SCHOOL OF GRADUATE STUDIES

CAUSES AND EFFECTS OF DELAY IN RESIDENTIAL CONSTRUCTION PROJECT

(CASE OF ADDIS ABABA HOUSING DEVELOPMENT PROJECT OFFICE)

BY

GETAW ZEWDU

JUNE, 2018

ADDIS ABABA, ETHIOPIA

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THE BOARD OF EXAMINERS

As members of the Examining Board of the Final M.A thesis Open Defense, we certify that we have read and evaluated the thesis prepared by Getaw Zewdu, entitled **"causes and effects of delay in residential construction project (the case of Addis Ababa housing development project office)"** and recommend that it be accepted as fulfilling the thesis requirement for the degree of: Master of Art in Project Management

Dean, Graduate Studies	**Signature**	**Date**
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DECLARATION

I hereby declare that this thesis titled **"causes and effects of delay in residential construction project (the case of Addis Ababa housing development project office)"** has been done by me and it is a record of my own research work. No part of this work has been presented in any previous application for another degree or diploma at any institution. All borrowed ideas have been properly acknowledged in the text and lists of references are provided.

Getaw Zewdu

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JUNE, 2018

ENDORSEMENT

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

Temesgen Belayeneh (PhD.) _____

Advisor Signature

JUNE, 2018

DEDICATION

The result of this thesis dedicated to

My Mother Edilam Assefa

And

My Father Zewdu Delelegn

CERTIFICATE

This is to certify that Getaw Zewdu has worked this thesis on the topic-causes and effects of delay in residential construction project the case of Addis Ababa housing development project office under my supervision. To my belief, this work undertaken by Getaw Zewdu was original and qualifies for submission in partial fulfillment of the requirements for the award of MA degree in Project Management.

Temesgen Belayneh (PhD)

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Signature

June, 2018

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Contents

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ACRONYMS

AAHDPO	Addis Ababa housing development project office
RII	Relative Importance Indices
GTP	Growth and transformation plan
GDP	Gross domestic product

Abstract

Construction industry is one of the significant contributors to the economic growth and development of Ethiopia. However problem of delays in the construction sector is a global phenomenon and the construction sector in Ethiopia is no exception. Therefore, the aim of this study is to fill an important knowledge gap by identifying the various attributes for construction project delay and its effect. A questionnaire survey was used for data collection and one-hundred and thirty two (132) questionnaires were completed and analyzed. Using a simple ordinal scale, based on a 5-point Likert Scale, professionals, contractors and consultants expressed their views on the relative importance of thirty-six (36) pre-selected factors on construction project delays and six (6) effects of delay. Feedback from a survey administered to the clients, contractors and consultants was analyzed using Relative Importance Index (RII). Results showed that inadequate experience and skills of contractors, inappropriate construction method by contractors, insufficient funding by clients, poor site management by contractors and impractical allocation of resources are ranked by the clients, contractors and consultants as the main causes of project delays at Addis Ababa housing development project office. While, cost overrun, poor quality of completed work and time overrun are the top effects of project delay. Association result shows that client and contractors are significant causes for time & cost overrun while contractors are the only common cause for poor quality completed work. Construction frontline players are recommended to put their efforts on the identified key factors in relation to their magnitudes of influence. By doing so, the causes of project delays in Ethiopia construction and real estate sector could be significantly reduced or controlled, which will ultimately lead to the on time and within budget completion of projects.

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the study

The construction industry plays very important role for any country economic development. It provides a physical infrastructure which is a primary for country development. Due to its forward and backward linkages with other industries, construction industry plays a very important role in providing the required infrastructure to improve the quality of life. Sustainable development of construction industry is therefore important which has a multiplier impact on the wider economy (Durdyev & Ismail, 2016). Construction project are failing at an alarming rate worldwide (Matta & Ashkena, 2007). In the construction industry, the term 'delay' is used to describe the time overrun of a project beyond the officially agreed completion time due to cause by the parties in the contract, who are the, employer, contractor and the consultant. It is a project spilling over its planned schedule and is considered as a common problem in construction projects. Completing projects on time is an indicator of efficiency, but the construction process is subject to the performance of parties, resources availability, environmental conditions, involvement of other parties, and contractual relations (Aibinu & Jagboro, 2002).

Project delays occur during the construction-phase, where many unforeseen factors are always involved. Delays can adversely impact on project stakeholders, such as owner, contractors, consultants etc. It means loss of revenue for the owner due to lack of productions facility and loss of profit for the contractor due to higher overhead costs. However, a delay in a construction project can be caused either by owner or by the contractor or by numerous other reasons. In some case, number of delays could be caused simultaneously either by owner or contractor without any dependence with each other, these are said to be 'concurrent delays' which is the most critical topic to deal with, and always leads to arbitration process (Aibinu & Jagboro, 2002).

Delays may occur for one or several reasons; it is a tedious task for owners and contractors to come to an agreement on the causes of a delay. Contractors try to show that the owners are responsible for any delays, while owners are prone to the view that delays are the fault of the contractor or of third parties (Zack 2001). Generally, the reasons for delays are client and contractor related. Unreasonable project scope and inadequate early planning are the prime delays by the client. The client interference and delay in the decision making process also major reasons for delays. The client in some cases delays the design or changes the design leading to various other changes like design related changes to drawings and their approval by the authorities. The contractor had delays related to overambitious estimates and incorrect task assessment which lead to delays and affect the project. In case of lack of task clarity, an inexperienced contractor or subcontractor may unknowingly delay the works (Sambasivan & soon, 2007).

Completing the project on specified time saves lots of money which is an indication of efficiency and an effective project management; however, it is a rare case of happening. Some of these effects are (Aibinu & Jagboro, 2002; Sambasivan & soon, 2007): time overrun, cost overrun, dispute, arbitration, total abandonment and litigation.

The increasing demand for public construction in Ethiopia indicates the significance of construction industry to the country‘s social and economic development. In the past ten years the construction industry shows 12.43% growth rate and contributes 5.3% to country GDP (AAHDPO, 2015).

Addis Ababa housing development project office is one of the construction sectors in Ethiopia established under proclamation no.15/2004 to improve the living standard of the Addis Ababa residents through the creation of employment opportunities, and provision of decent and affordable houses for low and middle income.

Recently the project office has designed various strategic plans parallel with government’s transformation plan to address the shortage of houses. Currently the project office accepts a total of 900,000 registered house seeker peoples. In the 1st growth and transformation plan (2003-2007 E.C) the project office planned to build a total of 190,000 houses but at the end of the plan only 78,174 houses are completed and transferred to beneficiary (AAHDPO, 2015); in the 2nd growth and transformation plan

(2008-2012 E.C) the project office also planned to build 235,000 houses excluding GTP one plan (AAHDPO, 2015).This indicates that the project is behind schedule and exercising project delays. Due to various project stakeholders are involved and operated in dynamic environment, it is better to undertake a study to identify the real causes and effects of project delay. Generally the objective of this study was to determine major causes and effects of the construction project delays on Addis Ababa housing development projects office.

1.2. Statement of the problem

Delays occur in construction project, and the magnitudes of these delays vary considerably from project to project. Some projects delay for a few days while others delay for over a year. Failure to achieve targeted time, budgeted cost, design specifications and specified quality result in various unexpected negative effects on the projects are the reason that delay to occur. Normally, when the projects get delayed, either the delivery time of the project will be extended or the progress of the project will be accelerated heavily in order to deliver it on time. The former will lead to arbitration, litigation, and penalties, etc. and the later will lead to incur additional cost, both will end up with loss of money. In worst case, accelerating the process of the project will also affect the quality of the output which sacrifices client's satisfaction (Hendrickson & Au, 2003).

A considerable number of international literatures discourse that the inability to complete projects on time and within budget continues to be a chronic problem worldwide and a far worsening case. The success of a construction project is critically affected by the capacity of the implementing firms, nature of the contract and stability of the economic environment (Dean, 2012). However there is no agreement among scholars and practitioners as to the nature of the causes of delays in construction projects. There is also lack of consensus as to the principle causes of delays. For instance, Al-Kharashi & skitmore (2009) identified leading causes of construction project delay in Saudi Arabia as lack of finance to complete the work by clients and delay in progress payment. Haseeb et al. (2011) identified natural disaster; improper planning and poor site management are main causes of delay in Pakistan construction industry. Doloi et al. (2012) indicates that lack of commitment, lack of project scope clarity is the main causes of delay in Indian

construction industry. Aibinu & Jagboro (2002), Change order, financial constraints and Lack of experience in construction. Other causes that have been highlighted include; poor organizational structure (Kagiri et al 2003), Sambasivan & Soon (2007), and Alinaitwe (2008) established that poor planning, poor site management, delayed payments, material shortage, and poor communication were the most important causes of delay.

Construction project delay has been a research topic for a decades and several studies have investigated causes of delay in other countries (Haseeb et al., 2011; Al-Kharashi& skitmore, 2009; Aibinu et al 2002;Frimpong eat al 2004;Alinaitwe, 2008; Sambasivan & Soon, 2007; Doloi et al, 2012; Mloof-ud-Dyian, & Rabbani, 2011). However, all of those studies are done in other countries and area specific. Therefore, applicability of such research in the construction context of Ethiopia still remains less explored, which limits the resources of the industry operators addressing the myriads of causes of delays presented in the literature. The identification of the fewest number of causes of project delays is of importance; this way the frontline players can focus their efforts and available resources to addressing the most effective causes for optimum and time effective results. The aim of this study is to fill an important knowledge gap by identifying the various attributes for construction project delay.

1.3. Research questions

This paper answered the following research questions. These are:-

1. What are client related factors causing construction delay at Addis Ababa housing development project office?
2. What are the contractor related factors causing construction delay at Addis Ababa housing project office?
3. What are the consultant related factors causing construction delay at Addis Ababa housing development project office?
4. What are the external factors causing construction delay at Addis Ababa housing development project office?
5. What is the most preferred causing construction delay at Addis Ababa housing development project office?
6. What are the effects of construction delays at Addis Ababa housing development project office?

1.4. Objective of the study

The study has general and specific objectives specified below.

1.4.1. General objectives

This paper aimed at determining the major causes and effects of project delay in Addis Ababa housing development project office.

1.4.2. Specific objectives

The specific objectives of this study includes

1) To identify the causes of delay in construction industry.
2) To identify the effects of delay in construction industry.
3) To know the association between the causes and effects of the delay in construction industry.

1.5. Significant Of the study

This research will do for the purpose of filling knowledge gap and have several of significant which considered important to refer for the parties that will involve in construction. These significant include: to study the factor that cause delay in construction project and produce the statistical result. The result of the study will be the guideline to the parties that involve, so that it will avoid any source that will happen in their project; to suggest several factors that will avoid the delay in construction project. The factor can be study for the parties that involve in construction to reduce the risk of delay in construction project and to study the effect of the delay in construction project. The result of the study will give good information to the involve parties to prepare full-time work and responsibilities to ensure every activities will be done according to the plan.

1.6. Scope and limitation of the study

The study covered only Addis Ababa housing development project office. This study is needed to evaluate the program not individual site performance. Site managers, accountant, contractors and consultants are included for the study to get a holistic view about the project.

The data analysis used for this study limited to descriptive statistics such as RII and association analysis.

Temporary suspension of work in some site, unwillingness of respondents hinders the researcher to collect the required data.

1.7. Organization of the study

This study consists of five chapters. The first chapter is concerned with providing introduction including background of the study, statement of the problem, research question, and objective of the study that tried to meet in the study, significance of the study, scope of the study and limitation of the study. The second chapter deals about reviewed of related literature to support the research objectives. The third chapter devoted about methodology used in conducting the study such as data collection and source of data, data analysis, sampling and sampling techniques etc. while chapter four deals with data presentation and interpretation and the last chapter is about conclusion and recommendation.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Definition of project delay

Construction is an industry that involves complex and dynamic processes. It consists of successful coordination of multiple discrete business entities such as professionals, tradesmen, manufacturers, trade unions, investors, local authorities, specialists, trade contractors and others. The construction industry is a very important sector for the development and economic growth of a nation's economy. Successful completion of construction projects leads to wealth creation; socio-economic growth and improved standards of living. Nations are evaluated as "developed", "developing" and "underdeveloped" based on the quantity and quality of completed construction projects in their domain. Delays in construction projects therefore impact on the economic projections of a nation. Assaf & Al-Hajji S, (2006).

According to Assaf & Al-Hajji S project delay in construction industry refers to the time overrun in specified completion date or time overrun in the delivery of the construction project on which all parties agreed. It is an act or event that extends the time required to perform the tasks under a contract. It usually shows up as additional days of work or as a delayed start of an activity. Pickavance define the word "construction delay'' as something happening at a later time than planned, expected, specified in a contract or beyond the date that the parties agreed upon for the delivery of a project. Lo, Fung and Tung (2006) define delay as the slowing down of work without stopping construction entirely and that can lead to time overrun either beyond the contract date or beyond the date that the parties have agreed upon for the delivery of the project.

