioned constructions of the housing units are still under way indicating delay in their status.

International and local studies focusing on factors of residential housing projects delay and its associates have the lists of factors believed to contribute to the delay of construction projects, for example Zewdu (2016); Desse (2016); Kusakc, Ayvaz, and Bejtagic (2017); Seboru (2015) ; Kariungi (2014) and Wong and Vimonsatit (2012). However, the construction of projects continues to be described as delaying for instance Getnet (2017); UN-HABITAT (2011) and Capital News Paper (2016). Moreover, little focus has been given on the relationship of the factors influencing delay of projects in the construction industry with biases to 20/80 condominium construction projects in Ethiopia. Consequently, researchers have concluded that more research is needed in the area (Zewdu, 2016 & Desse, 2016).

This research has, therefore, focused on examination of the determinants of project delay in construction projects taking the case of 20/80 condominium construction in Addis Ababa.

1.3 Research Objectives

1.3.1 General Objective

The general aim of the study is to investigate the determinants of construction projects delay: the case of 20/80 condominium housing construction Projects, Addis Ababa.

1.3.2 Specific Objectives

Specifically the study has addressed the following specific objectives:

1. To determine the influence of construction material availability have on the delay of 20/80 condominium construction projects in Addis Ababa
2. To investigate the influence of construction project planning on the delay of 20/80 condominium construction projects in Addis Ababa
3. To establish the influence of contractor's experience on the delay of 20/80 condominium construction projects in Addis Ababa
4. To find out the influence of supervision of work on the delay of 20/80 condominium construction projects in Addis Ababa, and
5. To establish the influence of Construction financial resource over the delay of 20/80 condominium construction projects in Addis Ababa

1.4 Research Hypothesis

The study has tested the following research hypothesis:

1. Ho: Construction material availability does not significantly influence the delay of 20/80 condominium construction projects in Addis Ababa at 5% of level of significance.

H1: Construction material availability does significantly influence the delay of 20/80 condominium construction projects in Addis Ababa at 5% of level of significance.

2. Ho: Construction project planning does not significantly influence the delay of 20/80 condominium construction projects in Addis Ababa at 5% of level of significance.

H1: Construction project planning does significantly influence the delay of 20/80 condominium construction projects in Addis Ababa at 5% of level of significance.

3. Ho: Contractor's experience does not significantly influence the delay of 20/80 condominium construction projects in Addis Ababa at 5% of level of significance.

H1: Contractor's experience does significantly influence the delay of 20/80 condominium construction projects in Addis Ababa at 5% of level of significance.

4. Ho: Supervision of work does not significantly influence the delay of 20/80 condominium construction projects at 5% of level of significance.

H1: Supervision of work does significantly influence the delay of 20/80 condominium construction projects at 5% of level of significance.

5. Ho: Construction financial resource does not significantly influence the delay of 20/80 condominium construction projects in Addis Ababa at 5% of level of significance.

H1: Construction financial resource does significantly influence the delay of 20/80 condominium construction projects in Addis Ababa at 5% of level of significance.

1.5 Significance of the Study

When compared to the unanswered issue of the delay of condominium housing construction of Ethiopia, only limited number of studies was undertaken up to now in relation to determinants of the delay. The study is identified factors of delay in the condominium construction with respect to 20/80 mode. Thus, the subject matter of this research and the resulting lessons drawn from the analysis are likely to benefit different stakeholders of the 20/80 condominium housing construction project. This study may be significant for its contribution to:

i. Knowledge

The study sheds light on the determinants of construction delay with respect to the 20/80 housing condominium construction in Addis Ababa and may improve an existing stock of knowledge.

ii. Managerial Decision Making

The study's findings and recommendations are highly important to management of the project because it draws the stakeholder's attention to some of the points where corrective actions are necessary and enable them to make such corrections.

iii. Literature and Reference

The research could be used to establish a framework for subsequent studies that can work with data sets that are more comprehensive. Furthermore, it could stimulate further researches.

iv. Policy Framing

The findings and recommendations of the study are important to policy makers because it draws their attention to some of the points that need corrective measures on their side.

1.6 Scope of the Study (Delimitation of the Study)

Thematically the study delimits to the investigation of the determinants of construction delay in Addis Ababa condominium housing construction project sites taking the case of 20/80 condominiums to take advantage of data maturity for it is the first program to be introduced in the city in contrary to the other infant programs of 40/60 and 10/90. Geographically, the study will also be limited to consultants, clients, contractors and subcontractors of the 20/80 condominium housing construction projects in Addis Ababa that are currently underway since 2014 and 2015, which are deemed to be delaying.

The research identified the major factors to the delay in the construction of 20/80 saving houses project in Addis Ababa through questionnaire survey. In the questionnaire survey, all fifteen 20/80 project sites did get to participate.

1.7 Limitations of the Study

The purpose of this study was limited to investigate the determinants of construction projects delay with respects to Addis Ababa 20/80 condominium housing program. Currently, the city is taking different condominium housing programs to solve the city's housing problem; however, this study did not investigate issues of the other programs except the 20/80.

1.8 Organization of the Paper

This research report is organized in five chapters. Chapter one is the introduction which includes the background of the study, statement of the problem, objectives of the study, research questions, research hypothesis, significance of the study, delimitations of the study, and ethical considerations. Chapter two of the study consists of the literature review with information from other articles and books, which are relevant to the researcher. Chapter three bring about the methodology to be used in the research. Chapter four will give the insights of data analysis, the findings and discussions of the study. Lastly, in chapter five, the study provides a summary of findings, discussions, conclusions and recommendations.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1. Introduction

This section summarizes the literature that is already in existence regarding the factors leading to delay in construction projects in the world and Ethiopia with specific emphasis on the construction projects. It presents an overview of previous work on related topics that provide the necessary background for the purpose of this research. It further organizes the work into various topics and sub-topics under theoretical review and empirical review that are strongly guided by the six objectives of the research.

2.2. Theoretical Review

2.2.1 Nature of Construction Projects Delay

Construction delay is the most frequent phenomenon in the construction industry. According to Assaf & Al-Hejji (2006), construction delay means the time overrun beyond a project completion date specified in a contract or the time overrun beyond a project delivery date that the contractual parties agreed.

Many construction projects worldwide face significant delay due to various reasons. According to Haseeb et al. (2011), around 80% construction projects in Pakistan faced delays. Assaf & Al-Hejji (2006) found that approximately 70% of the large construction projects in Saudi Arabia experienced time overruns. In Ethiopia, 94% of 52 surveyed public building projects constructed by local contractors in the years between 1995 and 2005 suffered delays (Abdo, 2006).

2.2.2 Classification of Delays

Before discussing classification of delay based on compensability, source and nature, it is necessary to understand the legal framework related to delay in the Ethiopian civil code.

2.2.2.1. Legal Framework Regarding Construction Delays

The legal framework allocates obligations to parties of a contract to share risks associated with a project delay. When an event that causes delay happens, it is possible to identify the responsible stakeholder as per the contract provisions and the responsible party pays compensation in terms of time or money to the non-responsible party. It also identifies certain conditions so called force majeure which may cause delays in completion of projects, but whose occurrence is beyond the control of the contractor and the client and hence the delay is neither caused by the contractor nor by the client.

2. 2.2.2 Delay related Articles in the Ethiopian Civil Code

The Ethiopian Civil Code (ECC) comprises six articles which address the nature, effect, and treatment of construction delays as discussed hereunder.

1. Article 1771: A contractual party is allowed to require enforcement of the contract or cancellation of the contract and damage caused to him by delay to be made good when the other party does not carry out his obligations under the contract. However,
2. Article 1791: If the party fails to perform his obligations, he shall be liable to pay damages unless he can show that performance was prevented by force majeure
3. Article 1792: Force majeure results from an unforeseeable occurrence, which absolutely prevents the contractor from performing his obligations
4. Article 1793: Examples of force majeure include the unforeseeable act of a third party for whom the contractor is not responsible, an official prohibition preventing the performance of the contract, a natural catastrophe such as an earthquake, lightning or flood, international or civil war and the death or a serious accident or unexpected serious illness of the contractor
5. Article 1794: Force majeure shall not exist in the following situations strike or lock-out taking place in the undertaking of a party or affecting the branch of business in which he carries out his activities; or an increase or reduction in the price of raw materials necessary for the performance of the contract; or the enactment of new legislation which makes the performance of the contract more onerous. Article 1794: When contractor delays the carrying out of his task, the client may fix him a reasonable time limit to begin the execution of the task. In case, the contractor, after this time limit, has not begun the task or has interrupted it in bad faith, the client

may cancel the contract without waiting for the expiry of the period laid down for the completion of the task. Where appropriate, the client may also claim damages from the contractor.

2.2.2.3 Types of Delays by Source

Construction delays are normally caused by either the contractual parties such as client, contractor and consultant or factors beyond the control of the parties or force majeure (Alhaji & Danladi, 2012).

1. Client

Delays are caused by the client's actions emanating from his need or inactions contrary to provisions stipulated in the contract. Examples include late payment to the contractor, change order, differing site condition, interference, late decision making, etc. In this case, the contractor will be entitled to claim for time extension and financial compensation (Saeed, 2012).

2. Contractor

Delays are also caused by the contractor's non-performance of activities due to his own problem or problems within his control which finally result in time overrun and cost overrun. Examples include inadequate experience, poor site management, problems related to subcontractors and suppliers, shortage of material, labor and finance, improper project planning, mistakes during construction, etc. In this case, the contractor will not be entitled to time extension and financial compensation, rather pay liquidated damage or actual damage to the client.

3. Consultant

In fact, delays may result from consultant problems, which include design errors, late approval of tests and drawings, poor project administration etc. In this case, the contractor will be entitled to claim for time extension or/and financial compensation whereas the client will not be entitled to claim for liquidated damage as the consultant is the representative and within control of the client.