For the client, construction delay refers to the loss of revenue, lack of productivity, dependency on existing facilities, lack of rentable facilities etc. For the contractor, construction delay refers to the higher costs, longer work duration, increased labor cost, higher material and equipment costs etc. Completion of construction projects on specified time or time agreed within parties indicates the work and construction efficiency. Delay

is a situation when the contractor and the project owner jointly or severally contribute to the non-completion of the project within the agreed contract period. Delays in construction projects are frequently expensive, since there is usually a construction loan involved which charges interest, management staff dedicated to the project whose costs are time dependent, and ongoing inflation in wage and material prices. They are usually accompanied by cost overruns. These have a debilitating effect on clients, contractors, and consultants in terms of, litigation, arbitration, cash-flow problems, and a general feeling of trepidation towards each other. Aibinu AA, Jagboro GO, et al, (2002).

2.2. Type of delay

According to Pickavance (2005), the technical meaning of the term "delay" in construction projects has not been defined correctly since it has a different sense to different conditions during the project execution. However, the term is normally used as an extended the duration or delay in the start or finish date of a project activities. Delays therefore cause the time extension and variation in cost allocation the impact in time and cost will only occur when the delay lies on the critical path of the program.

Braimah (2008) stated that delayed completion of any projects is generally caused by the actions or interactions of the project parties including the contractors, consultants, owners, or others (e.g. acts of God). Based on these sources and the contractual risk allocation for delay-causing events, Braimah has classified delays in to four categories as follows;

- Critical and non-critical
- Excusable and non-excusable

In the process of determining the effect of a delay on construction project, it is necessary to determine whether the delay is critical or noncritical. It is also required to fine the delays are concurrent or non-excusable.

2.2.1. Critical and non-critical delays

Delays that result in extended project completion times are known as critical delays, (Callahan et al, 1992). In the case of excusable critical delays, the contractor will

generally be entitled to a time extension. Changing the type of structural steel members while the contractor is erecting structural steel is a clear example of a critical delay that is likely to delay the contractor's overall completion of the project. However, many delays occur that do not delay the project completion date or milestone date.

The concept of critical delays emanates from critical path method scheduling, and all projects, regardless of the type of schedule, have critical activities. If these activities are delayed, the project completion date or a milestone date will be delayed. In some contracts, the term controlling item of work will be used. Normally, this refers to critical activities or critical paths that if delayed will delay the completion date (Trauner & Theodore, 2009). Determining which activities truly control the project completion date depends on the following: The project itself, contractor's plan and schedule, requirement of the contract for sequence and phasing and physical constraints of the project.

Non-critical delays are delays incurred off the critical path which do not delay ultimate project performance. If the delay in this case is excusable, the contractor does not have the right to receive a time extension, because this type of delay does not have an effect on the overall completion of the project (Leary and Bramble, 1988). However, noncritical delays may affect the contractor's cost performance; in this case, the contractor may have the right to receive additional performance costs. However, delays can also be further classified into compensable or non-compensable delays (Trauner & Theodore, 2009).

2.2.2. Excusable and non-excusable delay

2.2.2.1. Excusable

All delays are either excusable or non-excusable. An excusable delay, in general, is a delay that is due to an unforeseeable event beyond the contractor's or the subcontractor's control. Normally, based on common general provisions in public agency specifications, delays resulting from the following events would be considered excusable: General labor strikes, Fires, Floods, Owner-direct changes, Errors and omissions in the plans and specifications, Differing site conditions or concealed conditions, Unusually severe weather, Intervention by outside agencies and Lack of action by government bodies, such as building inspection.

These conditions may be reasonable, unforeseeable and not within the contractor's control (Trauner and Theodore, 2009), and the analyst will conclude that a delay is excusable based solely on the preceding definition. Decisions concerning delay must be made within the context of the specific contract. The contract should clearly define the factors that are considered valid delays to the project and that justify time extensions to the contract completion date (Trauner & Theodore, 2009). For example, some contracts may not allow for any time extensions caused by weather conditions, regardless of how unusual, unexpected, or severe.

2.2.2.2. Non-excusable delay

Non-excusable delays are events that are within the contractor's control or that are foreseeable. These are some examples of non-excusable delays: Late performance of subcontractors, Untimely performance by suppliers, and Faulty workmanship by the contractor or subcontractors and Labor strike.

Again, the contract is the controlling document that determines if a delay would be considered non-excusable. For example, some contracts consider supplier delays excusable if the contractor can prove that the materials were requisitioned or ordered in a timely manner, but that the material could not be delivered due to circumstances beyond the control of the contractor. Other contracts may not allow such delays. The owner and the designer or drafter of the contract specifications must be sure that the contract documents are clear and unambiguous. Similarly, before signing the contract, the contractor should fully understand what the contract defines as excusable and non-excusable delays (Trauner & Theodore, 2009).

2.3. Delay factors in construction projects

A large number of delay factors may lead to project delays in construction projects, arising from different parties and resources. These delay factors are countless, since each construction project has its own characteristics and environment. Efforts have therefore been made by many researchers to identify the most significant factors of delay in construction projects, which are discussed in the next section.

The literature review was conducted through published books, conference proceedings, articles related to the research area and e- resources. In the next step, all the delay factors that may be encountered in a construction project were listed through a detailed review of the literature, and the possible delay factors recognized in practice were identified. These delay factors were grouped into four major categories as follows: Contractor-related factors, Consultant-related factors, Owner-related factors and others (Shi & Arditi, 2001).

2.3.1. Delay factors related to contractor

Among all the construction parties, a contractor has the major responsibility to carry out most of the project activities. Similarly, if the project is not finished on time and within the allocated budget then the contractors is blamed. In reality, the contracting business is a challenging and demanding profession that contains many complex activities, and, to avoid project delays, the main contractor often holds full responsibility for the work of sub-contractors as well as his own. Basically, how the contractor deals with particular situations depends on the nature of the work and the type of contract (Shi & Arditi, 2001).

The capability of the contractor to finish the project according to the planned schedule mainly depends on two things: availability of resources (incorporating money, manpower, materials, and equipment and machinery) and managerial competence. There are two types of sources from which the contractor hires manpower: sub-contract and direct hire. If the sub-contractor causes delay to the construction project then both the owner and the main contractor have the responsibility to look for a solution to the problem. Therefore, it is essential for the contractor to constantly supervise the work performance of sub-contractors in order to maintain a balance between construction activities (Abdul-kadir & Price, 1995). On the basis of the literature review, nine contractor-related delay factors were identified in Table 2.1, but there are many other factors that may lead to project delays, and that can be broadly classified into four categories as follows: Materials, Equipment, Manpower and Project management performance

Table 2-1 Factors of delay related to contractor

Groups	Factors
Contractor-related delays	1. Inadequate contractor experience
	2. Inappropriate construction methods
	3. Inaccurate time estimates
	4. Inaccurate cost estimates
	5. Poor site management and supervision
	6. Improper project planning and scheduling
	7. Incompetent project team
	8. Unreliable subcontractor
	9. Obsolete technology

Source, Abdul-kadir & Price, 1995

2.3.1.1. Materials

Materials are one of the imperative components of any construction project and also the major expenditure for the owner. From the contractor's perspective, on-site management of materials is just one side of the picture. In reality, material procurement planning is vital for the contractor at the initial planning stages of the construction project (Abdulrahman & Alidrisyi, 1994). The failure to produce a proper procurement plan, or poor material handling by the contractor, may result in delays and many other problems such as the theft or deterioration of materials. According to Odeh & Bataineh (2002), the timely flow of materials is a vital responsibility of the contractor because in case of unavailability of materials additional expenditures will increase the cost of the construction project.

Koushki et al (2005) highlight another key aspect regarding material prices. According to them, an increase in material prices may sometimes hinder the owner's decision to acquire more materials, especially in the case of large building projects where rises in prices make a real difference. The decision to wait for a fall in material prices is crucial, because it may lead to delays in the whole construction project.

Similarly, modifications in the project specification sometimes occur due to errors in the design of the infrastructure. These design changes normally do not affect the types of materials used, but the acquisition of new materials may take a long time due to many factors such as price negotiations or waiting for client approvals (Wiguna & Scott, 2005). There are four materials-related delay factors, which have been identified in Table below:

Table 2-2 Factors of delays related to material

Groups	Factors
Material related delays	1. Shortage of required materials
	2. Delay in materials delivery
	3. Changes in materials prices
	4. Changes in materials specifications

Source, Wiguna & Scott, 2005

2.3.1.2. Equipment

Construction equipment and machinery are used to perform repetitive tasks and operations. According to the function, the equipment used in the construction sector can be classified into two fundamental categories: operators and haulers (Abdulaziz & Michael, 1998). Operating equipment includes cranes and graders which can be left within the boundaries of the construction site, whereas haulers are dump, trucks, and other transportation equipment which is usually used to shift the materials to and from the construction site (Odeh & Bataineh, 2002). The equipment can either be hired or purchased by the contractors, depending on the frequency of their intended usage (Kwakye, 1997).

Some of the basic responsibilities of the contractor regarding the acquisition of equipment are selection of suitable equipment type, on-time delivery, proper maintenance, and prevention from damage.

The project may face slowdowns in the construction processes if the contractor fails to fulfill his responsibilities regarding equipment. AbdMajid & McCaffer (1998) opine that the selection of equipment by the contractor is very important for making an effective

project plan, because a shortage or unavailability of equipment may badly disrupt the project schedule. Table 2.3 shows seven delay factors related to equipment.

Table 2-3 Factors of delays related to equipment

Groups	Factors
Equipment related delays	1. Insufficient numbers of equipment
	2. Frequent equipment breakdown
	3. Shortage of equipment parts
	4. Improper equipment
	5. Slow mobilization of equipment
	6. Equipment allocation problem
	7. Inadequately modern

Source, AbdMajid & McCaffer, 1998

2.3.1.3. Manpower

Manpower or human resources is another most important aspect in carrying out construction operations and processes. Manpower includes foremen, inspectors, technicians, and civil/ mechanical and electrical engineers. Manpower can be classified into three categories on the basis of skill level: skilled, semi-skilled, and unskilled. The thoughtful selection and efficient management of manpower can be the key to the success of a construction project.

Hendrickson (1998) mentioned that "productivity in construction is often broadly defined as output per labor hour". In normal circumstances, the contractor is responsible for identifying and assigning project roles and responsibilities to the different professionals involved. Drewin (1998) observed that "failure in selecting the correct number and category of the manpower force will severely affect the quality, the cost and the progress of the works and may result in complete failure of the project."

In Libya, the majority of construction companies and contractors are local, but they import many foreigners with a construction industry background. In fact, this has also created some problems for contractors in the past, because importing or outsourcing manpower from foreign countries involves many complex processes such as selection,

testing, health insurance, and travel and accommodation expenses (Ibrahim, 1987). These processes are often time-consuming and beyond the control of the contractor. In addition, due to the involvement of different nationalities, more issues may arise through cultural differences such as language barriers and different methods of working. These cultural differences may hinder the progress of the project. In order to avoid these problems, Odeh & Bataineh(2002) believe that interaction and coordination between the management and workers is very important in terms of understanding the work properly. There are seven manpower-related factors, highlighted in Table 2.4 as follows.

Table 2-4 Factors of delays related to labor

Groups Factors	
Manpower-related delays	1. Slow mobilization of labor
	2. Shortage of skilled labor
	3. Manpower productivity
	4. Manpower supply
	5. Absenteeism
	6. Strikes
	7. Low motivation and morale

Source, Odeh & Bataineh(2002

2.3.1.4. Project management performance

The project management environment is not stable and changes every day. According to Kraiem & Dieknam (1987), this environment is becoming more complex with the new developments in the project management context. Before looking at project management performance, it is better to first understand the exact meanings of project management. The Project Management Institute (1996) defined project management as "the application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project". In addition, the successful application of project management requires many other skills such as project planning, teamwork, and ensuring error- free delivery. However, the contractor usually faces few barriers in implementing successful project management.

During the construction project, a contractor performs various duties that contribute to project management performance. These duties and responsibilities normally include planning and scheduling, interaction and coordination with other construction participants, and monitoring and controlling purveyors and sub-contractors (Assaf & Al-Hazmi, 1995). In order to ensure effective project monitoring and control, a contractor must implement a proper communication plan by involving all the construction stakeholders; this normally includes suppliers, sub-contractors, the client, management, and local authorities. Horner and Duff (2001) suggested that meeting from time to time can create an effective environment for the construction participants to deal with any construction problems, such as delays. Project quality control is another issue that can have an adverse impact on the construction project. If insufficient care is taken to achieve the required quality standard, then it may lead to particular activities or the entire project being repeated (Carnell, 2000). Therefore, the contractor should bear in mind that each project activity has its own specific requirements, and that selecting an appropriate workforce for completing the task may also help to achieve the desired quality control. In addition, proper training and motivation on site can also increase the productivity of the workforce. On the other hand, adopting inadequate methods of selection and training with no motivation may lead to meager productivity, which in turn causes delays to the entire project. Table 2.5 displays fifteen delay factors associated with project management performance.

Table 2-5 Factors of delay related to project management performance

➢ Lack of motivation among contractor's members
➢ Shortage of contractor's administrative personnel
➢ Shortage of technical professionals in the contractor's organization
➢ Poor communication by the contractor with the parties involved in the project
➢ Contractor's poor coordination with the parties involved in the project
➢ Slow preparation of changed orders requested by the contractor
➢ Ineffective contractor head-office involvement in the project
➢ Poor controlling of subcontractors by contractor
➢ Loose safety rules and regulations within the contractor's organization

➢ Poor qualifications of the contractor's technical staff assigned to the project
➢ . Improper technical studies by the contractor during the bidding stage
➢ Ineffective planning and scheduling of the project by the contractor
➢ Ineffective control of project progress by the contractor
➢ Inefficient quality control by the contractor
➢ Delay in the preparation of contractor submissions

Source, Carnell, 2000

2.3.2. Consultant-related delay factors

The client may consult with other professionals who can assist him in organizing the entire construction project. These professionals are called consultants. The main duties and responsibilities of a consultant may be to design the infrastructure of the project, which includes architectural, mechanical, structural, and electrical designs. Some other responsibilities may include the preparation of project related documents such as bills, drawings, specifications, and tender documents (Long et al, 2004). Furthermore, in some cases, consultants also conduct project planning, cost control and estimation, and quality control.

In normal circumstances, consultant-related delays occur during preparation of drawings, during the adoption of design drawings, while taking design approvals from contractors and client, and when performing inspection procedures. There are many possible reasons behind these types of delays; prominent factors include inexperienced consultancy staff, poor qualifications, inadequate communication and coordination skills, and improper planning (Gunlana & Krit, 1996). Odeh & Battaineh (2002) believe that during the construction processes, the enquiries and inspections of the consultant may slow down the progress of the work. In response, the contractor may come up with solutions to the problems; however, these solutions may not satisfy the consultant, and could result in the work having to be redone. Effective control and command over production on the construction site is a major element that contributes to the success of implementing the project; conversely, hindrances in performing these activities can have severe impacts on a construction project. Table below shows the nine consultant-related factors that can result in construction delays.

Table 2-6 Factors of delay related to consultant

Consultant-related delays
➢ Poor qualification of consultant engineer's staff assigned to the project
➢ Delay in the preparation of drawings
➢ Delay in the approval of contractor submissions by the consultant
➢ Poor communication between the consultant engineer and other parties involved
➢ Poor planning and coordination by the consultant engineer with other parties involved
➢ Delays in performing inspection and testing by the consultant engineer
➢ Slow response from the consultant engineer to contractor inquiries
➢ Inadequate design specifications
➢ Poor contract management

Source, Odeh & Battaineh, 2002

2.3.3. Owner-related delay factors

The owner or client is the key participant during the entire construction process. Kwakye (1998) mentioned that the owner's duties and responsibilities are onerous, and that he or she needs other knowledgeable parties to manage or organize the construction project. In a few cases, owners have in-house project management teams that participate in the construction process, but most of the time, owners hire a project manager and external parties to handle the project (Odeh & Battaineh, 2002).

One of the most crucial decisions that owners need to take at the beginning of the project is to determine the duration of the contract. Many owners prefer fast completion of work but thorough investigations should be conducted to decide the contract duration. Another major factor that delays the initialization of the project is the owner's failure to hand over the site to the contractor. Therefore, the personal involvement and quick decision-making on various matters by the owner in the initial phases of the project may accelerate the project's progress. Kimmons & Loweree (1989) observed that "the working relationship between an owner and a contractor is one of the most crucial determinants of project success and this relationship also develops trust between the two parties". The owner must participate in the construction project horizontally and vertically, but without interrupting the contractor's project plan. In addition, financial matters should also be

taken into account, and the owner must ensure the on-time availability of funds; lack of financial stability may cause many problems, such as extensive delays due to labour strikes or material mismanagement (Chan & Kumaraswamy, 1997).

Based on the literature review of owner-related delay factors, thirteen factors have been identified, and are shown in Table below.

Table 2-7 Factors of delays related to owner

Delays related to owner
➢ Delay in furnishing and delivering the site to the contractor
➢ Unrealistic contract duration
➢ Delay in the settlement of contractor claims by the owner
➢ Suspension of work by the owner's organization
➢ Delay in issuing of change orders by the owner
➢ Slow decision-making by the owner's organization
➢ Interference by the owner in the construction operations
➢ Uncooperative owner with the contractor complicating contract administration
➢ Delay in progress payments by the owner
➢ Owner's poor communication with the construction parties and government authorities
➢ Owner's failure to coordinate with government authorities during planning
➢ . Poor coordination by the owner with the various parties during construction
➢ . Excessive bureaucracy in the owner's administration

Source, Odeh & Battaineh, 2002

2.3.4. External factors

Some factors are outside the control of construction participants. For instance, the weather conditions in Libya in the summer are very hot, and the temperature normally exceeds 40 degrees Celsius. On the other hand, the weather conditions in the United Kingdom are worst in the winter season, when the temperature can typically fall to -5 or -8. In such intense conditions, contractors may face many difficulties that normally result in either slowdown of the construction process or, sometimes, a complete stoppage of works. These difficulties may include disruption to utility lines such as gas, electricity or

water. Ogunlana & Krit (1996) mentioned that social and cultural festivals and celebrations may also affect the time it takes labour to reach the job site, negatively affecting the productivity of the construction project and potentially resulting in minor delays.

As discussed earlier, increases in the prices of raw materials can also have a significant impact on a construction project, yet is a factor also beyond the control of the owner and contractor. This is evidenced by the recent case in Libya, when many projects were stopped due to the prices of steel doubling in 2011. These external factors may also create clashes or disputes between the construction participants, which will further increase the product cost and duration (Odeh & Battaineh, 2002). Eight external- related factors are included in Table below.

Table 2-8 Factors of delays related to external factors

External- related delays
➢ Unforeseen ground conditions
➢ Unexpected geological conditions
➢ Problems with neighbors
➢ Unusually severe weather
➢ Conflict, war, and public enemy
➢ Poor weather conditions on the job site
➢ Traffic control and restrictions on the job site
➢ 8. Rises in the price of materials

Source, Odeh & Battaineh, 2002

2.4. Related studies

Related studies have been carried out by number researchers to determine the causes of delay in construction project: Anyman (2000) conducted studies on the causes of delays on 130 public projects in Jordan. The study was carried out on the following buildings: residential, office and administration buildings, school building, communication facilities and medical centers. The outcome of the result showed that the main causes of delay in construction of public are projects related to designers, economic conditions, user

changes, weather, site conditions, late deliveries and increases in quantity. Related studies have revealed that the causes of delay vary from country to country.

Al-Kharashi & skitmore (2009) identified leading causes of construction project delay in Saudi Arabia by conducting questionnaire survey administered to contractors, consultants and clients. They conclude that the most two significant causes of project delay are lack of finance to complete the work by the client and delay in progress payment by owners.

Haseeb et al. (2011) conduct a research on the causes of delay in large construction project in Pakistan, where the following factors are reported to be the most influential; natural disaster, financial and payment problem, improper planning and poor site management.

Doloi et al. (2012) report the factors affecting project delay in Indian construction projects by surveying construction professionals. After the factor analysis the most influential factors of delay were identified as follow; lack of commitment, inefficient site management, poor site coordination and lack of clarity in project scope.

The study carried out by Sunjka & Jacob (2013) revealed that the ten (10) most common causes of project delays in the Niger Delta region in Nigeria includes youth commotion, communal catastrophes, lack of proper planning, poor contract management, late identification and resolution of drawing and specification errors. Ibrahim (2006) worked on finding out the causes of delay in construction projects and their severity according to contractors and consultants and stated that cost, time and quality have proven their importance as the main measures for construction project success.

A similar study in Malaysia by Alaghbari*et al* (2007) also revealed that financial problems were the main factors based on a list of thirty-one (31), factors like clients, contractors, consultant and coordination problems were the second most important factors causing delay in construction. In the kingdom of Saudi Arabia, a research conducted by Albogamy*et al*., (2012) on solving construction delays identified the following major ten (10) contributing factors causing delays: poor qualification, low performance of the lowest bidder contractor in the government tendering system, skills and experience of the contractors‘ technical staff, delays in sub-contractors work, poor planning and scheduling of the project by the contractor, delay in progress payments by the owner, shortage of qualified engineers, delay in preparation of shop drawings cash

flow problem faced by the contractor, inadequate early planning of the project and non-utilization of professional construction contractual management.

Ramya*et al*., (2015) studied the delay factors and their impact on project completion in Malaysian construction industry. The study result indicated nine (9) most important causes of delay from a list of twenty-eight (28) different causes. The ten most important causes of delay were; (1) contractor‘s improper planning (2) contractors‘ poor site management (3) client‘s inadequate financial resources and payments for complemented work (4) problems with subcontractors (5) shortage of material (6) labour supply (7) equipment availability and failure, (8) Lack of communication between parties and (9) mistake during the construction stage. A similar study in Saudi Arabia by Assaf*et al* (2006) identified fifty-six (56) causes of delay in large building construction project and their relative importance. The study was conducted on contractors, owners, and architects/engineers. The result indicated that all three groups generally agree on the ranking off individual delay factors. The factors were grouped into nine (9) major groups and ranked. The nine groups were material, financing government relation, manpower, equipment, changes, scheduling and controlling, environment, and contractual relationships. Focused on the contractors surveyed, the most important delay factors were (1) preparation and approval of shop drawings (2) delays in contractor‘s progress (3) payment by owners and (4) design changes.

Generally studies that are related to delays in construction projects have shown that most of the causes of delays are commonly global, like, bad supervision, delay in carrying out payment certificate over a task performed, inadequacy of a client‘s fiscal resources, poor management of site by contractors, project cost underestimation, problem of access to bank credit; variations orders; design and specifications errors; poor communication among parties; delays in works of sub-contractors; slow making of decision; incomplete or lack of adequate document before starting work; price fluctuation of materials; delay by statutory authorities etc.

From literature review, it was found that several studies conducted in different countries to identify the delay factors.

The table; presents the similarity and differences of delay factors identified by difference authors.Table: Summary of delay factors in construction projects found by past studies in differences countries

Malaysia Wael et al (2007),	**Nigeria** Aibinu & Jagboro (2002)	**Thailand (**Ogunlana et al., 1996)	**Indonesia** Kaming et al., 1997)	**Saudi Arabia** Sadi & Al-Hejji (2006)	**Hong Kong** Chan & Kumaraswamy (1994)
1. Lack of materials 2.Unavailability of equipment and tools in the market 3. Poor weather conditions 4. Delays in materials Transportation. 5. Design complexity 6. Plant procurement 7.Statutory undertakers	1. Contractors' difficulties in receiving interim payments from public agencies 2.Contractors' financial difficulties 3. Inadequate public agencies' budgets 4. Deficiencies in contractors' organizations 5. Deficiencies in planning and scheduling 6. Frequent variation/changed orders 7. Difficulties in obtaining construction materials 8. Deficiencies in public agencies'	1. Materials procurement 2. Waiting for information 3. Poor contractor management 4.Laborers/tradesmen shortage 5. Waiting for information 6. Design delays 7. Planning and scheduling deficiencies 8.Construction plant shortages 9. Changed orders 10.Contract	1. Design changes 2. Poor labour Productivity 3. Inadequate planning 4. Location restriction of the project 5. Skilled labour shortage 6.Equipment shortage 7. Materials shortage 8. Inaccurate prediction of equipment production rate 9. Inaccurate prediction of craftsmen production rate	1. Change orders by the owner during construction 2. Delays in progress payments 3.Ineffective planning and scheduling by the contractor 4. Poor site management and supervision by the contractor 5. Shortage of manpower 6.Difficulties in financing by the contractor 7. Changes in government regulations 8. Traffic control and restrictions at site 9. Effect of	1. Poor site management 2. Unforeseen ground conditions 3. Delays in design information 4. Lack of communication between consultant and contractor 5. Inadequate contractor experience 6. Low speed of decision making involving all project teams 7. Client-oriented variations

	organizations 9. Contractors' unrealistic tenders	or's financial difficulties	10.Inaccuracy of materials estimate	social and cultural factors 10.Accidents during construction	8. Necessary variations of works 9. Delays in subcontractor's Work 10. Improper control over site resource allocation

Jordanian Odeh & Battaineh (2002)	**Kuwait** Aibinu & Jagboro (2002)	**Ghana** Frimpong et al (2004)	**United Arab Emirates** Zaneldin (2006)	**Iranian** Asnssshari et al (2009)	**UK** Zaneldin, (2006)	**Ethiopia** Zewdu & Aregaw (2015).
1, Financial difficulties faced by contractors 2. Change orders from the owner 3. Poor planning and scheduling of the project by the Contractor. 4.External factors	1. Change orders 2. Financial constraints 3. Lack of experience in construction 4. Contractor and material Problems	1. Payment difficulties from agencies 2. Poor contractor management 3. Material procurement 4. Poor technical performances 5. Bad weather and unexpected natural event	1. Contract ambiguity claims 2.Acceleration claims 3. Changes claims 4. Extra-work claims 5. Different site condition Claims	1. Increase in price of land 2. Lack of materials and machines 3.Unavailability of resources	1.Change of design 2.Bad weather	1.Poor planning 2. Fluctuation of price of materials 3.poor productivity 4.inflationary pressure 5.project financing in descending order.