4. Force Majeure

Delays are caused by force majeure, which are beyond the control and without the fault of the client or the contractor. Examples include the unforeseeable act of a third party for whom the contractor is not responsible, an official prohibition preventing the performance of the contract, a natural catastrophe such as an earthquake, lightning or flood, international or civil war and the death or a serious accident or unexpected serious illness of the contractor. In this case, the contractor shall not be entitled to financial compensation, but extension of time to complete the project. In addition, the contractor shall not pay liquidated damage to the client (ECC, 1960)

2.2.2.4 Types of Delays by Compensation

Construction delay is classified into two major types of delay by compensability such as non-excusable (contractor-caused) delay and excusable delay. The excusable delay is further classified into compensable (client-caused) delay and non-compensable (force majeure-caused) delay as discussed hereunder (Alhaji & Danladi, 2012).

1. Non- Excusable Delays

Non-excusable delay is any delay caused by the contractor, its sub-contractors, or suppliers only. The contractor is responsible for the delay and the owner is entitled to claim any delays to the project as per the contract. The contractor gets neither a time extension nor financial compensation rather the client is entitled to liquidated damages or actual damages provided there is no liquidated damages clause in the contract. These delays include, for example, late commencement of work, poor site management, shortage of material, low productivity of labor, equipment failure, problems with sub-contractor etc. The contractor is generally not entitled to relief and must either make up the lost time through acceleration or compensate the owner. Acceleration is often carried by working overtime and on weekends by adding manpower or even by placing extra shifts and equipment.

2. Excusable Compensable Delays

Excusable compensable delay is caused by either the client or the consultant. The client is responsible for both the time and cost effect of the delay. Contractor gets both a time extension and financial compensation. Examples include failure to pay the contractor, the

client's intervention with the work, change order, differing site condition, late decision making etc.

3. Excusable Non-Compensable Delays

Excusable non-compensable delays are caused by third party or force majeure. Contractor is normally entitled to a time extension but no compensation for delay damages. Examples include an official prohibition preventing the performance of the contract, a natural catastrophe such as an earthquake, lightning, or flood, international or civil war and the death or a serious accident or unexpected serious illness of the contractor.

2.2.2.5 Types of Delays by Nature

Construction delays are classified into three categories such as independent delay, serial delay and concurrent delay based on their time of occurrence (Arditi & Robinson, 1995; Stumpf, 2000).

1. Independent delays

An independent delay is defined as a particular delay occurring solely and without concurrency with other delays (Arditi & Robinson, 1995). Analyzing this type of delay is simple and the effect can be identified easily by imposing the delay on the project schedule, but independent delay may cause serial delays. Example is when a contractor fails to supply material solely.

2. Serial delays

Serial delay is a series of sequential, non-overlapping delays that are linked together (Arditi & Robinson, 1995; Stumpf, 2000). It is caused by the action or inaction of one of the parties (Raid et al., 1991). Measuring the impact of serial delays is comparatively simple as none of the individual delays interferes with one another. Example is when client fails to pay the contractor and then the contractor fails to supply material sequentially (Arditi & Robinson, 1995).

3. Concurrent delays

Concurrent delay is defined as two or more delays that occur at the same time, either of which would cause project delay (Williamet al, 2011). Concurrent delays can be caused by a combination of delays as follows (Kraeim, 1987):

- I. Excusable delay and non-excusable delay. Example is when severe weather occurs and contractor fails to supply material at the same time. In such a case, contractor should be entitled to time extension, but not financial compensation.
- II. Excusable delay and compensable delay: Example is when severe weather occurs and client fails to pay the contractor at the same time. In such a case, contractor should be entitled to time extension, but not financial compensation.
- III. Excusable delay, non-excusable delay, and compensable delay: Example is when severe weather occurs, contractor fails to supply material, and client fails to pay the contractor at the same time. In such a case, contractor should be entitled to time extension, but not financial compensation.
- IV. Non excusable delay and compensable delay: Example is when contractor fails to supply material and client fails to pay the contractor at the same time. In such a case, contractor should be entitled to time extension, but not financial compensation.

2.2.2.6 Types of Delays by Responsibility

Ahmed et al. (2002) delay responsibilities are categorized in to client responsible, contractor responsible, neither party responsible, and both parties responsible so as to identify which party will be entitled for compensation as discussed hereunder,.

1. Client Responsible

Such delays occur when the client is responsible for the occurrence of delay, then Contractor will be granted time extension and financial compensation and client will not be entitled to claim for liquidated or actual damages. Examples include change order, failure to pay the contractor, differing site condition etc.

2. Contractor Responsible

Such delays occur when the contractor is responsible for the occurrence of delay; client will be entitled to claim for liquidated or actual damages. Contractor will not be granted time extension and financial compensation. Examples include failure to deliver material and equipment, low productivity of workers, failure of equipment etc.

3. Neither Party (e.g. force majeure) Responsible

Such delays occur when a delay occurs due to force majeure, neither parties are responsible. However, Contractor will get time extension to complete the project but no financial compensation and client will not be entitled to claim for liquidated or actual damages. Examples includes civil war, occurrence of a natural catastrophe such as earthquake, flood etc.

4. Both Parties Responsible

Such delays occur when a delay occurs due to both parties concurrently, Contractor will get time extension to complete the project, but no financial compensation and client will not be entitled to claim for liquidated or actual damages. Joseph (2004) showed that in building construction projects in Botswana public sector, contractors were responsible for 48% of the total delay experienced on their projects while the employer or the government was responsible for 31% of the delays. The rest of the delays were due to force majeure.

2.2.3 Identification of Delay Events

A delay event is any types of event which causes delay to completion (Alena et al, 2015). Identifying delay events is very important, but difficult and time taking to determine the responsible contracting party for a delay. Delay events are typically grouped into either of the Contractor's delay event or the Client's delay event. The contractor delay events include late commencement of work, late material delivery, equipment failure, low productivity of labor, etc. There are two primary approaches to identify delay events: effect-based approach and cause-based approach (Farrow, 2001). The effect-based approach: investigates the as-built schedule to identify the deviations from the as-planned schedule, which are the effects of delay events. This approach identifies the effects first and then investigates the causes of those effects.

The cause-based approach: lists out a set of delay events first and then measures the effects of those causes based on a baseline schedule. The cause-based approach requires a reliable as-planned schedule as it must verify that identified delay events were not counted at the as-planned status.

2.2.4 Determinants of Project Delay

Delay can be described as one of the most important issues of a project success. Despite its proven significance, it is common to see public sector construction projects failing to achieve its objectives within the specified time. To this effect, several past studies have identified typical determinants of delay in the public sector construction projects. However, the focus this study will be on such determinants, which are very common in various construction projects. These are construction material, project financing, Project planning, Contractors experience and supervision of work.

2.2.4.1 Project Planning

Planning must reflect the tactics selected to achieve the project's strategic objectives including the integration sequence of the various system entities. Projects failing to do this will suffer huge overruns and schedule delays (Forsberg, Mooz and Cotterman, 2005).

2.2.4.1.1 Plan the Work and Work the Plan

Forsberg, Mooz and Cotterman (2005) define planning as the process that determines beforehand the tasks necessary to complete the project. Moreover, planning continues and the plan evolves as the project progresses through the phases of the project cycle. Thus, a plan contains at least:

- ✓ What is to be done?
- ✓ When it should be done?
- ✓ Who is responsible for doing it?

2.2.4.2 Project Financing

Construction is a high-risk business with historically low profit margins. Control over costs, cash flow, and adequate project funding is critical to the success of any business endeavor, and construction is certainly no exception (Levy, 2007).

Financing is related to unreasonable constraints to the owner or funding shortage, methods of payment, delayed payment on contracts, monthly payments from agencies, cash problem during construction, etc (Rahman et al., 2013). According to Zagorsky (2007), financial difficulty is defined as getting into a situation where a respondent's credit is adversely impacted, such as not paying bills. Contractor's financial difficulties are

defined as the contractor not having sufficient funds to carry out the construction works. This includes payment for the materials, laborer's salaries and equipment to be used for the construction work. Slow collection, low profit margins and insufficient capital or excessive debt are the 3 major causes of financial difficulties among contractors. Slow collections topped the list in the years 2005 and 2007, in which the contractor received late payment from the client. Delay in payment from the client would eventually cause financial difficulties to the contractor. Thus, most of the construction works cannot be carried out due to these financial difficulties. Insufficient profit is the second highest factor contributing to the financial difficulties of the contractor. Insufficient profit cannot be controlled because it is due to bad economic conditions. Insufficient capital is one of the major causes of financial difficulties among contractors. Poor financial control by the contractor can lead to insufficient capital (Liu, 2010). Hence, the contractor will have excessive debt which causes them to face financial difficulties as they cannot pay back the debt resulting into cost and time overruns of the project. Similarly, some contractors take up many projects at the same time thereby constraining their financial resources leading to some of the project being delayed.

2.2.4.3 Construction Material

Enshassi et al (2009) discovered in her study that top factors that influenced on delay and cost overruns included on increment in material prices due to continuous delay in construction fluctuation in cost of construction materials unsettlement of local currency in relation to dollar value, funds and associated auxiliaries not ready, lack of finance planning and monitoring during pre-test and post contract stages culminating into inaccurate construction project take-off. According to a study done by Kombo (2006) on delay and cost overruns in public sector construction projects in Kenya, it was found out that construction works in the public sector projects depends mainly on equipment, plants and materials whose unavailability may cause project delay and increase in cost overruns without effective and efficient procurement procedures.

2.2.4.4 Supervision of work

The competence of the project manager during project implementation will also affect the timely completion of a project. Positive attitude of project manager and project

participants has emerged to be the most important success attribute for quality compliances at project sites (Kenig et al, 2012).

The authors additionally observed that some of the attributes that are with high importance are all related to the project manager. For example effective monitoring and feedback by the project manager, project managers technical capability, leadership quality of the project manager, effective monitoring and feedback by the project team members. Also looked at is the authority to take day to day decisions by the project managers' team at site. Furthermore, the success of project hinges on the efficacy of the project team in managing the process (Olatunji, 2010). This indicates adequate capacity of the project manager as well as the project team to ensure proper inspection and investigation of work done on site.

According to McMiniminee et al. (2010), a weak link in the process such as a lack of project management experience, could adversely affect timely execution/ timely completion of the projects. When there is no proper inspection/supervision, quality control is greatly compromised. Chism and Armstrong (2010) agree by stating that inspection and workmanship standards are quite important to achieve quality. Fapohunda and Stephenson, (2010) state that to achieve the pre-determined project objectives, the construction site manager should have a significant influence over cost, time, scope and quality which make it paramount for the manager to have ability of exercising authoritative and absolute control.