2.5. Effects of delays

According to study by Sambasivan & Soon (2007), on the impact of construction delays in the industry of construction, the following six impacts were pinpointed: total abandonment; Arbitration; time overrun; Cost overrun; dispute; Litigation. Additionally, Almed. (2000) stated that impact of delays in construction project could cause; provocative relationship, cash flow problem, disbelief, project rejection, general sense of trepidation among parties and lawsuit. The study by Kikwes, (2012) also revealed that disruption and delays in construction project create the following consequences; negative social impact, misunderstanding causing dispute, time overrun, resources wasting in relation to equipment as well as labour, and work going beyond budget. Most construction contract deals with delays in construction projects and disruption through making provisions inside a contract that a contractor ought to make submission of claims for time extension and cost recovery after proper notification that events met are expected to or are resulting in delays to completion (Hamzah*et al.*, 2011 and Briamah, 2009) cost budgeted as well as specified quality outcome in other unanticipated negative effect and failure to achieve the best time. Mostly, in times where projects are being delayed, projects are one or the other protracted or the time accelerated and thus, invites extra cost (Fawzy *et al.*, 2012 and McGraw *et al*., 2009).

According to Li *et al.* (2000) when delay happens there exist conceivable conditions that a manager of project might face the challenge of extra money to finish the task conceding the quality of the project by reducing specification and standard as well as rework consequently to amend the project. The research conducted by Aibinu & Jagboro (2002) on effect of the delivery of project in the construction industry of Nigeria discovered the following; cost overrun, time overrun, project budgeted cost, work exceeding schedule, arbitration (ADR) disagreement, lawsuit, and complete abandonment. Study carried out by Kamming *et al.* (1997) on manipulating factors on thirty-one (31) multi-storey projects in the Indonesian setting showed that the overrun of cost happens mostly and are thus severe as compared to time overruns. Again, they explain that, key factors affecting overruns of cost include inflation on material cost, as well as wrong assessment on material degree of densities with regards to scarcity and availability.

In the research‘s quest to examine the effect pinpointed by other researchers and their related studies universally, the following were observe to be the main effect in project adversarial relationship, time overrun, cost overrun, distrust, cash flow problems, arbitration, litigation and complete abandonment.

Based on the review of relevant literature; it can be seen that several studies have identified and evaluated causes of project delay in other countries. However, the research finding in other countries and in different project types may not be completely applicable to the nature and scope of this research as the socio-cultural, regulatory, legislative environment and project specific issue may vary from country to country and from project to project. Therefore, this study aims to fill important knowledge gap by identifying and determining the causes of delay in residential projects in Ethiopia.

2.6. Causes and effects of project delays identified for investigation

Below list causes of construction project delays are identified from the literature and categorized for investigation in this study as follows.

Table 2-9 Identified causes for investigation

Client related delay factors	Description
Insufficient funding	Funds are not adequately released during relevant phases of projects' execution, Milestones payments are not made on time due to organizational lapses or bureaucracy; Inadequate cash flow leads to delay in delivery of materials and equipment to the site and delay in payment to contractors and consultants.
Impractical allocation of resources	Funds, manpower's, materials, equipment are inadequate to complete the project because project owners or clients have not properly assessed whether they have the required resources to complete projects
Construction Material shortages	This results in slowed activities and sometimes temporary abandonment of sites.
Poor quality materials supply	Poor quality materials lead to poor quality workmanship, thus an unacceptable product. Most often, the project owners insist that correction be made or that parts of work be completely scrap and rework.
Lack of adequate communication between the parties	Poor or inadequate communication between parties leads to misunderstanding and misrepresentation of facts. This could breed conflicts and consequently hinders smooth progress of activities
Major disputes & negotiations	Major disputes and negotiations between parties in project impede progress of work as aggrieved parties wait until grievances are resolved before they continue.
Wrong	Organizational structures affect project performance. There are certain

organizational structure linking to the project	projects that cannot be managed by certain types of organizational structures. For instance, it is difficult to execute quick impact projects in a functional organizational structure because of the slow decision making processes and bureaucracies associated with such a structure
Unrealistic contract duration	This could be caused by wrong packaging of the contract document, unprofessional/inexperienced client's staff. Where the stated completion duration is impracticable, the responsibility lies on the stakeholders to review the initial expected completion time and make amendments where necessary.
Wrong choice of Consultants & contractors	Clients select Consultants and Contractors as their vendors. If the selection process is faulty, unqualified vendors will be engaged. This could lead to faulty works and frequent rework and delay in project completion and cost overrun.
Slow decision making	Clients are the project Owners. When they do not make decisions on time regarding project matters, they slow down activities at the project sites. Slow decision making could be caused by an organization's internal bureaucracy or wrong channels of communication
Design alterations & change orders	Change in specifications and scope which were not considered originally or changes of design to address some omissions that were vital to project functionality. Alterations may require temporary stoppages that delay overall project completion and holding cost
Contractor related factors	Description
Inappropriate construction methods	Construction activities are required to be carried out using best practices and tools. When the procedures are not followed, errors

	occur, leading to rework and delays as well as cost overrun.
Inadequate planning	Contractors appoint Project Managers who are expected to draw up workable project plans and modalities for their implementation. A faulty plan will lead to delay in project completion. Most Local Contractors rarely have practicable work programs at the initial stage of project planning. Lack of appropriate work programs impairs monitoring of project progress against the stipulated time.
Inadequate experience	A contractor who does not possess requisite experience usually makes construction errors. These errors lead to rework and delays in activities.
Mistakes during construction stage	Inexperienced contractors usually make errors during construction. Sometimes contractors employ low skilled staff in order to make more profit by paying them lower salaries. Tendencies of errors are, thus, higher. Rework of an already executed aspect of a scope slows down project progress. This has serious impact if it involves execution of critical tasks.
Incompetent site management	Contractor's employees that are not skilled in project management are not able to manage their project site appropriately, thus, culminating in faulty work, reworks and delay in completion of tasks
Improper equipment selection & Faulty equipment	The use of the incorrect equipment extends tasks while faulty equipment leads to delay due to the time spent to repair.
Unskilled site manpower	Employment of unskilled personnel at the project sites impedes execution of work to specification and leads to error or mistakes

	during construction. Time is then spent on alterations and corrections
Consultant-related issues	Description
Inappropriate design	Improper design stalls project execution because of the time it takes for such design to be reviewed, amended and accepted for construction works. When errors are observed in the design, works are temporary suspended until such errors are removed. This is predominant in organization's where selection processes of vendors are compromised
Poor contract management	Most projects have consultants as the contract managers. They liaise between the client and the contractor. Projects get delayed when the required management principles are not utilized during projects' execution
Late identification & resolution of drawings & specification errors &omissions	Projects are required to be completed on schedule, within budget and according to specification. If consultants do not identify errors and omissions in the working drawings early enough, already completed activities may require alterations when such errors and omissions are discovered after project commencement
Late preparation of drawings and other contract documents	Drawings and other contract documents such as Bill of Engineering Measurement and Evaluation (BEME) are required for a smooth execution of any project. Therefore, delay in their release stalls project activities
Improper contract packaging/delivery strategy	Clients usually outsource packaging/delivery of contracts to the consultants who are professionals. Errors in this task hinder the overall project performance because issues not properly captured must be addressed before project activities can progress otherwise, issue may arise that lead to legal redress.

Over inspection	Inspectors are required to track performance of the project through periodical monitoring. Too frequent inspection becomes a distraction to the contractors, and hence could impede contractors' progress
Long waiting time for inspection & testing	Certain aspects of projects require inspection and testing before further activities could be carried out. Usually, Consultants and Clients' staff are tasked with the responsibility of coordinating such exercises. Delays in these impede project progress
Inappropriate coordination of information	If projects issues or contractor's requests are not addressed sensible and information is not effectively managed, project activities can be negatively affected. There must be a good communication management plan in place so that site information is properly channeled and coordinated. Lack of coordination of information fosters misunderstanding, potentially causing conflicts that require resolution time

Table 2-10 Effects of project delays identified for investigation

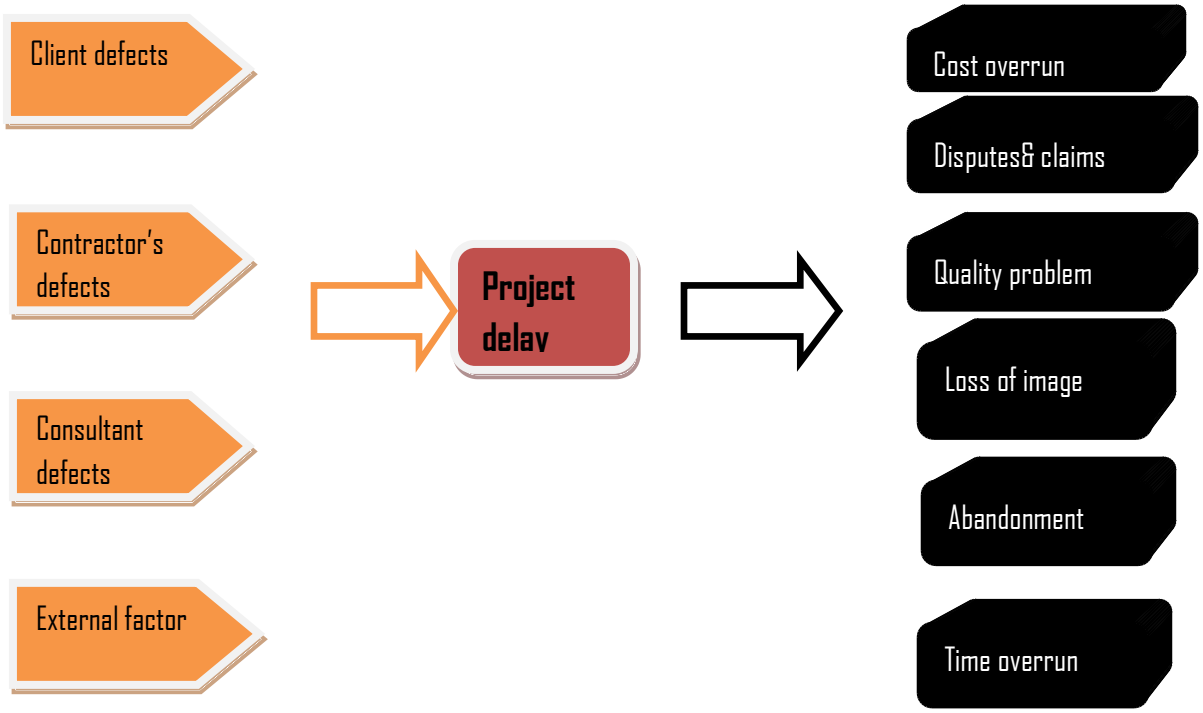
Effects	Description
Cost overrun	When a project is completed at a cost higher than what was budgeted, it is said to experience a budget overrun or cost overrun.
Poor quality completed project	As highlighted in the previous section inferior workmanship and/or inferior quality materials, can lead to issues of project quality
Bad Public Relations	When projects are delayed, contractors, consultants and clients could put their public reputations at risk
Disputes and claims	Disputes and claims arise against for the losses incurred through delays and one or the other parties have the responsibility to cover the loss.

Total abandonment or termination of contracts	Delays in project execution could lead to total abandonment if issues leading to the delays are not resolved timely.
Time overrun	When the stipulated completion time is pushed forward, the project is said to have experienced time overrun.

2.7. Conceptual framework

Conceptual frameworks, according to Kothari (2008), are structured from a set of broad ideas and theories that help a researcher to properly identify the problem they are looking at, frame their questions and find suitable literature. Most academic research uses a conceptual framework at the outset because it helps the researcher to clarify the research questions and aims.

Based on literature review I came up with the following conceptual framework as below



CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

3.1. Introduction

This chapter was discussed the research methodology that have been applied in this study. It explains the research design that was adopted in this study. Various methodological issues were also discussed including: research design and approach, population and sampling techniques, source of data and collection techniques and data analysis method that have been used to conduct the study.

3.2. Research Design and Approach

Research design refers to the arrangement of collecting and analyzing data in manner that aims to combine relevance to the research purpose with the economy in the procedure (Babbie, 2007). The purpose of this study was particularly intended to identify and determine causes and effects of construction project delay in Addis Ababa housing development project office. For this objective descriptive survey design was adopted with a view to provide descriptions with regard to the causes and effects of project delay. A descriptive research design is a scientific method which involves observing and describing the behavior of a subject without influencing it in any way. In addition, a descriptive study attempts to describe a subject, often by creating a profile of a group of problem, people or events, through collections of data and the tabulation of frequencies on research valuables and the research reveals who, what, when, where or how much (Serakan, 2010).

To collect the relevant data the survey was used standardized questionnaire. Bothe qualitative and quantitative approaches had used for the survey. The researcher was used the two approaches in order to get a holistic view of the topic under study.

3.3. Population and sampling techniques

Population is a set of elements, services, people, household, groups, or things that are well defined and being investigated in the study. There should be observable

characteristics in the population which the researchers will generalize his result on (Mbachu, 2004). The study target populations were 55 clients, 21 consultants and 94 contractors. Therefore a total of 170 individuals were participated.

Regarding the application of data, the sampling method used in this study was census; the parties included in the survey are mainly site engineers, managers and accountants representing clients, consultants and contractors at Addis Ababa housing development project office. All the respondents were selected on the basis that they have long experience in implementation of construction projects. Contractors selected based on their experience in the construction industry than five years and two years at Addis Ababa housing development project office because the more experienced one knows more about the phenomenon.

3.4. Data Collection Methods

Both primary and secondary data were employed to conduct this research study. Primary data collected through structured questionnaire and secondary data gathered through review of literatures, Addis Ababa housing development project office working documents, quarter & annual performance reports and individual file of different sites. Using structured questionnaire a total of one hundred seventy sets of survey questionnaire was distributed to the targeted respondent in order to identify the most important factors that cause delays and the common effect of delays, The survey questionnaires were distributed to the target group mainly engineers, managers and accountants representing clients, consultants and contractors in Addis Ababa housing development project office site who are take part in the project implementation.

The total number of questionnaire distributed to Project owners/ manager and accountant are fifty five sets, total number of questionnaires distributed to consultants was twenty one sets and total number of questionnaires distributed to contractors was ninety four sets. Friend's referral networks and professional relations are the main data collection methods. The questionnaires were distributed through friends working in different site of Addis Ababa housing development project office as project contractors, consultants, and clients. Friends in turn distributed to their networks. With this sampling method, the researcher was able to obtain a large number of completed questionnaires quickly.

3.5. Questionnaire Design

A questionnaire survey was designed based on the objectives of the study, which are causes of delay in implementation of projects at Addis Ababa housing development project office. The survey done through a questionnaire exercised to evaluate the perception of parties involve in the construction process on comparative significance of causes and effects of delay in Addis Ababa housing development project office. The parties included in the survey are mainly engineers, managers and accountants representing clients, consultants and contractors in Addis Ababa housing development project office. All the respondents were selected on the basis that they have long experience in implementation of construction projects. A questionnaire survey was developed to get the opinion and understanding from the experienced respondents regarding to projects implementation delays and its effect. The questionnaires are all classified into 3 parts:

- PART 1: Respondent Background
- PART 2: Causes of project implementation Delays
- PART 3: Effects of Construction Delays

Part 1: Respondent Background

In this section, the researcher was trying to obtain the respondents' information. The questionnaire includes:

- The respondent project stakeholder type
- Educational background
- Year of experience on housing development project office

Part 2: Causes of project Delays

This section is designed to evaluate the factor that contributes to the causes of Project implementation delays from the previous literature review. There are in total of four groups of causes for delay in construction project:

- Client
- Consultant
- Contractor
- External

The questionnaire is mainly based on Likert scale of 5 ordinal measures from 1 to 5 according to level of contributing.

- (5) = very high
- (4) = high
- (3) = Moderate
- (2) = low
- (1) = very low

Part 3: Effects of project implementation Delays

For this section, respondents were evaluated the effects of construction delays based on their working experience and their own judgment. There are consists of 6 impacts of construction delays, i.e. time overrun, cost overrun, quality problem, disputes & claims, loss of reputation and total abandonment.

The questionnaire is mainly based on Likert scale of 5 ordinal measures from 1 to 5 according to frequency of occurrence.

- *(5) = Always*
- (4) = Mostly
- (3) = Sometimes
- (2) = Seldom
- (1)= Never

3.6. Method of data analysis

The data analysis was determined to establish the relative importance of the various factors that contribute to causes of project implementation delays and effects of project implementation delays.

There are consists of 2 steps to analyzing the data:

a) Calculating the Relative Importance index (RI I),

b) Ranking of factors in each category based on the Relative Importance Index (RII).

Calculation of Relative Importance Index (RII*)* Kometa et al. (2008), Aibinu & Jagboro(2002) and Faridah Binti Hasbullah (2014) used the relative importance index (RII) method in their research. The same method was adopted in this study for analysis of objective 1 and objective2 within various groups (client, consultants, contractors and overall). The five point scale ranged from 1(very low) to 5 (very high) was transformed to relative importance index (RII) foreach factor as follows:

$$RII = \frac{\sum_{i-1}^{N} Wi}{A*N}$$

Where ***Wi*** is the weighting given to each delay factor, ***A*** is the highest weight (5 in this case), and ***N***is the total number of respondents. The *RII* value had a range from 0 to 1,

where the higher the value of *RII*, the more important was the cause or delays (Sambasivan & Soon 2007). The same ranking approach is employed for effects of delays. The *RII* value is range from 0 to 1 which the higher the value of *RII*, the more important was the cause and effect of delays. The *RII* was used to rank the different causes. The *RII* is then being classified based on the *RII* classification table as shows in Table 1.The discussion will be made when the *RII* was classified as most preferred causes and effects of delay only.

Table 3.1-1Classification of RII

Scale	**Level of Preference**	**RII**
1	Not preferred at all	$0.0 \leq RII \leq 0.2$
2	Slightly preferred	$0.2 < RII \leq 0.4$
3	Moderately preferred	$0.4 < RII \leq 0.6$
4	Preferred	$0.6 < RII \leq 0.8$
5	Most Preferred	$0.8 < RII \leq 1.0$

Source: Kometa et al. 2008,

Association between group factors and effects; the method of analysis for objective 3 was association between group of factor and effects. The correlation is to see whether the causes and effects are linear to each other (negatively and positively correlated).

3.7. Ethical considerations

Due to sensitivity of the some collected information, the researcher hold moral obligation to treat the information utmost propriety and respondents were assured about the confidentiality of the information they provided as well as their right to withdraw at any time during data collection.

CHAPTER FOUR

4. DATA ANALYSIS AND DISCUSSIONS

4.1. Introduction

This chapter presents the data analysis and discussions based on the questionnaire survey. The collected data were analyzed using the method as mentioned in Chapter Three and the findings also outlined based on specific objectives of the study.

There are in total of one hundred seventy set of survey questionnaire was distributed to the targeted respondent in order to identify the most important factors that cause delays and the common effect of delays.

The survey questionnaires were distributed to the project owners /management of the project, consultants and contractors who are take part in the project implementation of those projects undertaken by Addis Ababa housing development project office. The total number of questionnaire distribution and responses has been analyzed and shown in table below.

Table 4.1-1 Data distribution and collection

Description	number of questionnaires distributed	number of questionnaires complete & return	Percentage of Number of Responses
Client	55	40	80%
Consultant	21	16	76%
Contractors	94	76	73%
TOTAL	170	132	77%

A total of 170 questionnaires were distributed to respondent and 132 questionnaires were collected and used for analysis. As the above figure 4.1 shows the collected questionnaire from client, consultant and contractors were 30%, 12%, 58% respectively

Out of 170 questionnaires, 38 questionnaires are incomplete and not filled by respondents because due to temporary abandonment of sites & works are temporary suspended, respondent absence and hectic.

Generally, the next analysis was based on the above 77% collected data from clients, consultants and contractors in total.

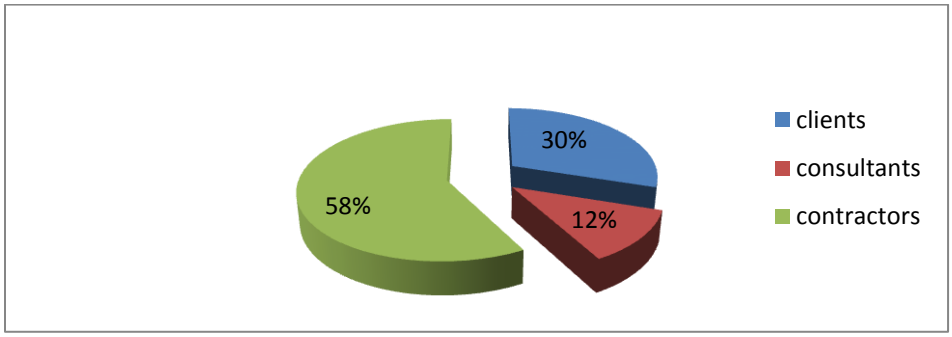


Figure 4.1-1 percentage shares of collected data

4.2. Demographic Characteristics of Respondents

Demographic characteristics of the respondents of this research include project stakeholder type, educational level and level of experience at Addis Ababa housing development project office.

Table 4.1-2 Demographic characteristics of respondents

	Frequency	Percentage
Project stakeholder type		
Clients	40	30%
Consultants	16	12%
Contractors	76	58%
Total	132	100%
education level		

TVET	40	30%
Diploma	7	5%
BA Degree	33	25%
Construction Management	10	8%
Civil Engineer	30	23%
Arctictur	3	2%
Masters	9	6%

Year of experience at AAHDPO		
2-3 years	16	12%
3-4 years	18	14%
4-5 years	66	50%
above 5 years	32	24%

Source; own survey questionnaire, May 2018

As per the result of table 4.2, 40 (30%) of the participants in this research were clients, 16 (12%) of respondents were consultant and 76 (58%) of respondents were contractors. This means majority of the study participants were contractors and clients because the contractors have better knowledge, understanding and experience about the nature and phenomenon of project delay and its effects. Hence the contractors are the major and direct implementer of the project; they are key informant for this study. Regarding to the education level of respondents majority 95 (64%) of respondents were degree holders and above and the remaining 47 (36%) of participants were diploma and TVET professionals. Generally the majorities of the respondents were literate and have better educational background.

As table 4.2 depicts the frequency and percentage of respondents in terms of experience the majority 98 (74%) of respondents had greater than 4 year of experience. This means the majority of respondent were well experience and deep understanding about the nature of study area.

4.3. Data Analysis

The objective of conducting the analysis for this section is to establish the factors under the groups of causes identified from the literature review and the ranking according to their significant influence towards cause and effects of construction project delays.

A ranking method was used to achieve this objective and the significant of using these methods is revealing the most influential factors within each category of causes.

4.3.1. Factors and Groups that Causes Delays

The first objective of study related to causes of delays from thirty six set of questionnaire have been identified and grouped into four major groups(client related factors, consultant related factors, contractors related factors and external factors). These factors were ranked in each group based on Relative Importance Index (RII) from the viewpoint of clients, consultants and contractors. The following is a brief description of these factors in each group.

4.3.1.1. Client Related factors of Project delays

Under this topics client related factors were ranked according to the client, consultant and contractors view respectively and overall scores. The questionnaire included 13 client-related delay factors. The most preferred causes of delay are those with RII greater than or equal to **0.8.** Table 4.3 shows the Importance indices for all the factors within this group.

Table 4.1-3 Stakeholders view on client related factors

	Client		**Consultant**		**Contractor**		**Overall**	
case name	**RII**	**rank**	**RII**	**rank**	**RII**	**Rank**	**RII**	**Rank**
Insufficient fund	0.82	1	0.8	3	0.83	1	0.82	1
impractical allocation of resource	0.82	2	0.81	1	0.80	3	0.81	2
Construction Material supply shortages	0.67	11	0.8	4	0.81	2	0.76	4
Poor quality material supply	0.68	8	0.81	2	0.70		0.73	6
Lack of adequate communication	0.66	12	0.67	11	0.75	7	0.70	8

between parties								
Frequently disputing & negotiations	0.74	5	0.71	9	0.77	5	0.75	5
Wrong organizational structure and bureaucracy linking to the project	0.76	4	0.77	5	0.78	4	0.77	3
Unrealistic contract duration	0.74	7	0.67	10	0.72	9	0.72	7
Wrong choice of Consultants & contractors	0.81	3	0.72	8	0.75	6	0.76	4
Slow decision making	0.68	10	0.66	12	0.73	8	0.69	9
Design alterations & change orders	0.74	6	0.75	7	0.69	11	0.73	6
Delay in the payment to the contractors of completed works	0.68	9	0.67	11	0.75	7	0.70	8
Frequent Contractors change and transfer	0.79	3	0.75	6	0.70	10	0.75	5

Source; own survey questionnaire, May 2018

This is interesting to compare the causes as perceived by consultants and contractors because of they know more about the client's problem and to avoid under or over estimation of clients view. Most often, one party were blaming the other. Three of most preferred causes perceived by consultants are impractical allocation of resource (RII = 0.81), poor quality materials supply (RII = 0.81) and insufficient fund (RII = 0.8). While most preferred causes perceived by contractors are insufficient funding (RII = 0.83), construction materials supply shortage (RII = 0.81) and impractical allocation of resource (RII = 0.8). Secondary data also shows that material supplies are the bottleneck for smooth running of projects.

Generally, consultants blame client's impractical allocation of resource, poor quality materials supply and insufficient fund as most important causes of the delay. Contractors also blaming client's insufficient funding, construction material supply shortage and impractical allocation of resource as most important causes of project delay.