2.2.4.5 Contractor's experience

Contractor's experience is a variable that affect adherence to timely completion of projects. A contractor is the one who carries the actual construction; the contractor who has been awarded the tender starts by identifying the best plan, allocating both manpower and required resources, linking all the legal partners and above all delivering within the assumed times (Elshakour, 2012). In his work of the 21st century projects in LDCs that are emerging like Angola, Libya, Ghana, SA and East Africa's Rwanda, Kaming et al. (2012) argue that the contractor's knowledge, competence and experience in construction projects have forced up to 85% of these countries run to sourcing for external experts from countries like China, Japan, Israel and many more so that their projects can

achieve the time frames and quality targets. This was rated as one of the highest benefactor that is experienced across the world.

Using a scientific approach on why the almost 32 roads constructed/maintained by the GoK, World Bank, KURA, KeNHA, Australian Development Bank etc. across the country failed to meet the deadlines between 2008- 2012, Oraro (2012) used the approach below and results published. Cross tabulation and the Chi-Squared test was carried out to determine the relationship between the contractors' experience and adherence to the time estimates by Oraro in 2012. The Chi-Squared critical value at $\alpha = 0.05$ was 3.841 whereas the calculated value was 10.2011 which translates to a p-value of 0.00609339. As a result, the study established that the relationship between contractors experience and adherence to time estimates was very significant, at 0.05 level of significance. The Pearson coefficient of correlation at 0.05 confidence level was found to be 0.397 and a p-value of 0.041, which also showed that the relationship was significant at 0.05 confidence level.

2.3 Empirical review

2.3.1 Determinants of Projects Delays

Delays happen in construction projects, but the magnitude of these delays varies from project to project. It is vital to identify the causes of delay in a bid to minimize or avoid delay in any construction project. A number of researches have been conducted on the causes of construction delay worldwide.

Alinaitwe, Apolot & Tindiwensi (2013) have made an investigation into the causes of delays and cost overruns in Uganda's Public Sector Construction Projects in the case of Civil Aviation Authority (CAA). It specifically aimed to identify the causes of delays and overruns and to rank them according to their frequency, severity and importance.

It computed and ranked frequency index, severity index and importance index values and all 20 factors. The five most important causes of delays in construction projects were found to be changes to the scope of work, delayed payments, poor monitoring and control, the high cost of capital and political insecurity and instability. Moreover, the relationship between the factors that cause delays and those that cause cost overruns was found to be moderate (Alinaitwe et al., 2013).

An empirical study on key determinants of construction delay was made with the purpose of identifying the important dimensions of construction delay. It used questionnaire with 40 factors causing delay method to collect data from respondents. The study employed exploratory factor analysis and identified nine dimensions related to design, equipment, personal, manpower, experience, government, material, finance and owner (Abinayasri, Anandakumar & Krishnamoorthy, 2017).

Seboru (2015) investigated into factors causing delays in road construction projects in Kenya. The findings reveals the overall top five causes of delay indentified by both consultants and contractors were: Payment by client; slow decision-making and bureaucracy in client organization; Claims; Inadequate planning / scheduling; and Rain. Likely, the top five causes of delay identified by consultants were: Payment by client; Slow decision-making and bureaucracy in client organization; Inadequate planning / scheduling; Different site conditions; and Proximity to borrow pit. Moreover, the top five causes of delay identified by contractors were: Slow decision-making and bureaucracy in client organization; Payment by client; Engineer's certificates; Claims; and Rain.

Kusakc, Ayvaz, and Bejtagic (2017) studied an Analysis of Causes and Effects of Delays in Construction Projects in Libyan Oil Industry. To identify the most essential factors, the conducted survey among clients, consultants and contractors involved in projects in Libya. The sampling procedures used were convenience and snowball sampling where the participants are identified through referral networks and professional relations. Their findings reveal that the top three delay factors are: security factor, shortage in material, and construction method.

A study undertaken on Construction delay: a quantitative analysis investigated the causes of delays on 130 public projects in Jordan to aid construction managers in establishing adequate evaluation prior to the contract award using quantitative data. Projects investigated in the study were residential, office and administration buildings, school buildings, medical centers and communication facilities. The study identified the main causes of delay in construction of public projects to be related to designers, user changes, weather, site conditions, late deliveries, economic conditions and increase in quantity (Al-Momani, 2000).

Kariungi (2014) investigated the determinants of Timely Completion of Projects in Kenya: A case of Kenya Power and Lighting Company, Thika. The factors were assessed from various project levels; ranging from formulation of project plans, execution, monitoring and

evaluation, and closure. The study adopted descriptive and exploratory research designs while the target population was project engineers, supervisors and technical staff working in projects. Questionnaires, interviews and observation check lists were used to collect data from various respondents based on their suitability. The data it collected was coded and analyzed using SPSS. In addition, measures of central tendency and correlation analysis were used to establish an interaction between the independent and dependent variables. The findings were procurement delays, timely availability of funds and climatic factors.

Construction projects located in the Gaza Strip, Palestine suffer from many problems and complex issues and consequently a study with an objective to identify the factors affecting the performance of local construction projects; and to elicit perceptions of their relative importance was undertaken. The study deployed a comprehensive literature review to generate a set of factors believed to affect project performance and hence a total of 120 questionnaires were distributed to 3 key groups of project participants; namely owners, consultants and contractors. The survey findings indicate that all 3 groups agree that the most important factors affecting project performance to be: delays because of borders/roads closure leading to materials shortage; unavailability of resources; low level of project leadership skills; escalation of material prices; unavailability of highly experienced and qualified personnel; and poor quality of available equipment and raw materials (Enshassi, Mohame and Bushaban, 2009).

Delays are major problems that face the Western Australia's construction industry. Delays can lead to many negative effects such as cost overruns, and is of high concern to those who are involved in the construction industry. This study was set to identify the major causes of delays in the Western Australian construction industry, by means of a literature review and a questionnaire survey. A total of 48 delay factors were obtained from literature review and were further categorized into eight major groups that contributed to the causes of delay. The questionnaire survey was distributed to the targeted respondents from a combination of clients, contractors, and consultants in Perth, Western Australia. About 32 respondents participated in the survey. Based on the data received, albeit limited, the top ten most important causes identified were: (1) Shortage of skills; (2) Financial difficulties; (3) Shortage of labour; (4) Unrealistic deadlines for project completion; (5) Unforeseen ground conditions; (6) Poor organization of the contractor or consultant; (7) Poor communication; (8) Underestimation of time of completion; (9) low speed of decision; and (10) Design errors made by designers (Wong and Vimonsatit, 2012).

Sambasivan and Soon (2007) studied the causes and effects of delays in Malaysian construction industry and identified ten most important causes as: (1) contractor's improper planning, (2) contractor's poor site management, (3) inadequate contractor experience, (4) inadequate client's finance and payments for completed work, (5) problems with subcontractors, (6) shortage in material, (7) labor supply, (8) equipment availability and failure, (9) lack of communication between parties, and (10) mistakes during the construction stage. The study adopted questionnaire survey to solicit the causes and effects of delay from clients, consultants, and contractors. About 150 respondents participated in the survey.

A survey conducted in Saudi Arabia to determine exact factors responsible for project delay was achieved by carrying a critical analysis of the literature and carrying out a questionnaires survey among consultants, project managers and engineers involved in construction projects and collecting their responses. The paper cited the main delay factors in the importance of Project owner's role, contractor related, Financing related, Materials related, Design documents have been cited as (Al Hammadi and Nawab, 2016).

2.4 Summary of Literature Review

The reviewed literature revealed various studies in different parts of the world that have largely made on the factors relating to construction projects delay. Investigation into the causes of delays and cost overruns in Uganda's Public Sector Construction Projects in the case of Civil Aviation Authority (CAA) -2013, an empirical study on key determinants of construction delay was made with the purpose of identifying the important dimensions of construction delay-2017, factors causing delays in road construction projects in Kenya-2015, analysis of Causes and Effects of Delays in Construction Projects in Libyan Oil Industry-2017, Construction delay: a quantitative analysis investigated the causes of delays on 130 public projects in Jordan to aid construction-2000, determinants of Timely Completion of Projects in Kenya: A case of Kenya Power and Lighting Company, Thika-2014, Construction projects delay in the Gaza Strip, Palestine-2009, construction projects delays in the case of Western Australia's construction industry-2012, and causes and effects of delays in Malaysian construction industry-2007. These studies have been carried out and published.

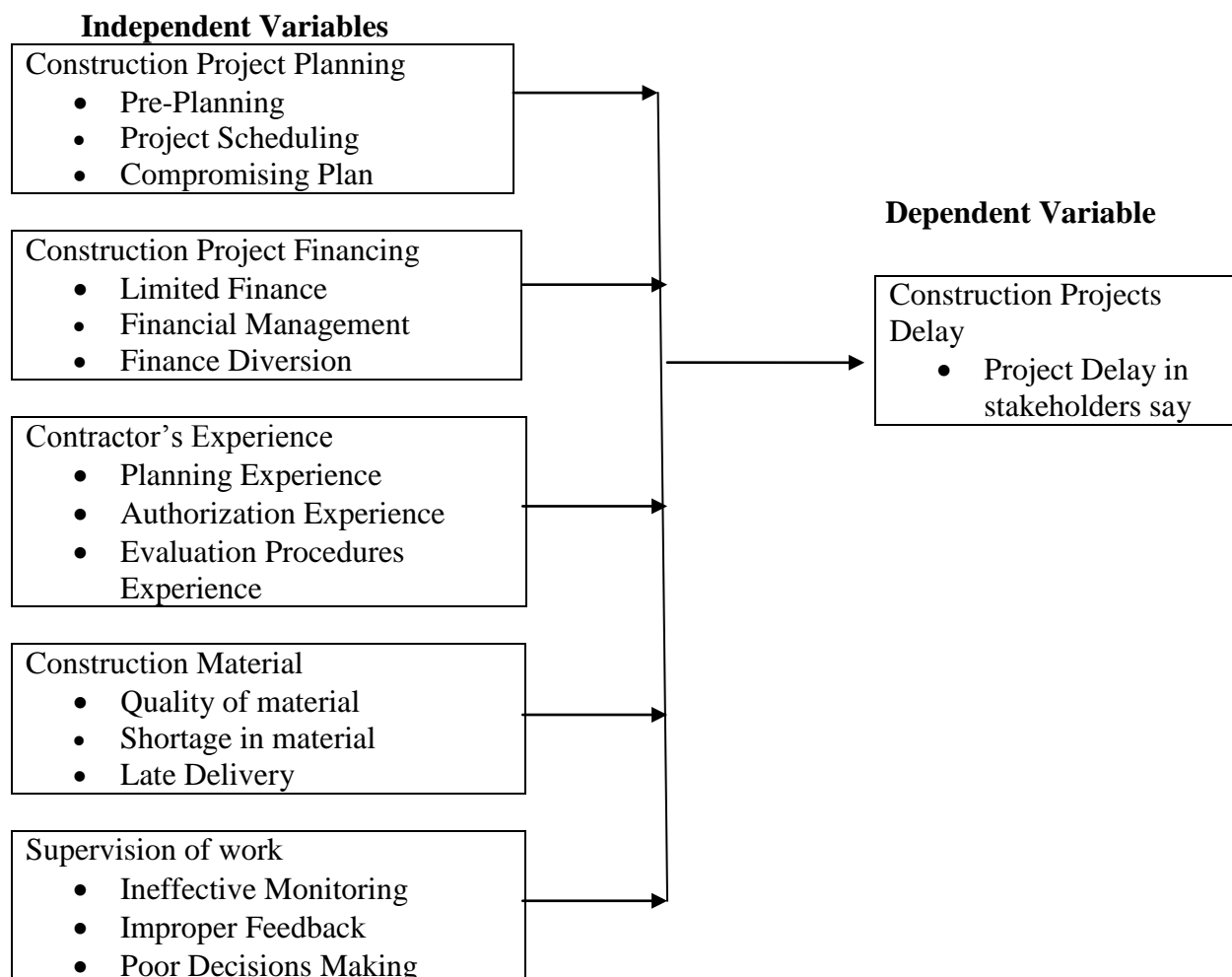
Therefore, in relation to the above, the chapter has highlighted the literature that is existing in relation to the delay of projects in the construction industry. The chapter has reviewed the literature in relation to the six objectives and the factors have been looked at from the global perspective down to the study scope area. Among the highlighted factors include:

Projects Funding (financing), Project Planning, Contractor's Experience, construction material and Supervision that are considered to be independent factors while delay in projects implementation in the construction industry is taken to be the dependent variable. The chapter also highlights the conceptual framework, relationship between variables and research gaps.

2.5 Conceptual Framework

A conceptual framework is a detailed mental formulation of ideas that give direction to a study. It enables the interaction between dependent and independent variables to be portrayed (Kothari, 2004). In this study, the dependent variable will be delay of projects in construction industry while the independent variables are going to be those factors that are thought to influence the realization of the dependent variable.

Figure 2.1: Conceptual Framework



Source: Developed by the researcher based on Literature review

In relation to the literature review, the conceptual framework has underlined a number of factors that determine the rate at which the construction projects are completed. On the far

right is the dependent variable that is manipulated or that changes as the independent variables interact. The dependent variable in this case is the delay of construction projects implementation in the construction industry.

Factors that interact to bring this influence on the dependent variable are called independent variables and they include Projects Funding, Project Planning, Contractors Experience, construction material and Supervision of work. The five factors are expected to be indicators that will determine whether the projects delays are caused by their interaction or not.

CHAPTER THREE

RESEARCH METHODOLOGY AND METHODS

3.1. Introduction

This chapter presents the methodology and research design that was adopted in conducting the research study and collecting the desired data and reach at conclusion. The chapter defines the research design followed, target population of the study, the sampling size used, sampling procedure followed as well as the type of data collection instrument used. The data collection procedures and data analysis techniques used in analyzing the results of the study are also discussed. The detail about the methodology and methods of the study are discussed below.

3.2. Research Design

Creswell (2003) defines a research design as the scheme, outline, or plan that is used to generate answers to research problems. Further Dooley (2007) notes that a research design is the structure of the research that serve as the glue that holds all elements of a research project together. This implies the fact that it gives direction and systematizes the research as it involves the process, which the investigator will follow from the inception to completion of the study.

In light of this, the study has adopted a mixed method research approach with concurrent triangulative research design, which according to Creswell (2012), is used when the problem has been defined specifically, and where the researcher has certain issues to be examined through qualitative and quantitative approaches. This design would also help in conducting statistical analysis to reach at conclusive results about the phenomenon under the study. More specifically, the quantitative aspect employed survey method while the qualitative aspect utilized case analysis. Hence, the study employed concurrent triangulation to examine the determinants of project delay in case of 20/80 condominium housing projects in Addis Ababa

3.3. Target Population of the Study

According to Kothari (2004), a study population is a well-defined or specified set of people, group of things, households, firms, services, elements or events which are being investigated. Thus, the target populations of the study are all contractors, consultants, and clients of the 20/80 condominium housing projects that are currently under construction in the 15 sites of Addis Ababa within which they consist of 684 contractors, 21 consultants, and 15 clients.

3.4.Sampling Technique and Sample Size

The sample size is determined using statistical formula put hereunder considering the population and confidence level so as to estimate the number of questionnaires to be distributed to respondents considering the response rate. Hence, the sample size is determined by the following formula (Khotari, 2004)

$$n = \frac{z^2 \cdot p \cdot q \cdot N}{e^2 (N - 1) + z^2 \cdot p \cdot q}$$

Where n, m and N represent the sample size of the limited, unlimited and available population respectively.

Where, z=the statistical value for the confidence level used i.e. 2.575, 1.96 and 1.645 for 99%, 95% and 90% confidence level respectively.

P=the value of the population proportion that is determined, take a conservative value of 0.5 (Snitch et al, 2002)

q= 1-p

e = the sampling error = 1-confidence level

Currently, there are 15 sites under construction since 2014. To have fair distribution between the constructors, consultants and clients, stratified sampling method is used. Thus, the sample size at 95% confidence level, degree of variability = 0.5 becomes 251 that is only 239 contractors (out of 684), 5 clients (out of 15), and 7 consultants (out of 21).

Table 3.1 Population and Sample Size

Targeted Parties	No. of Population	Sample
Contractors	684	239
Consultants	21	7
Clients	15	5
Total	720	251

Source: Addis Ababa Housing Development project Office (2018)

3.5.Sampling Selection Procedure

The sampling procedure describes the list of all population units from which the sample will be selected (Cooper & Schindler, 2003). The study employed use of questionnaires to the people concerned with 20/80 condominium. Sample of responding are drawn from all consultants, contractors and clients of 20/80 housing construction in Addis Ababa where stratified sampling technique is employed in coming-up with a sample size of 251 respondents from a total of 720 population in 20/80 housing projects within Addis Ababa namely; Contractors, Consultants and Clients. In stratified sampling subjects are selected in such a way that the existing sub-groups in the population are more or less represented in the study (Mugenda & Mugenda, 2003).

3.6. Sources and Types of Data

Kothari, (2004) notes that there are two major sources of data namely primary and secondary data sources that could be used in any study. Hence, the data sources for the research were both secured from primary and secondary sources. The primary data was collected from purposively selected constructors through survey instrument. In addition, primary data was also collected through key informant interview conducted with purposively selected clients and consultants. The data was also supported by document analysis technique, which was applied through the review of reports. In utilizing secondary sources, published articles, research works, previous studies, books, reports, and other sources were reviewed. In addition to this, both quantitative and qualitative data was collected from various sources and was used for the research.

3.7.Data Collection Tools

According to Creswell, (2003), there are many methods of data collection. The choice of a tool and instrument depends mainly on the attributes of the subjects, research topic, problem question, objectives, design, expected data and results. This is because each tool and instrument collects specific data. To this end, the study has used questionnaire, key informant interview and document analysis techniques to collect both primary and secondary data. Secondary data are secured through the review of relevant articles, research works, books, and journals, officially published documents government and, and other pertinent sources.

A. Questionnaire

Questionnaire as instrument to conduct the survey was prepared and distributed to illicit information from randomly selected constructors enhancing the validity of the instrument. The Questionnaire was prepared in Likert scale and respondents were asked to rate the issues under each headings. With this regards, the questionnaire had closed-ended questions. The researcher has administered the survey questionnaire to each member of the target respondent. The questionnaire was carefully designed and pilot test was conducted with a few members of the population for further improvements. This test was done in order to enhance its validity and accuracy of data to be collected for the study. The researcher has employed data enumerators and administered the questionnaires individually to selected respondents snowball sampling techniques. The enumerators were given one day training on how to gather data through survey instruments.

Before the actual data analysis was made, the study has checked the reliability of data collection instrument. The reliability among the multiple measures of the variables that comprise this study was measured using Cronbach Alpha coefficient generated by statistical SPSS. Cronbach's Alpha is a measure of internal consistency of questions within the questionnaire and checks if the questions of the questionnaire were understood and if the data are reliable for analysis (Travakol & Dennick, 2011). Accordingly, Cronbach Alpha test was conducted to check the consistency of the questions and the reliability statistics was 0.819. This implies that there was a higher level of consistency in the questionnaire in measuring all the variables of the study.

Table 3.2: Reliability Statistics

Cronbach's Alpha	N of Items
.819	31

Source: Own Survey, 2018

B. Key informant Interview

Key informant interview was conducted with the representatives of sub-cities and consultants at different sites. The selection of key informants is done using snowball sampling techniques.

C. Document Analysis

Review and analysis of important documents related to the study were reviewed in order to get sufficient data that supports the findings of the study. Data gathered from reports, brochures, quarterly internal publications of City Government of Addis Ababa Housing Agency were analyzed accordingly to substantiate the primary data, in developing the research proposal and as well as in conducting the study. In addition, secondary data are secured from relevant publications related to the study and analyzed accordingly.