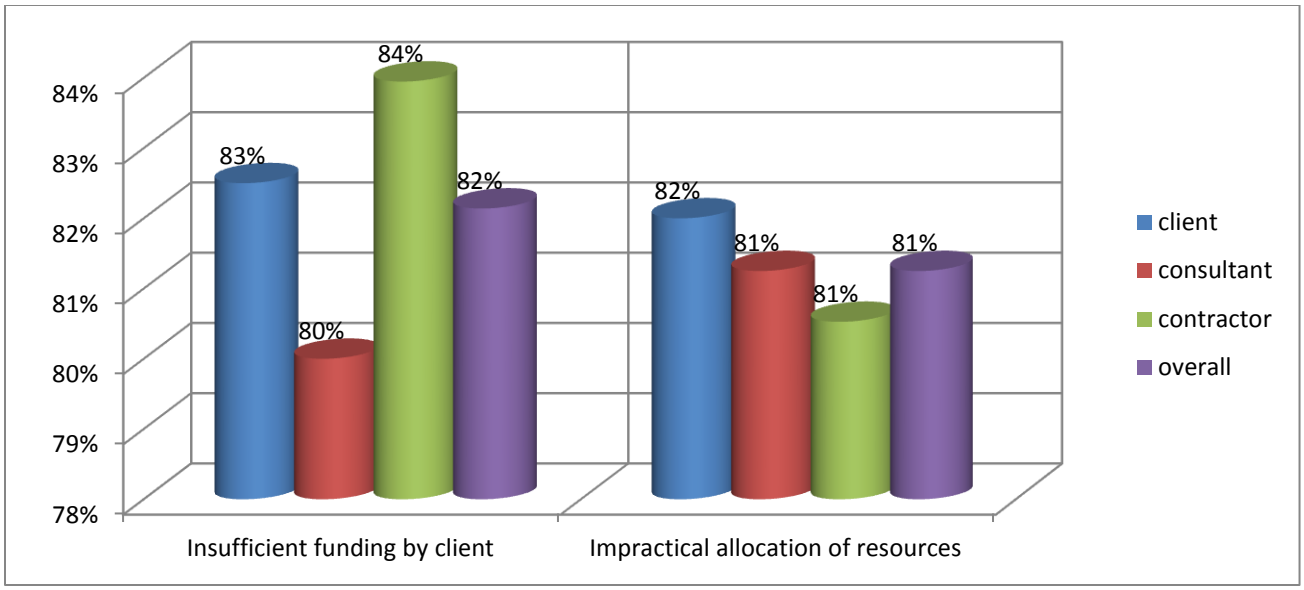


Figure 4.1-2 Most common client related factor of project delay

The above figure 4.2 depicts that insufficient funding (RII = 0.82); this result is consistent to Alaghbari *et al* (2007) and Ramya et al (2015) identified that insufficient funding by clients as most important causes of delay. If funds are not adequately released during relevant phases of projects' execution; Milestones payments are not made on time due to organizational lapses or bureaucracy, inadequate cash flow leads to delay in delivery of materials and equipment to the site and delay in payment to contractors and consultants.

Impractical allocation of resources (RII = 0.81) Funds, manpower's, materials, equipment are inadequate to complete the project because project owners or clients have not properly assessed whether they have the required resources to complete projects. In addition to this secondary data shows that supply of construction materials are the bottleneck for the project (see appendix-4).

Wrong organizational structure and bureaucracy (RII = 0.77) this results is also consistent to the results of research conducted by Kagiri et al (2003), Organizational structures affect project performance. There are certain projects that cannot be managed by certain types of organizational structures. For instance, it is difficult to execute quick impact projects in a functional organizational structure because of the slow decision making processes and bureaucracies associated with such a structure.

4.3.1.2. Contractors Related factors of Project delays

Under this topics contractors related factors were ranked according to the client, consultant and contractors view respectively and overall scores. The questionnaire included 7 contractors-related delay factors. The most preferred causes of delay are those with RII greater than or equal to 0.8. Table 4.4 shows the importance indices of all the factors within group.

Table 4.1-4 Result of Stakeholders view on contractors related factors

	Client		Consultant		Contractor		Overall	
case name	**RII**	**rank**	**RII**	**Rank**	**RII**	**rank**	**RII**	**Rank**
Inappropriate construction methods	0.87	1	0.86	3	0.74	4	0.82	2
Inadequate construction planning or scheduling	0.85	2	0.81	4	0.71	6	0.79	4
Inadequate experience and skills of contractor	0.83	3	0.88	2	0.8	1	0.83	1
Mistakes during construction stage	0.8	5	0.89	1	0.7	7	0.79	5
poor site management by contractor	0.82	4	0.79	5	0.79	2	0.8	3
Improper construction equipment selection & Faulty equipment	0.79	5	0.78	6	0.76	3	0.78	6
Unskilled site manpower of contractors	0.79	4	0.76	7	0.73	5	0.76	7

Source; own survey questionnaire as of May, 2018

As above table 4.4 shows that clients and consultants agreed that inappropriate construction method, inadequate planning or scheduling, inadequate experience and skill and mistake during construction stage are the most preferred causes for delay. Inadequate experience and skills of contractor (RII=0.83),Inappropriate construction methods (RII=0.82) and poor site management by contractor (RII=0.8).

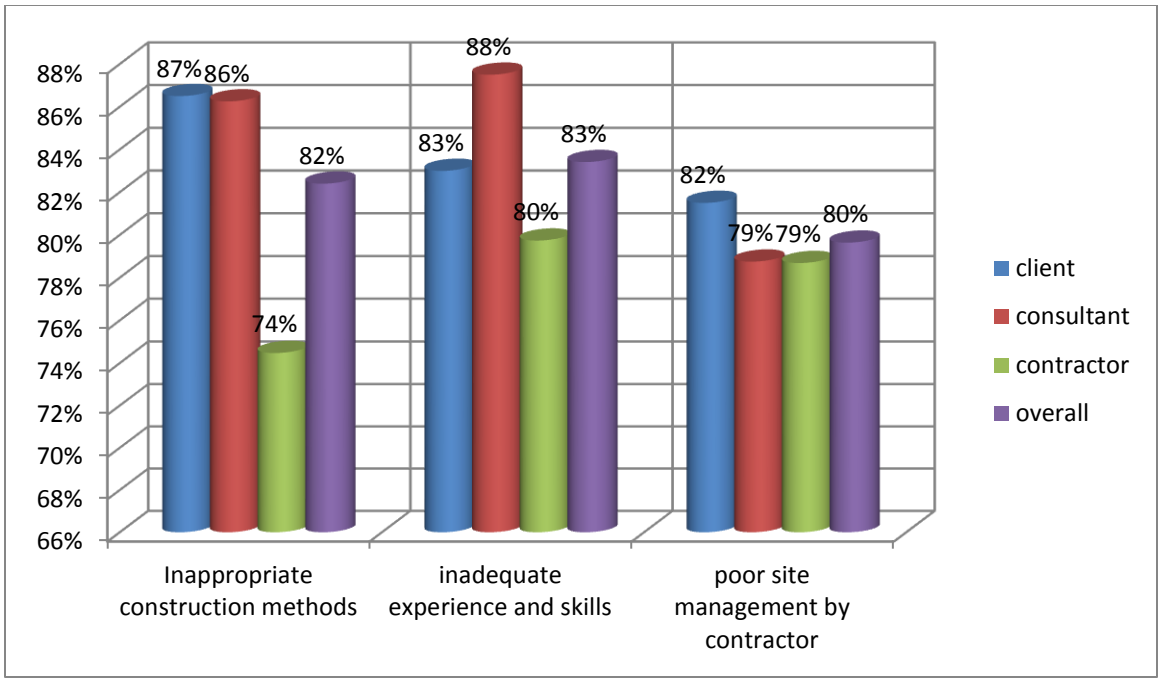


Figure 4.1-3 Most Common Factors of Contractors Related Delays

4.3.1.3. Consultant Related factors of Project delays

Under this topics consultant related factors were ranked according to the client, consultant and contractors view respectively and overall scores. The questionnaire included 8 consultant-related delay factors. The most preferred causes of delay are those with RII greater than or equal to 0.8.

Table 4.1-5 Result of Stakeholders view on consultant related factors

	Client		Consultant		Contractor		Overall	
case name	**RII**	**rank**	**RII**	**rank**	**RII**	**rank**	**RII**	**Rank**
Long waiting time for inspection & testing	0.84	1	0.68	3	0.83	1	0.78	1
Inappropriate design and topology	0.82	3	0.71	1	0.8	2	0.78	2
Poor contract management by consultant	0.8	4	0.69	2	0.74	5	0.74	4
Late identification & resolution	0.7		0.66	1	0.78	3	0.72	5

of drawings & specification errors &omissions								
Late preparation of drawings and other contract documents	0.83	2	0.69	5	0.77	4	0.76	3
Improper contract packaging/delivery strategy	0.75		0.7	2	0.69	3	0.71	6
Over inspection	0.8	5	0.69	7	0.67	5	0.71	5
Inappropriate coordination of information by consultant	0.79		0.66		0.69		0.71	6

Source; own survey questionnaire as of May, 2018

Even if there are no most preferred consultant related causes for delay based on overall score, there is significant influence on project stakeholders considerably. Long waiting time for inspection & testing (RII=0.84, 0.83) and inappropriate design and topology (RII=0.82, 0.8) are commonly perceived by client and contractors respectively as most preferred cause for implementation delay.

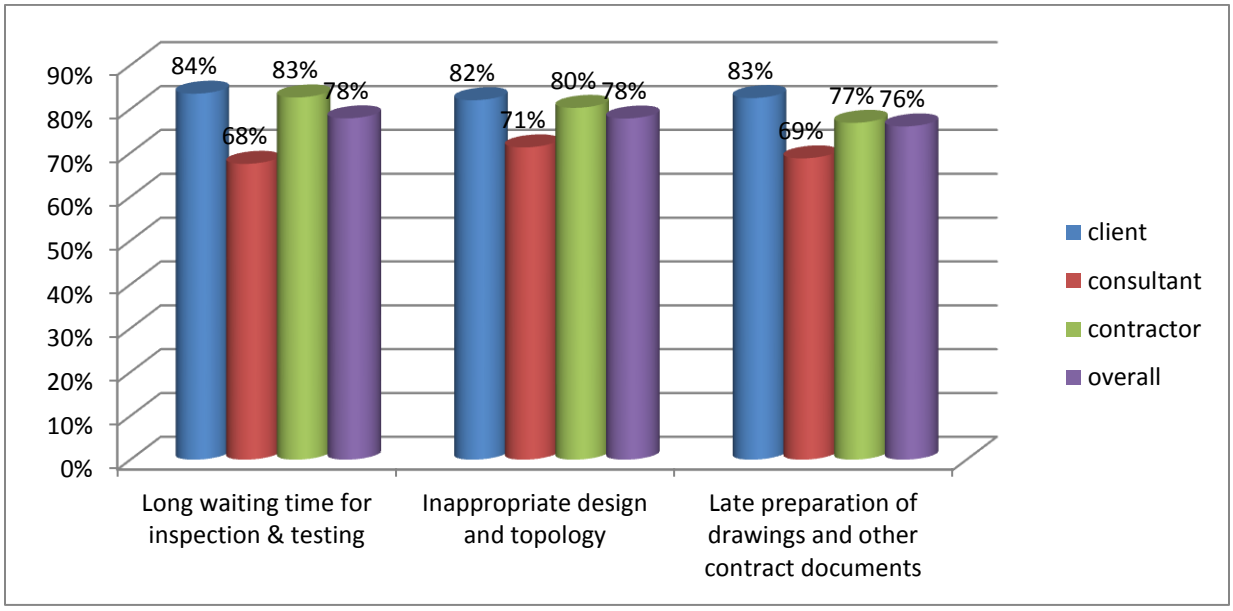


Figure 4.1-4 Most common factors of consultant related delays

4.3.1.4. External factors of Project delays

Under this topic external factors were ranked according to the client, consultant and contractors view respectively and overall scores. The questionnaire included 8external factors of delay. The most preferred causes of delay are those with RII greater than or equal to **0.8.**

Table 4.1-6 Result of Stakeholders view on external factors of project delay

	Client		**Consultant**		**Contractor**		**Overall**	
case name	**RII**	**rank**	**RII**	**rank**	**RII**	**rank**	**RII**	**Rank**
Delay in providing services for utilities such as water, electricity, etc.	70%	2	75%		78%	1	74%	2
Frequent interruption of power supply which leads to delay in civil works and machinery installation	68%	7	68%		74%	6	70%	8
Delay in obtaining the required documents from concerned government offices. Municipality , Regional Environmental offices	67%		78%	2	71%	7	72%	6
Seasonality of works to be performed (for example civil work, Land development etc. cannot be done during rainy season)	72%	1	79%	1	77%	2	76%	1
Inflation of price of materials, equipment's and machineries causes implementation delay of	70%	3	76%		75%	4	74%	3

the project									
Delay in fund release on the Bank or the financers side have negative influence in the implementation schedule of the project	70%	4	73%		71%	8	71%		7
Delay on the Bank side in conducting progress report and acceptance works in the implementation of project causes delay of the project	68%	5	76%		76%	3	73%		4
Frequent changes in the government rules and regulation exert negative influence in meeting the implementation of the project	68%	6	76%		74%	5	73%		5

Source; own survey questionnaire as of May, 2018

Under this group analysis, there is no most significant cause of project implementation delay that affect smooth running of projects but some factors are considerably affect the project. Based on the above table 4.4 all factors are preferred causes for delay having greater RII 0.7. Seasonality of works to be performed (RII=0.76), Delay in providing services for utilities such as water, electricity, etc. (RII=074) and Inflation of price of materials, equipment's and machineries causes implementation delay of the project (RII=0.74) are the top three causes of project delay.