3.8. Method of Data Analysis and Presentation

The data collected was analyzed using Statistical Package for Social Sciences (SPSS) program. Both descriptive statistics and binary logistic regression analysis were used as data analysis technique. Descriptive statistics was used in the study to describe the quantified responses of respondents in descriptive statistics using frequency distribution. Besides, the data collected through survey questionnaire has run through binary logistic regression analysis to bring out the determinants of project delay in the study area. Binary logistic regression was employed to examine the determinants of project delay. It helped to determine the combined effects of explanatory variables on the dependent variable. The focus of the study as stated earlier was to identify the determinant of project delay. The study has measured explanatory and dependent variables through the rated opinion of respondents.

3.9. Basic assumption of Binary logistic regression Model

Reddy, Likassa & Asefa (2015) have made a list of the following basic assumptions:

- Logistic regression assumes meaningful coding of the variables. Logistic coefficients were difficult to interpret if not coded meaningfully. The convention for binomial logistic regression is to code the dependent class of interest as 1 and the other class as 0.
- Logistic regression does not assume a linear relationship between the dependent and independent variables.
- The dependent variable must be categorical.
- The independent variables need not be interval, no normally distributed, no linearly related and no equal variance within each group.
- The groups must be mutually exclusive and exhaustive; a case can only be in one group and every case must be a member of one of the groups.

- Larger samples are needed than for linear regression because maximum likelihood coefficients are large sample estimates.
- The logit regression equation should have a linear relationship with the logit form of the dependent variable.
- Absence of multicollinearity.
- It does not need a linear relationship between the dependent and independent variables.
- Logistic regression can handle all sorts of relationships; it applies a non linear log transformation to the predicted odds ratio.
- The error terms need to be binomially distributed.
- The assumption of homoscedasticity is not necessary in logistic regression. Logistic regression can handle ordinal and nominal data as independent variables.
- Logistic regression requires the dependent variable to be categorical (Mostly binary).

Logistic regression assumes linearity of independent variables and log odds. Otherwise, the logistic regression underestimates the strength of the relationship and reject the relationship easily, that is being not significant (not rejecting the null hypothesis) where it should be significant. Logistic regression requires quite large sample sizes (Reddy et al., 2015).

3.10. Model Specification of the Study

A binary logistic regression was used to analyze the determinant factors of project delay in 20/80 construction of housing projects in Addis Ababa. Hence, the following regression model was assumed as a test model in which the data analysis and interpretation was based upon.

The dependent variable in logistic regression is usually binary that is the dependent variable can take the value 1 with a probability of success π , or the value 0 with probability of failure $1-\pi$. This type of variables is called a Bernoulli (binary) variable. The relationship between the predictor and response variables is not a linear function in logistic regression instead log it transformation of π is used. Consider a collection of P explanatory that the outcome is present to denote by:

$$P \left[\frac{\pi}{1-\pi} \right] = \frac{\exp (B_0+B_1X_1+B_2X_2+B_3X_3+B_4X_4+B_5X_5)}{1+\exp (B_0+B_1X_1+B_2X_2+B_3X_3+B_4X_4+B_5X_5)}$$

Then log odds of having $y=1$ (which the project is delayed) is modeled as a linear function of the explanatory variables as:

$$\text{Ln} \left[\frac{\pi}{1-\pi} \right] = (\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5; 0 \leq \pi \leq 1)$$

Where, β_0 : is the intercept

$\beta_1, \beta_2, \beta_3, \beta_4$, and β_5 : Coefficient of the explanatory variables

X_1 : Construction Material, X_2 : Project Planning, X_3 : Contractor's experience, X_4 : Supervision of work and X_5 : Financial Resources.

3.11. Operationalization of Study Variables

Operationalization refers to the process of developing indicators or items for measuring the research constructs (Creswell, 2004). Literature reviewed has identified various variables for this study. The independent variables consist of five elements namely construction materials availability, project planning, and supervision of works, financial availability, and constructors' experience) while the dependent variable is the project delay. The following table shows the detail.

Table 3.3: Operationalization of variables

Research Objectives	Independent Variable	Indicators	Level of Scale	Level of analysis
To evaluate the level to which Construction material influence on the delay of 20/80 condominium construction projects	Construction material	Quality of material Shortage in material	Ordinal scale	Descriptive: Central tendency
To explore the presumed influence of construction project funding over the delay of 20/80 condominium construction projects	Projects Funding	Source of Finances Financial management	Ordinal scale	Descriptive: Central tendency
To inspect the alleged relationship between construction project planning and the delay of 20/80 condominium construction projects	Project Planning	Pre-Planning, Project Schedule	Ordinal scale.	Descriptive: Central tendency.
To investigate the degree to which contractor's experience influence on the delay of 20/80 condominium construction projects	Contractors Experience	Planning Experience Authorization Experience Evaluation Procedures Experience	Ordinal Scale.	Descriptive: Central tendency.
To evaluate the extent to which supervision of work influences the delay of 20/80 condominium construction projects	Supervision	Effective Monitoring Proper Feedback Decisions Making	Ordinal scale.	Descriptive: Central tendency.
Dependent Variable	Project Delay	Actual time taking as compared to planned time in stakeholders say	Nominal	Descriptive: Central tendency

3.12. Ethical Considerations

Ethics in research should be viewed as integral part of the research planning and implementation, not viewed as an afterthought or a burden (Gakuu and Kidombo, 2013). This research is guided by strict adherence to research ethics which do not allow the researcher to engage in deception or invasion of privacy. The respondent's right not to respond to the questions will be clarified from the onset and consent sought from the word go. The anonymity of the respondents will also be assured and confidentiality will be guaranteed as an integral part of the research. The researcher will maintain humility and will conduct the research with utmost honesty avoiding distortions and misleading data manipulation. The researcher will also try hard to uphold intellectual honesty and seek collaborative support, which will be duly acknowledged. The researcher also endeavors to arrive at conclusions based on objective inferences that are guided by the data collected.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.1. Introduction

Project delays are a common problem internationally in the construction industry in modern times. Investigating the reasons for delay has become an important contribution to improved construction industry performance. In light of this, the study has examined the determinants of project delay in construction projects taking the case of 20/80 condominium construction in Addis Ababa. In line with this, the study has formulated five research hypotheses and tested them for validity in the study area. This chapter thus presents the analysis and discussions made on the data collected from study respondents and available literature. The data were gathered through questionnaire, key informant interview, document analysis, and review of related literature.

To present the findings, the study has used both descriptive and inferential statistics. Descriptive analyses were made on the variables of the study using frequencies distribution while inferential statistics was made to test the research hypotheses. Accordingly, in the following sections of the chapter, the analysis and discussion of data was conducted and presented thematically. In the chapter, four major parts are presented. The first part discusses the background of the study while the second section deals with the descriptive analysis of the responses of respondents. The final part of the chapter presents the discussion made on the regression analysis to test the hypotheses formulated in the first chapter of the study. On top of this, the analysis and discussions, which made are substantiated with relevant and available literatures. The analysis of the data was conducted through Statistical Package for Social Sciences (SPSS) version-20 software.

4.2. Response Rate

The sample of the study consisted of 239 randomly selected respondents. The selection of respondents was made using snow balling sampling techniques. Following this, the researcher has distributed 239 questionnaires prepared for this purpose to the respondents. Accordingly, out of the total number of sampled respondents 228 complete questionnaires were received, translating into 95.4% response rate. The response rate was considered appropriate since Nulty, (2008) argues that any response rate above 75% is classified as appropriate. The rate of return of questionnaire was computed as follows

$$\text{Rate of return} = (R / (S - ND)) \times 100$$

Where; R = number of questionnaires that were returned

S = total number of questionnaires sent out, and

ND = number of questionnaires unable to be delivered (“returned to sender”)

$$\text{Rate of return} = 228 / (239 - 0) \times 100$$

$$\text{Rate of return} = 95.4\%$$

4.3. Background Information of Respondents

Table 4.1: Background Information of Respondents

No.	Indicator	Measurement	Frequency	Percent
1	Gender of Respondents	Male	180	78.9
		Female	48	21.1
2	Age of Respondents	18-30ys	135	59.2
		31-40yrs	66	28.9
		41-50yrs	9	3.9
		51-60yrs	18	7.9
3	Educational level of Respondents	Secondary	18	7.9
		Vocational Training	18	7.9
		Diploma	69	30.3
		Degree	111	48.7
		Masters	12	5.3
4	Employment Type of respondents	Contractor	228	100

Source: Own Survey, 2018

The gender composition of the above table shows the response was dominated by the male gender with a total of 180 male respondents while 48 of the respondents went for the female gender implying 78.9% and 21.1% respectively. From the age distribution of respondents, majority of the population that participated in the study were between ages 18- 30 years making 59.2%. This was followed by 28.9% for ages that went within 30 – 40 years, ages 51-60 years followed with 7.9%, and finally 41-50 years followed with a percentage of 3.9%. Regarding the academic qualification of respondents, the majority of the population that participated in the study were dominated with degree holders for 48.7% followed with 30.3%, 7.9%, 7.9% and 5.3% Diploma, vocational training, secondary and masters respectively. The employment types of the respondents were all contractors.

4.4. Construction Materials Supply of 20/80 Condominium Construction in Addis Ababa

Construction delay factors are considered significant role in the delivery of a construction project on time, within budget and at the required quality. According to Alinaitwe, Apolot & Tindiwensi (2013) the major causes of delays in construction projects are material procurement problems, and shortage of construction materials. Similarly, Kuşakc, Ayvaz & Bejtagic, (2017) confirmed in a study conducted on the “analysis of Causes and Effects of Delays in Construction Projects in Libyan oil industry that construction material supply has a determinant effect of project delay. With this regards, this research aimed at examining the roles construction material supply on project delay. The following table indicates the responses of study participants.

Table 4.2: Construction Material Supply

No.	Indicator	Measurement	Frequency	Percent
1	The project in the site have been delayed due to low quality	Strongly Disagree	30	13.2
		Disagree	45	19.7
		Weakly Agree	42	18.4
		Agree	45	19.7
		Strongly Agree	66	28.9
2	Shortage of construction material has led to delayed projects	Strongly Disagree	18	7.9
		Disagree	21	9.2
		Weakly Agree	30	13.2
		Agree	63	27.6
		Strongly Agree	96	42.1
3	Late delivery of construction material has led to delayed projects	Strongly Disagree	12	5.3
		Disagree	18	7.9
		Weakly Agree	33	14.5
		Agree	51	22.4
		Strongly Agree	114	50.0

Source: Own Survey, 2018

From the responses received, various factors attracted different degrees of responses on the lik+ert scale a rating. On the factor that focused on low quality of material, 66 respondents strongly agreed that it influenced the delay of construction of 20/80 condominium in Addis Ababa. Thirty respondents has opted for strongly disagree, 42 (18.4%) went for weakly agree, 45 (19.7%) for agree while 45 (19.7%) went for disagree. Concerning shortage of construction material, 18 (7.9%) went for strongly disagree, 21 (9.2%) went for disagree, 30 (13.2%) went for weakly agree, 63 (27.6%) went for agree while 96 (42.1%) went for strongly agree. Late delivery of construction material factor attracted, 114 respondents went for strongly agree, 51 went for agree, 33 weakly agree, 18 disagreed and 12 strongly disagreed. Regarding late delivery of materials, 114 (50%) respondents disagreed, 51 (22.4%)

respondents agreed, 33 (14.5%) respondents weakly agreed, 18 (7.9%) respondents disagreed and 12 (5.3%) respondents strongly disagreed.

The findings of the study imply that majority of the respondents agreed that there is a problem of construction material supply and there are late delivery of construction material with low quality, which affected the proper construction processes. Besides, the key informant interviewees (the consultants) have stated that there are times where the supply of construction material was critically short. They further admitted that there were also times where the supplies of materials arrive at construction sites being late. These, according to the key informants, has affected the construction process and contributed to project delays. Similarly, the client key informant interviewees argued that the supply of raw material is not up to the required level and lacks standardized quality. This finding is attested in a study conducted by Kariung (2014). He found out that there were late delivery and shortage in material supply in a construction power and lighting construction in Kenya. In addition, Seboru (2015) stated that procurement is the entire process of acquiring materials, property, and services required for a particular project. However, he added, shortage in supply and untimely supply affects construction sector.

4.5. Project Planning of 20/80 Condominium Construction in Addis Ababa

Although schedule delays are common features in all construction projects the identification of the main causes of schedule delays and the implementation of actions that prevent these delays are fundamental steps for resolving delay related issues (Murithi, Makokha & Otieno, 2017). In this context, the study has assessed project planning of 20/80 condominium constructions in Addis Ababa. The study has found out that majority of the respondent agreed and strongly agreed that project planning process had contributed to project delay in the study area.

Table 4.3: Project Planning

No.	Indicator	Measurement	Frequency	Percent
1	Project Schedule planning has not been achieved due to poor coordination	Strongly Disagree	9	3.9
		Disagree	18	7.9
		Weakly Agree	27	11.8
		Agree	90	39.5
		Strongly Agree	84	36.8
2	Pre-planning of the condominium housing projects is very poor	Strongly Disagree	27	11.8
		Disagree	12	5.3
		Weakly Agree	21	9.2
		Agree	60	26.3
		Strongly Agree	108	47.4
3	The housing Agency has compromised plans due to external interferences	Strongly Disagree	51	22.4
		Disagree	15	6.6
		Weakly Agree	45	19.7
		Agree	51	22.4
		Strongly Agree	66	28.9

Source: Own Survey, 2018

From the responses received, various factors attracted different degrees of responses on a rating. On the variable that focused on project schedule planning affected by poor coordination, 84 (36.8%) respondents strongly agreed that it influenced the delay, 9 (3.9%) went for strongly disagree, 27 (11.8%) went for weakly agree, 90 (39.5%) agreed while 18 (7.9%) went for disagree. With the existence of poor pre-planning factor, 27 (11.8%) went for strongly disagree, 12 (5.3%) went for disagree, 21 (9.2%) went for weakly agree, 60 (26.3%) went for agree while 108 (47.4%) went for strongly agree. On the issue related to compromising plans by the Agency (The Addis Ababa Housing Development Office) due to external interferences factor led to project delay, 66 (28.9%) respondents strongly agreed, 51 (22.4%) agreed, 45 (19.7%) weakly agreed, 15 (6.6%) disagreed and 51 (22.4%) strongly disagreed. Majority of the respondents had the view that poor coordination, weak preplanning activities, and compromised plans due external interferences were the factors, which characterize weak project planning in sampled 20/20 Condominium Construction in Addis Ababa. However, responses reported by the key informants (both the client and consultants) show that the project planning activities were adequately done. They state that the problem was on the implementation of project plans. According to their view, inadequately structured project implementation has affected project construction process and contributed to project

delays. In support of this finding, a study conducted by Al-Momani (2000) concluded that weakly planned and design projects are characterized by low coordination among different units of the project and absence of well-thought preplanning activities. In similar vein, Alinaitw, Apolot & Tindiwensi (2013), stated that poor project planning has a considerable effect on project success. In addition, Seboru (2015) concluded his study stressing that inadequate planning and scheduling affects construction project delays.

4.6. Constructors Experience of 20/80 Condominium Construction in Addis Ababa

According to Hammadi & Nawab (2016), contractors work experience has a direct impact up on the construction project delay. They stated that one of the major causes for project delay in the construction projects is the inadequate work experience of project contractors. Correspondingly, the finding of a research conducted by Sambasivan & Soon (2007) confirmed that contractors work experience has a significant effect on the schedule of projects and low level of experience contributes to project delays. In line with this view, the study has found out in this study that contractors work experience in the construction of 20/80 Condominium Construction in Addis Ababa affected the schedule of project completion.

Table: 4.4: Contractors work experience

No.	Indicator	Measurement	Frequency	Percent
1	Contractor's planning experience influences the rate of projects completion	Strongly Disagree	15	6.6
		Disagree	27	11.8
		Weakly Agree	39	17.1
		Agree	60	26.3
		Strongly Agree	87	38.2
2	Authorization experience and channels used by the contractor	Strongly Disagree	12	5.3
		Disagree	36	15.8
		Weakly Agree	27	11.8
		Agree	84	36.8
		Strongly Agree	69	30.3
3	Evaluation procedures experience held by the contractor influence projects	Strongly Disagree	18	7.9
		Disagree	33	14.5
		Weakly Agree	39	17.1
		Agree	72	31.6
		Strongly Agree	66	28.9

Source: Own Survey, 2018

Concerning contractors' work experience, various factors attracted different degrees of responses on a rating provided by respondents. On the factor that focused on contractor's planning experience, 87 (38.2%) respondents strongly agreed that it influenced the delay, 15

(6.6%) went for strongly disagree, 39 (17.1%) went for weakly agree, 60 (26.3%) agreed while 27 (11.8%) went for disagree. With the weak authorization experience of contractor's leading to project delay, 12 (5.3%) strongly disagreed, 36 (15.8%) disagreed, 27 (11.8%) weakly agreed, 84 (36.8%) agreed while 69 (30.3%) strongly agreed. In connection to evaluation procedures experience factor, 66 (28.9%) respondents strongly agreed, 72 (31.6%) agreed, 39 (17.1%) weakly agreed, 33 (14.5%) disagreed and 18 (7.9%) strongly disagreed. With this regards, the key informant interviewees mentioned that most of the contractors had weak profile of work experiences and most of the contractors involved in the construction projects of condominium as the government has the intension of promoting domestic contractors specifically small and medium enterprises. This view is supported by the findings of Sambasivan & Soon (2007). They argued that one of the major causes of project delay in Malaysian construction industry is the inadequate experience of contractors. Similarly, the study conducted by Al Hammadi & Nawab (2016) concluded that low level of contractors' experience has affected construction project delay.

4.7. Supervision of Work of 20/80 Condominium Construction in Addis

Ababa

According to Murithi, Makokha & Otieno (2017), supervision of construction project works by concerned stakeholders has an impact on the success of the project. It is stated in the same study that weak project supervision activities leads to project delay. Similarly, Sambasivan & Soon (2006), argued in their study that proper and timely supervision and monitoring works could enhance efficiency in project works while ineffective supervision, weak feedback system and low decision making ability leads to project delay and even project abandonment. With this regards, the study has found that majority of the respondents had the view that ineffective monitoring, weak feedback system and poor decision making powers of supervisors have contributed to project delay in the study area. The following table shows the detail of the descriptive statistics.

Table: 4.5: Supervision of Work

No.	Indicator	Measurement	Frequency	Percent
1	Projects in the site have been delayed due to ineffective monitoring	Strongly Disagree	18	7.9
		Disagree	15	6.6
		Weakly Agree	42	18.4
		Agree	72	31.6
		Strongly Agree	81	35.5
2	Proper feedback is missing in supervisors leading to delays	Strongly Disagree	15	6.6
		Disagree	18	7.9
		Weakly Agree	45	19.7
		Agree	92	40.4
		Strongly Agree	58	25.4
3	Poor decisions making from the supervisors has led to delayed projects	Strongly Disagree	12	5.3
		Disagree	18	7.9
		Weakly Agree	30	13.2
		Agree	75	32.9
		Strongly Agree	93	40.8

Source: Own Survey, 2018

From the above table it is easy to determine that majority of the respondents 31.6% and 35.5% agreed and strongly agreed to the existence of ineffective supervision and monitoring activities conducted by supervisors in the study area. Less than 15% of the respondents have disagreed with the idea that there was a weak monitoring activity by supervisors. Besides, majority of the respondents (65.8%) have also stated that there was not viable feedback system where supervisors effectively communicate with supervisee on the finding of the monitoring activities timely. Minor number of respondents stated that there was feedback system whereby effective communication was maintained between supervisors and supervisees. In last, it is confirmed by majority of the respondents (63.7%) that poor decisions making from the supervisors has led to project delayed while 20.9% of the respondents disagreed and strongly disagreed that there was proper decision making situations in the construction projects of the study area.

This finding is associated with the research ideas of Alinaitw, Apolot & Tindiwensi (2013) that poor decision-making and communication system in project works (e.g., slow responses to site queries, late receipt of drawings) could lead to weak supervision work and in turn

paved a way for project delay. Similarly, Kariungi (2014) stated that strong supervisory works could ensure that project works are up to the planned schedules and reduce cost overrun. In general, it is important to consider effective supervisory activities in order to ensure that construction projects under 20/80 condominium housing schemes are completed within due time and planned budgetary allocations.