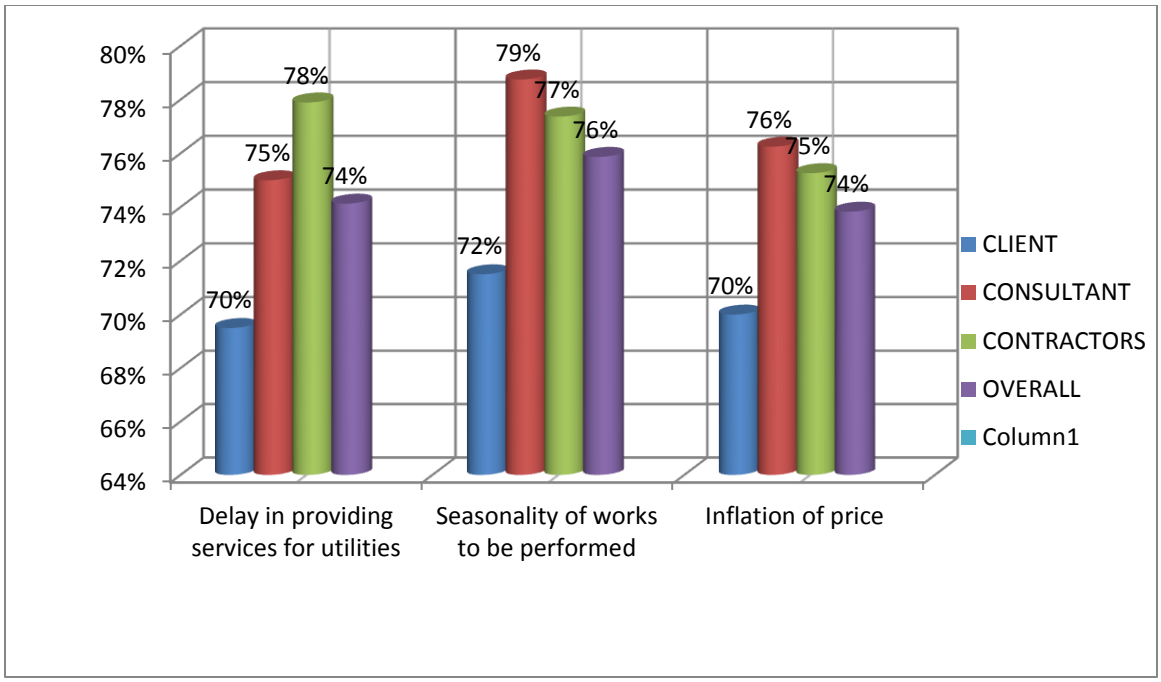


Figure 4.1-5 Most common factors of consultant related delays

4.3.2. Ranking of the most common factors

Based on the results of analysis the factors in each group, as discussed above, the overall ranking of factors that causes delays have been established to outline most significant or important factors of delay according to RII classification.

Table 4.1-7 Ranking of common factors of project delay based on RII

CASE NAME	RII	RANK
Inadequate experience and skills of contractors	0.83	1
Inappropriate construction methods	0.82	2
Insufficient funding by clients	0.82	3
Impractical allocation of resources by clients	0.81	4
poor site management by contractors	0.8	5

Source; own survey questionnaire as of May, 2018

As table 4.5 and figure 4.6 shows five factors are most common causes for project implementation delay. Inadequate experience and skill of contractors (RII=0.83), Inappropriate construction method (RII=0.82) and poor site management (RII=0.8) are most preferred contractors related causes of project delay. While insufficient funding (RII=0.82) and impractical allocation of resources (RII=0.81) are also client related project delay causes. Generally contractors and clients are the main causes of project delay; hence they are direct participant and implementers of project they should plan, schedule and program their resources for the smooth running of project.

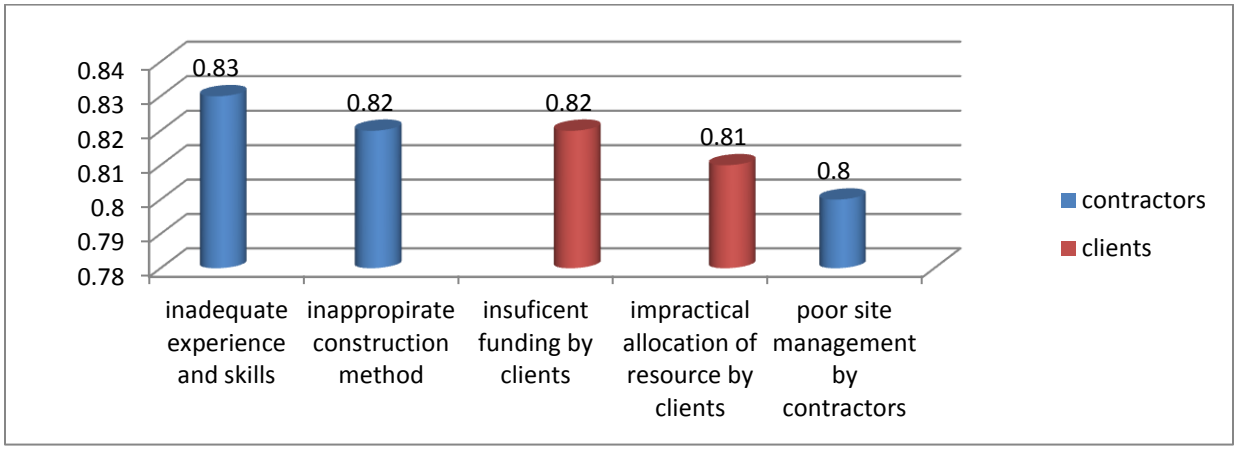


Figure 4.1-6 Most common causes of delay

4.3.3. Effects of construction project delay

The primary data that collected from the third part of the questionnaire was analyzed from the perspective of clients, consultants and contractors. The calculation of RII and ranking were done like previous section. Based on the RII, the value that classified as most preferred effects are in range 0.8 to 1.0 and the result I found shows that there is 4 effects of delays that perceived by clients which is time overrun (RII=0.84), quality problem (RII=0.83), cost overrun (RII=0.81) and loss of goodwill (RII=0.8); effects of delays that perceived by consultant which are time overrun (RII=0.85), quality problem(RII=0.84) and cost overrun (RII=0.0.81); while effects of delays that perceived by contractors are time overrun(RII=0.83), quality problem(RII=0.83) and cost overrun(RII=0.81). Generally time overrun (RII=0.83), quality problem (RII=0.83) and cost overrun (RII=0.81) are the most preferred effects of delay at Addis Ababa housing development project office.

Table 4.1-8 Effects of project delay based on RII

Effects	client		Consultant		contractor		Overall	
	RII	***rank***	***RII***	***rank***	***RII***	***rank***	**RII**	**Rank**
Time overrun	0.84	1	0.85	1	0.81	2	0.83	1
Cost overrun	0.81	3	0.81	3	0.81	3	0.81	3
Quality problem	0.83	2	0.84	2	0.82	1	0.83	2
Loss of goodwill	0.8	4	0.78	4	0.69	5	0.75	4
Disputes & claims	0.74	6	0.76	5	0.75	4	0.75	5
Total abandonment	0.76	5	0.74	6	0.65	6	0.72	6

Source; own survey questionnaire as of May, 2018

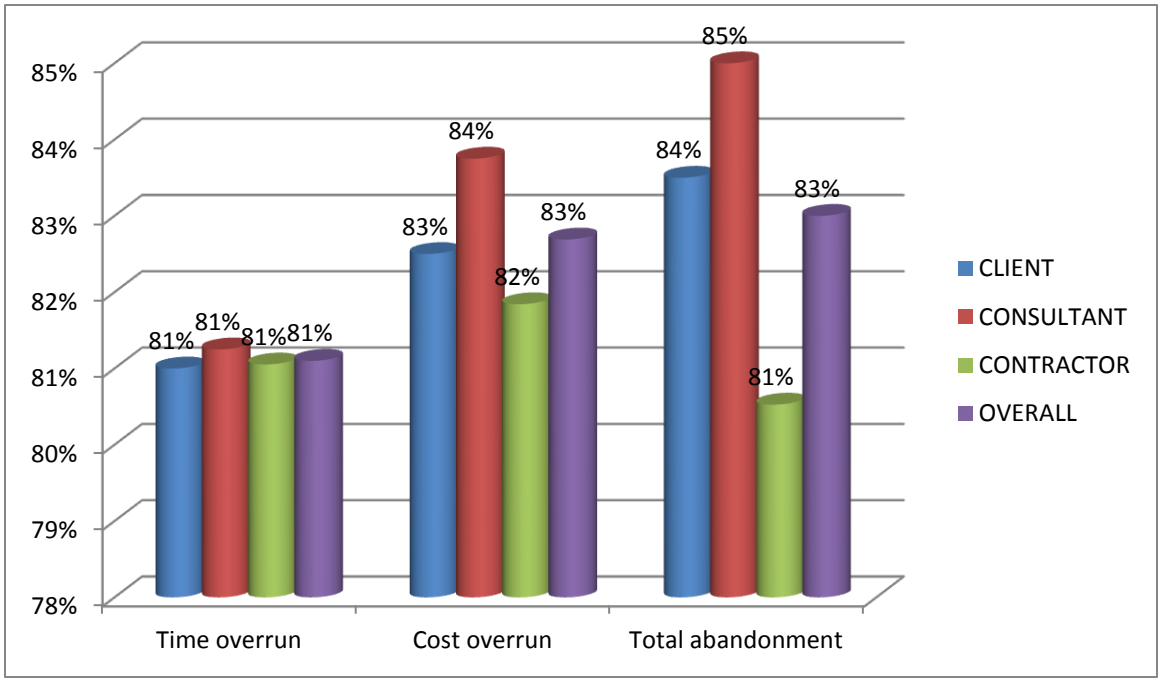


Figure 4.1-7 Common effects of project delay

4.3.4. Association between Categories of Causes and Effects of Delays

The next analysis was to identify the empirical relationship between the causes and the effects. In short, empirical relationship attempt to describe, explain and make prediction through observation. In this research, relationship between causes and effects through

observable data were successfully attempted. Since the data that been collected through survey is based on Likert Scale, it can be considered as interval data.

Therefore, an associational analysis was done to study the empirical relationship between the categories of causes and its effects of delay. Table 4.8 gives the result of analysis. Highlighted coefficient shows the coefficients are significant at 0.05signficance level.

Table 4.1-9 Association between the categories of causes and effects of delays

	Causes of delay							
Effects	**Client**		**Contractor**		**consultant**		**External**	
	coefficient	***Sign. Level***	***Coefficient***	***Sign. Level***	***coefficient***	***Sign. level***	***Coefficient***	***Sign. level***
Time overrun	0.4040*	0.0000	0.3622*	0.0000	0.1774*	0.0419	0.2050*	0.0184
Cost overrun	0.3205*	0.0002	0.3977*	0.0000	0.2519*	0.0036	0.0362	0.6805
Quality problem	0.0958	0.2747	0.2419*	0.0052	0.1420	0.1043	-0.0952	0.2774
Loss of goodwill	0.2175*	0.0122	0.3375*	0.0001	0.0447	0.6105	0.0556	0.5269
Disputes & claims	0.2122*	0.0146	0.2683*	0.0019	0.2563*	0.0030	0.0194	0.8255
Total abandonment	-0.0677	0.4404	-0.0839	0.3388	0.1193	0.1729	0.0508	0.5630

Source; own survey questionnaire as of May, 2018

As we observed from the above table 4.8 all factors are significant for time overrun but client and contractors are significant at significant level of 0.0000and coefficient of 0.4040 and 0.3622 respectively. So client and contractors factors are significant cause for time overrun. When you see the association between causes and cost overrun client, contractor and consultant factors are positively associated except external factors. Contractor factors are significant at the level of 0.0000 and coefficient of 0.3977.The

only significant variables for quality problem are contractors with a significant coefficient of 0.2419 and significant level of 0.0052.

Generally, Most of the causes and effects are associated positively to each other. From the results, we can say that the effects of delays happen in the project site have positive relationship with the causes of delays.

4.4. Discussion

Brief discussion on the critical factors causing delays in construction projects in the descending ranking order.

4.4.1. Causes of Delay

The result above show that the causes of delays that can be classified as most common causes are inadequate experience and skill of contractors (RII=0.83), inappropriate construction method (RII=0.82), insufficient funding (RII=0.82), impractical allocation of resource (RII=0.81) and poor site management by contractors (RII=0.8).