4.8. Financial Resources

It is indicated in various literatures financial resource shortage is one of the most critical reasons for project delay. With this regards, Kholif, Hosny and Sanad (2013) analyzed time and cost overruns in educational building projects in Egypt and found out that the major causes of project delay is financial difficulties of contractor. Similarly, Al-Momani, (2000) conducted a study on construction project delay and found out that the main causes of delay in construction of public projects relate to financial shortages. In light of this, the study has investigated the financial resource availability for the construction of 20/80 condominium houses in Addis Ababa and found out that majority of the respondents had the view that financial resource scarcity is one of the major factor which contributed to the project delay of condominium houses construction in the study area. With this regards, the following table presents the descriptive result of the study.

Table: 4.6: Availability of Adequate Financial Resource

No.	Indicator	Measurement	Frequency	Percent
1	Limited Finance	Strongly Disagree	60	26.3
		Disagree	36	15.8
		Weakly Agree	30	13.2
		Agree	42	18.4
		Strongly Agree	60	26.3
2	Financial Management	Strongly Disagree	57	25.0
		Disagree	33	14.5
		Weakly Agree	42	18.4
		Agree	33	14.5
		Strongly Agree	63	27.6
3	Project Finance Diversion	Strongly Disagree	54	23.7
		Disagree	36	15.8
		Weakly Agree	42	18.4
		Agree	30	13.2
		Strongly Agree	66	28.9

Source: Own Survey, 2018

The above SPSS output indicates that diverse factors attracted different degrees of responses on a rating. On the factor that focused on limited finance, 60 (26.3%) respondents strongly agreed that it influenced the delay, 60 (26.3%) went for strongly disagree, 30 (13.2%) went for weakly agree, 42 (18.4%) agreed while 36 (15.8%) went for disagree. With respect to the financial management factor, 57 (25%) went for strongly disagree, 33 (14.5%) went for disagree, 42 (18.4%) went for weakly agree, 33 (14.5%) went for agree while 63 (27.6) went for strongly agree. In addition, in relation to project finance diversion factor attracted 66 (28.9%) respondents for strongly agree, 30 (13.2%) for agree, 42 (18.4%) for weakly agree, 36 (15.8%) for disagree and 54 (23.7%) for strongly disagreed. In support of this, the key informants (consultants and clients) of the study have confirmed that lack of adequate financial resource has hampered the efficiency of construction process and lead to project delay. They added that the supply of financial resource is not timely and even the available financial resource is diverted to a different use by contractors. There were no mechanisms to enforce and monitor how the available financial resource is put in to use once it is allocated by the government for the construction purposes. This finding implies two interrelated ideas; firstly, there is inadequate financial supply for managing appropriate construction activities and secondly, even the available fund is not used properly. This finding of the study is similarly indicated by the study conducted on road construction industry in Kenya by Kimemia (2015). He stated that availability of financial resource is the determinant factor for project success. Adequate financial resource plays an important role for accomplishment of projects within due time while the opposite leads to project delays.

4.9. Binary Logistic Regression Result

The objectives of this study were to examine the determinants of project delay in the case of 20/80 Condominium Construction in Addis Ababa. In line with this, the research has formulated the five research hypotheses. In this part hence, the result from binary logistic regression analysis is presented and discussed.

Accordingly, the researcher has opted for performing binary logistic regression analysis to test the research hypothesis and establish the relationship between the independent variables (construction material supply, project planning, contractor's work experience, supervision of work, and financial resources) and dependent variable (project delay). In the study, binary logistic regression model is considered as the data, which is collected from respondents through the questionnaire is discrete variable (nominal and ordinal). Both the dependent and independent variables were measured in discrete variables representing dichotomous data.

Hence, the data did not fulfill the requirements of linear regression. It is indicated in Pallant (2011) that linear regression is conducted when at least the dependent variable is a continuous variable. Therefore, this study has used binary logistic regression, which is actually fit with the data the research had collected. This is also supported by the statements of Pallant (2011) that variable (independent and dependent) measured through nominal and ordinal scale should be regressed using either binary logistic regression or ordinary logistic regression.

Besides, before conducting the regression analysis, the study has identified outliers and removed them from the analysis as they distort the findings of the study. According to the view of Pallant (2011), it is a requirement to detect and remove outliers from the analysis. He further explains that if outliers are left undetected, they may provide the finding of a study a different shape and distorts the findings of the study. Hence, the study has identified six outliers and removed from the regression analysis. With this regards, the following section presents the findings of the regression analysis.

Accordingly, the researcher findings of this regression analysis illustrates that the model summary (Nagelkerke R Square) is 0.507 while the Cox and Snell R Square is 0.261. This implies that 50.7% of the variation in project delay is attributable to the variation in the explanatory variables (construction material supply, project planning, contractors work experience, supervision of work, and financial resources). In other words, this implies idea that the independent variables explain 50.7% of the variation in project delay of 20/80 Condominium Construction in Addis Ababa. In this context, the explained variation is the variation in the dependent variable due to factors that are included in the regression model. As stated above Nagelkerke R Square measures the proportion or variation in the dependent variable that is explained by the explanatory variables. According to the model summary, it seems that there is a significant relationship between the independent and dependent variable. Nevertheless, it is not good to pass final judgment until the model has been subjected to an objective statistical test. The following table indicates the model summary.

Table: 4.7: Model Summary

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	93.139 ^a	.261	.507

Source: SPSS Output, 2018

In light of this, to consolidate the findings further, Hosmer and Lemeshow test is conducted. for the significant of Nagelkerke R Square (i. e. the adequacy of the binary logistic regression model is equivalent to testing the hypotheses). The purpose of this test is therefore to prove that the regression model on relationship between independent variables and dependent variable is adequate or fit. In conducting the test, the study has formulated the following null and alternative hypotheses.

Ho: the model is not fit if Hosmer and Lemeshow Test statistic is < 0.05

H1: the model is fit if Hosmer and Lemeshow Test statistic is > 0.05

According to Pallant (2011) the null hypothesis states that the Hosmer and Lemeshow Test statistic (p-value) is less than the 0.05 significant level hence, suggesting that the model is insignificant (none of the independent variables explains the dependent variable) hence, rejecting Ho means such a model is adequet, and can be used for prediction or inferencial purposes. Regarding the test, the folloiwng table indicates the result.

Table 4.8: Model Fitness of the model (Hosmer and Lemeshow Test)

Hosmer and Lemeshow Test			
Step	Chi-square	df	Sig.
1	4.348	8	.824

Source: SPSS Output, 2018

It is show in table 4.10 that the model adequate with significance level of 0.824. In this case, we reject the null hypothesis, which states that the model is not fit if Hosmer and Lemeshow test statistic is less than the significance level of 0.05. This implies that the explanatory variables (construction material supply, project planning, contractors work experience, supervision of work, and financial resources) have significant effects on the dependent variable (project delay) at 5% level of significance.

It is seen in the results that the p-values for construction material availability, supervision of work, and financial availability are less than 0.05 while the p-value of constructors experience and project panning is more than 0.05. Thus, it is concluded that **the three variables** (construction material availability, supervision of work, and financial availability) **significantly affect project delay** while the remaining two variables did not significantly affect project delay of construction of 20/80 condominium housing in Addis Ababa.

Table 4.9: Significance level of independent variables

		Variables in the Equation					
		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1 ^a	Cons_Mat	.392	.110	12.683	1	.000	1.479
	Proj_Plann	.107	.115	.869	1	.351	1.113
	Contr_Exp	-.220	.125	3.089	1	.079	.802
	Super_Work	.568	.161	12.497	1	.000	1.764
	Fina_Resource	-.509	.121	17.711	1	.000	.601
	Constant	-1.266	1.936	.428	1	.513	.282

Source: SPSS Output, 2018

Specifically, the results of the binary logistic regression show that availability of construction material has a significant effect on project delay of 20/80 condominium housing in Addis Ababa. This implies that we reject the null hypothesis and conclude that there is a significant effect of availability of constructions materials on project delay. Likewise, the finding on effects of supervision of work on condominium construction projects shows that supervision of work has a significant effect on project delay at 5% of level of significance. This entails that the null hypothesis is rejected. In addition, the findings of the study reveal that project funding has a significant effect o project delay at 5% level of significance. Hence, we reject the null hypothesis. In contrast, the finding of the study dictates that the effects of project planning on project delay is insignificant. In this case, thus we do not reject the null hypothesis and concluded that project planning does not significantly affect project delay at 5% of level of significance. Similarly, constructors' experience does not significantly affect project delay of 20/80 condominium housing projects and thus we do not reject the null hypothesis.

In general, it is found in the study that the considered model is fit and the model explains shows that 50.7% of the change in the dependent variable (project delay) is attributable to the changes in the significant variables. In comparing the findings of this study with other research findings, it became difficult, as there are very few of them conduct using binary logistic regression. However, for the mere reason of comparing results, study considered other related literatures, which analyzed the determinants of project delay using Pearson correlation and chi-square tests. With this regards, the findings of this study agree with the findings of research works conducted by Desse, (2016), Soon & Sambasivan (2006) and Kariungi (2014). However, the study conducted by Seboru (2015) and Wong & Vimonsatit (2012) found out a different findings which actually contradicts the finding of this study. This implies that further researches should be conducted in order to make valid generalizations of the findings.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1. Conclusions

Delay factors are considered significant roles in the delivery of a construction project on time, within budget and at the required quality. It is known that construction projects are mix of very complex processes that seldom go according to the implementation plan. Due to financial, material, technical, administrative, and environmental factors, many of the construction projects designed in developing countries face extended delays. Taking this into consideration, this study has given due attention to analysis of the determinants of project delay taking the case of 20/80 condominium housing projects in Addis Ababa. In doing this, it focused on the statistical testing of hypotheses formulated in the introductory part of the study. The study has addressed the effects of independent variables (construction material, project planning, contractors' experience, supervision of work and financial resource) on the dependent variables (project delay). Besides, the paper has also analyzed the aspects of each variable and reached at certain findings employing both descriptive and inferential statistics. With this regards, the following paragraphs presents the major conclusions of the study.

Primarily, the study has found that 20/80 condominium housing project in the site have been delayed due to low quality of materials. Majority of the respondents agreed that shortage of construction materials has led to delayed projects. Besides, overwhelming number of the respondents stated that late delivery of construction materials has led to delayed projects in the study area. Likely, the binary logistic regression result indicates that construction material availability have a significant influence on project delay inferring that the null hypotheses is rejected at 5% level of significance.

Secondly, concerning the project planning, majority of the respondents agreed that Addis Ababa Housing Agency has compromised plans due to external interferences. In addition, respondents stated that pre-planning of the condominium housing projects is very poor. Likely, the study has also found out that project schedule planning has not been achieved due to poor coordination among the stakeholders of projects. Nevertheless, the binary logistic regression result indicates that construction project planning has no significant influence on project delay inferring that the null hypotheses is not rejected at 5% level of significance.

Thirdly, the study has revealed that contractor's planning experience has influenced the rate of projects completion in the study area. In addition, the evaluation procedures experience held

by the contractor influence projects performances. Unlikely, the binary logistic regression result indicates that contractor's planning experience has no significant influence on project delay inferring that the null hypotheses is not rejected at 5% level of significance.

Fourthly, it is discovered that 20/80 condominium housing projects in the sites have been delayed due to ineffective monitoring activities, conducted by supervisors. Absences of proper feedback system and poor decisions making from the supervisors in supervisory activities have lead to construction delays. Similarly, the binary logistic regression result indicates that supervision of work has a significant influence on project delay inferring that the null hypotheses is rejected at 5% level of significance.

Finally, concerning financial resource availability, it is found that construction of condominium houses have limited financial access. Majority of the respondents have indicated that the available financial resource is not managed efficiently. It is indicated by the respondents that the inefficiency is manifested through absence of strong auditing procedures and mechanisms of controlling fraudulent activities. It is also revealed in the study that constructors divert the financial resource which is intended for the specific project construction to other business activities indirectly. There in the meantime put the performance of projects lag behind from the expected time of delivery. Likely, Likely, the binary logistic regression result indicates that financial resource has a significant influence on project delay inferring that the null hypotheses is rejected at 5% level of significance.

More specifically, concerning the inferential statistics result, the study employed binary logistic regression and found out that the model assumed in the study is adequate stating that the explanatory variables adequately explain the changes in the dependent variables. It is indicated in the finding part that 50.7% of the changes in project delay is due to the changes in the explanatory variables. Moreover, the Hosmer and Lemeshow Test indicate that the model is fit in expressing the effects of explanatory variables on dependent variable. However, specifically, three variables namely, construction material availability, financial resources, and supervision of works have a significant effect on project delay inferring that the null hypotheses are rejected at 5% of level significance. Nevertheless, the other two variables (constructor's experience and project planning) do not have a significant effect on project delay.

5.2. Recommendations of the Study

The study has examined the determinants of construction project delay in case of 20/80 condominium housing in Addis Ababa in light of five major explanatory variables. Based on the findings, the study has forwarded certain recommendations. The recommendations addressed here, therefore, present options for empirical implications and practical interventions to increase efficiency and effectiveness of construction projects. Hence, concerned stakeholders of these projects would be benefited from the recommendations given below.

1. It is found in the study that construction project in the study site are delayed due to supply of low quality construction materials, shortage of essential construction supplies, and in most cases, materials are shipped after long time of delay to construction sites. Hence, constructors, construction supervisors and consultants should work together in order to ensure the quality of materials which are put into use in the construction process and ensure that materials are up to the acceptable standards. The Addis Ababa Housing Development Project Office should also monitor the quality of materials supplied for construction purpose as the quality of material has long lasting effect on the building and a lagging effect on timely completion.

Likely, it's also important to ensure the supply of adequate construction materials without causing delay of supplies. Hence, contractors should work hard in supplying adequate construction materials. They should also ensure that the required materials are shipped to construction sites in the time of requirement. Besides, The Addis Ababa Housing Development Project Office should monitor and supervise the supply of adequate construction materials to construction sites.

2. It is revealed in the study that the Addis Ababa Housing Development Project Office has compromised plans due to external interferences. It is revealed that there are times external interference in planning and implementation of the construction projects when it faced fund shortages. This causes project delay. Therefore, it is imperative for the success of projects that external parties should not engaged in unnecessary intervention in these projects and should be disregarded by the office. Thus, the office should also manage projects conducted in its jurisdictions properly.

In relation to the existence of weak coordination and poor planning of construction projects in the study sites, the city government, constructors, construction supervisors, and

other concerned stakeholders should work in cooperation and maintain project synergy in order to achieve the common goal (maintaining successful project accomplishment).

3. The study finding show that most of the contractors' planning experience is below the standards and this influences the rate of projects completion. In addition, authorization experience and channels used by the contractor and the evaluation procedures experience held by the contractor influence projects delays. Hence, it is recommended that the city government should be strict in providing bid to constructors in that it must consider the experience of constructors and maintain minimum standards.

Similarly, the Addis Ababa Housing Development Project Office and Consultants should work jointly keeping the hierarch of authority intact, should be strict in monitoring and controlling the quality of constructions, and delay of projects. There should be effective monitoring systems where by all stakeholders engage in controlling the quality and timely of projects. The represented clients should supervise consultants and consultants should work effectively to ensure projects are successfully implemented.

4. The office should also strengthen the communication system, which can maintain proper flow of information among sub-city administration, consultants, constructors, and city government. There should be proper feedback system, which works to ensure feedback on performance, and demands are actively reach stakeholders for remedial actions.

In relation to the poor decisions making from the supervisors leading to project delay, supervisors should be well trained and oriented by the city government/ sub-city administration to develop their decision-making skills. This in turn helps them to make timely and right decision regarding the activities of construction projects.

5. Related to financial resource, it is found that construction of condominium houses have limited financial access adding that even the available financial resource is not managed efficiently. Moreover, it's found that there is the existence of project financial diversion. Thus, it is recommended to devise a strong auditing procedures and mechanisms of controlling financial diversion to make sure that the financial resource are put and used for the intended purpose i.e. for construction of the project. These in the meantime would put the performance of projects exceed the expected time of delivery.

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APPENDICES

Appendix 1: Questionnaire

**ADDIS ABABA UNIVERSITY
SCHOOL OF COMMERCE
DEPARTMENT OF PROJECT MANAGEMENT**

Graduate Program

Questionnaire to be filled by Contractors

Dear respondents,

At present, I am working on a research titled “determinants of construction projects delay in the case of 20/80 condominium housing construction projects implemented by Addis Ababa housing Agency” for the partial fulfillment of the requirements for the degree of Master of Arts Degree in Project Management at Addis Ababa University, Commerce Campus. The main objective of this research is to examine the determinants of construction delay in the 20/80 scheme project. To meet this research objective, it is necessary to have the response of contractors, clients and consultants currently working on the scheme project and hence you are one of the stakeholders recruited to complete this questionnaire. If you choose to participate in this research, please answer all questions as honestly as possible and your immediate response is highly appreciable. Participation is strictly voluntary and you may decline to participate at any time. I confirm that your response will be kept confidential and will dully be used for academic purposes only.

With Regards,

Dawit Sene

Advisor: Dr. Dereje Teklemariam

Thank you very much for your cooperation!

Part I. Background information about the respondent

1. Gender: Male ☐ Female ☐

2. Age: 18-30yrs ☐ 31-40yrs ☐ 41-50yrs ☐ 51-60yrs ☐ 61-70yrs ☐ Over 70yrs ☐

4. Level of education:

☐☐

Secondary Vocational Training ☐ Diploma ☐ Degree ☐ Masters ☐ PhD/Above

5. What is the Name of the Project Site?

Part II. Items as per the Objectives of the study

1. Item on the existence of delay (Dependent Variable)

Answer the following statement in relation to the current status of 20/80 condominium construction project in your site: 0= NO 1= Yes

Effect	0	1
1.1 Does the construction project of 20/80 housing condominium in your site delayed i.e taking longer time than what was initially planned?		

2. Item on construction material (Independent Variable)

Indicate the degree to which you agree or disagree with the following statements: 1= Strongly Disagree 2= Disagree 3= Weakly Agree 4= Agree 5= Strongly Agree.

Factor	1	2	3	4	5
2.1 The Projects in the site have been delayed due to low quality of materials					
2.2 Shortage of construction material has led to delayed projects					
2.3 Late delivery of construction material has led to delayed projects					

3. Items on the Project Planning (Independent Variable)

Indicate your position on the factors below appropriately: 1= Strongly Disagree 2= Disagree 3= Weakly Agree 4= Agree 5= Strongly Agree

Factor	1	2	3	4	5
3.1 Pre-Planning of the condominium housing projects is very poor					
3.2 Project Schedule planning has not been achieved due to poor coordination					
3.3 The housing Agency has compromised plans due to external interferences					

4. Items on Contractors Experience (Independent Variable)

Indicate the extent to what do you agree that the following statements in relation to condominium housing construction projects in Addis Ababa: 1= Strongly Disagree 2= Disagree 3= Weakly Agree 4= Agree 5= Strongly Agree.

Factor	1	2	3	4	5
4.1 Contractor's planning experience influences the rate of					

projects completion					
4.2 Authorization experience and channels used by the contractor influence completion					
4.3 Evaluation procedures experience held by the contractor influence projects completion					

5. Items on Supervision of Work (Independent Variable)

Indicate the degree to which you agree or disagree with the following statements: 1= Strongly Disagree 2= Disagree 3= Weakly Agree 4= Agree 5= Strongly Agree.

Factor	1	2	3	4	5
5.1 Projects in the site have been delayed due to ineffective monitoring					
5.2 Proper feedback is missing in supervisors leading to delays					
5.3 Poor decisions making from the supervisors has led to delayed projects					

6. Items on Financial Resources (Independent Variable)

Using a scale of 1to 5, rate the extent to which the following factors have influenced the delay of 20/80 condominium construction projects in Addis Ababa? 1=very great extent, 2= great extent, 3=fair extent, 4=little extent, 5= very little extent.

Indicators	1	2	3	4	5
6.1 Limited Finances					
6.2 Financial management					
6.3 Project Finances Diversions					

Thank you very much again for taking your time to participate in this study!!