Inadequate experience & skills of contractors (RII=0.83); the physical conditions prevailing in construction fields are highly challenging. Thus, contractors sometimes may not be able apply usual construction methods and a contractor with inadequate experience cannot plan and manage the projects properly. Construction activities are required to be carried out using best practices and tools. When the procedures are not followed, errors occur, leading to rework and delays.

The studies by Sambasivan & Soon (2007) and Kikwasi (2013) were focusing both on causes and effects of delays on construction projects in Malaysia and Tanzania respectively. From the perspectives of three parties involved in a project, they found that contractor's improper planning, contractor's poor site management, inadequate contractor experience are most important factors. A research conducted by Albogamy *et al*., (2012) also identified poor qualification; skills and experience of the contractor's technical staff are the major cause for project delay in kingdom of Saudi Arabia.

Inappropriate construction method by contractors (RII=0.82); A contractor who does not possess requisite experience usually makes construction errors. These errors lead to rework and delays in activities. Ramya *et al*., (2015) also identified mistake during construction stage and improper construction method is among the most important factor

for delay. Generally Construction activities are required to be carried out using best practices and tools. When the procedures are not followed, errors occur, leading to rework and delays as well as cost overrun

Insufficient funding by clients (RII=0.82); Funds are not adequately released during relevant phases of projects' execution. Milestones payments are not made on time due to organizational lapses or bureaucracy. Inadequate cash flow leads to delay in delivery of materials and equipment to the site and delay in payment of workers' salaries. This study results are consistent with the following research.

A research done by Fugar & Agyakwah-Baah (2010) found this problem as the main contributing factor that cause delay in building project in Ghana. Payment delays may result in cost over runs hence adequate funding prior to the award of contract is seem necessary to ensure that project cost remains within budget. According to Arditi *et al*., (1985) long delays as a result of inadequate funding in inflationary periods increase cost-overruns extremely. A similar study in Malaysia by Alaghbari *et al* (2007) also revealed that financial problems were the main factors based on a list of thirty-one (31), factors like clients, contractors, consultant To reduce these challenges, contracting parties most especially the client should address the challenges related to funding before project commencement and prepare a good payment schedule to ensure that payments are honored on time.

Impractical allocation of resource by clients (RII=0.81); Funds, manpower, materials, equipment are inadequate to complete the project because project owners or clients have not properly assessed whether they have the required resources to complete such projects.

Contractor's poor site management (RII=0.8); Contractor's poor site management is one of the most significant causes in causing the construction delay. The results of this research find that site management is an important factor to make the project run smoothly. Usually this problem might happen to contractor that is still new in this field. Poor site management will causes negative impact on the overall work progress.

A research done by Syahira & Dr. Khairulzan (2014) found that contractors' poor site management as most significant factor of construction project delay in Malaysia.

4.4.2. Effects of Delay

The most common effects of delay perceived by all the respondents were time Overrun (RII=0.83), quality problem (RII=0.83) and cost overrun (RII=0.81)Time overrun(RII=0.83); Contractor related, material related, labour equipment related and external related factors have impact on time overrun. Out of the most important causes of delay discussed earlier, the causes are belonging to the contractor factors. When we see the RII that classified as common causes, we can see the causes are from the factors that stated above. Factors such as problem with subcontractor, management in site and delay in payments are most affected causes of delay in construction project and cause time overrun.

Quality problem (RII=0.83); as highlighted above the awarding of projects to having inadequate experience and skilled contractors, inferior workmanship and/or inferior quality materials, can lead to issues of project quality

Cost overrun (RII=0.81); usually factors that related to cost overrun is the contract that been made early before the construction starts. Client related, contractor related, material related and labour equipment related factors also lead to cost overrun. Mistakes and discrepancies in the contract document may come from the resources available, payment terms and project duration. If there is discrepancies happen, then cost overrun will occur. Time overrun leads to cost overrun. A study conducted by Sambasivan & Soon (2007), shows that total abandonment; Arbitration; time overrun; Cost overrun; dispute; Litigation are the effect of delay. Additionally, Almed. (2000) stated that impact of delays in construction project could cause; provocative relationship, cash flow problem, disbelief, project rejection, general sense of trepidation among parties and lawsuit. The study by Kikwes, (2012) also revealed that disruption and delays in construction project create the following consequences; negative social impact, misunderstanding causing dispute, time overrun, resources wasting in relation to equipment as well as labour, and work going beyond budget.

The research conducted by Aibinu & Jagboro (2002) on effect of the delivery of project in the construction industry of Nigeria discovered that; cost overrun, time overrun, disagreement, lawsuit, and complete abandonment are the consequence of project delay.

Study carried out by Kamming *et al.* (1997), shows that in Indonesia overrun of cost happened mostly and is thus severe as compared to time overruns.

CHAPTER FIVE

5. SUMMARY OF FINDING, CONCLUSION AND RECOMMENDATION

5.1. Summary of finding

Through this study, the construction industry is still facing the delay in project and this study come out with the causes and effects of the delays. A questionnaire is designed and distributed among the clients, contractors and consultants firm at Addis Ababa housing development project office, This study identified the most common causes of delay in construction industry are (1) Inadequate experience and skills of contractor (2), Inappropriate construction methods by contractor (3) Insufficient funding by clients, (4) Impractical allocation of resources by clients and (5) poor site management by contractors.

This study also comes out with the most common effects of construction delay which is (1) time Overrun, (2) poor quality of completed work (3) cost overrun. Contractor and clients are the cause for time overrun and cost overrun based on associational analysis results while contractors are the only causes for poor quality completed work.

5.2. Conclusion

The aims of the study were to recognize the major causes and effects of delay that influence the performance of construction works at Addis Ababa housing development project office. A comprehensive literature review was carried out to identify the causes of delay specified in the literature. The literature review and the pilot study revealed 36 delay causes and 6 effects were distributed. The questionnaire sets were distributed to the three main parties involve in the construction process. Number of participants responded to the survey were 40 clients, 76 contractors and 16 consultants. The paper presented the most significant factors causing the delay to the four groups. This is bases on the importance indices for the delay factors. Number of factors that showed significant effect on the performance of the projects is: two factors are related to client's group, three factors are related to contractor's group, Total of 5 out of 36 delay factors showed that they are of significant effect. Ranking of these factors was made according to the

Importance Indices in the four groups. Top five factors causing delays for construction projects in Addis Ababa housing development project office are: (1) inadequate experience and skills of contractor, (2) inappropriate construction method by contractor, (3) insufficient funding by client, (4) impractical allocation of resources by client and, (5) poor site management by contractors. Contractors and clients are the cause of time overrun and cost overrun while contractors are the only significant cause for poor quality completed work. The research also revealed that the delay of projects will cause time overrun, cost overrun, disputes, arbitration, litigation and total abandonment. These results are based on relative importance indices.

As an important contribution, this study comes out with empirical relationship between causes and effects of delays as the third objective as discussed in the discussion above. Hope that this study can be a help to the practitioners (clients, consultants and contractors) and also academicians to a better understand about the project management and make efforts to reduce the construction delays

5.3. Recommendation

Based on the survey results and literature review, the researcher lists some key points to reduced delays. The prescriptions were divided into three groups; prescriptions for the clients, prescriptions for the consultants, prescriptions for the contractors.

5.3.1. Prescription for clients

We know that clients usually select the contractors which give lowest bid. But to prevent any problem that might happen in future, clients should select contractors that have sufficient experience, enough technical and financial capability and have sufficient manpower to make sure the project run smoothly. Secondly, client should not frequently interfere during the project for example keep making changes about the requirement. This can interrupt contractor's productivity of work. Thirdly, client should have enough money to pay the contractors just in time. Client should work carefully so that bank or any finance institution will released the payment on schedule.

Clients should have guaranteed enough financial resources before the execution of project so that payment to the contractors is not delayed which in turn results with large time overruns. Slow decision making process is a common problem, especially for

projects owned by public institutions. Thus, reducing the bureaucracy during all phases of project execution is a must to avoid delays.

5.3.2. Prescription for consultants

The design of the contract is highly essential for smooth execution of a project. Contract must prescribe the mechanism to solve disputes, and mechanism to evaluate the risk of delays so that possible risk factors can be foreseen and eliminated accordingly without causing major delays.

Consultants should play a key role in communication between the parties involved. Consultants should monitor the work closely by making inspections at appropriate times. The inspections should be wisely scheduled so that the mistakes can be prevented before they occur. Contractors also should include the duration and the solution to settle disputes during the making of the contract between the clients and consultants in early stage.

5.3.3. Prescription for contractors

The most important thing is contractor should take the project that they have expertise on it only. Secondly, contractors should have enough money based on the cash flow to start the project in order to run the project smoothly. Third, contractors should provide proper planning and schedule to the clients and they also have to make sure the subcontractors, materials, labour and equipment is sufficient enough to start the project. A good and detailed work plan should be prepared and shared with the client. This work plan should include not only detailed project steps but also schedules dedicated to procurement of material and equipment, financing, and human resources.

Based on the above recommendation if each party apply it and follow the proper project management tools and technique; the effect of each factors on the project will be minimized and controlled.

Finally the recommendation will be on how to improve the questionnaire production which researcher should have read more journal, thesis and books in order to get many ideas of the questions that I want to ask because the questionnaire that been produced not represent all the causes and effect of construction industry around the world. That may be a small portion of causes and effect that being find during this study. Secondly, the method of analyzing should be added.

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APPENDIX-1 QUESTIONAIRE

Saint Mary University

School of Graduate studies

School of Business

Project Management Department

Questionnaire to be filled by the respondents

Dear Respondents,

My name is Getaw Zewdu. I am studying MA in project management in Saint Mary University and now I am going to study on significant causes and effects of project delay in case of Addis Ababa housing development project office. Dear Respondent I would like to expresses my deep appreciation for your time, honest and prompt response.

Objective: - this questionnaire is designed to collect primary data on significant Causes and effects of project delay undertaking by the housing project office for partial fulfillment of MA in Project Management. Therefore, the research is to be evaluated in terms of its contribution to your understanding of factors causing implementation delay of the project and the effects of those delays.

General Instruction

- No need of writing your names
- in all cases where answer option are available put (x) mark for the specific questions in the appropriate space provided

Confidentiality: I want to assure you that the data you provided is only for purpose authorized by Saint Mary University and no other can access the data you provided to me. Dear respondents please fill the questionnaire considering or taking in to account the project you are managing and running only.

If you have any question concerning the questionnaire, please contact me

Mobile Phone- +251-924-93-95-14

Email; getawzewdu7@gmail.com

I. General Information

Educational Background

Below High School	High School Completed	TVT	Diploma	BA Degree	Civil Engineer	Construction Management	Architecture	Other

Project stakeholder type				
Agency employees	Consultant	Contractor		

Year of experience in construction project				
2-3 year	3-4 years	4-5 years	Above 5 years	

II. Specific Questionnaire

Sr. No	**Causes of Project Delays**	**Very LOW**	**LOW**	**Medium**	**HIGH**	**Very HIGH**
1	Insufficient fund					
2	impractical allocation of resource					
3	Construction Material supply shortages					
4	Poor quality material supply					

5	Lack of adequate communication between parties					
6	Frequently disputing & negotiations					
7	Wrong organizational structure and bureaucracy linking to the project					
8	Unrealistic contract duration					
9	Wrong choice of Consultants & contractors					
10	Slow decision making					
11	Design alterations & change orders					
12	Delay in the payment to the contractors of completed works					
13	Frequent Contractors change and transfer					
14	Inappropriate construction methods					
15	Inadequate construction planning or scheduling					
16	Inadequate experience and skills of contractor					
17	Mistakes during construction stage					
18	poor site management by contractor					
19	Improper construction equipment selection & Faulty equipment					
20	Unskilled site manpower of contractors					
21	Inappropriate construction methods					

22	Long waiting time for inspection & testing					
23	Inappropriate design and topology					
24	Poor contract management by consultant					
25	Late identification & resolution of drawings & specification errors & omissions					
26	Late preparation of drawings and other contract documents					
27	Improper contract packaging/delivery strategy					
28	Over inspection					
29	Delay in providing services for utilities such as water, electricity, etc.					
30	Frequent interruption of power supply which leads to delay in civil works and machinery installation					
31	Delay in obtaining the required documents from concerned government offices. Municipality , Regional Environmental offices					
32	Seasonality of works to be performed (for example civil work, Land development etc. cannot be done during rainy season)					
33	Inflation of price of materials, equipment's and machineries causes implementation delay of the project					
34	Delay in fund release on the Bank or the financers side					

	have negative influence in the implementation schedule of the project					
35	Delay on the Bank side in conducting progress report and acceptance works in the implementation of project causes delay of the project					
36	Frequent changes in the government rules and regulation exert negative influence in meeting the implementation of the project					
III	**Effects or consequences of project delay**					
No	**Effects of project delay**	**Never**	**Seldom**	**Sometimes**	**Mostly**	**Always**
1	Cost overrun					
2	Quality problem					
3	Disputes & claims					
4	Loss of public confidence or organizational image					
5	Abandonment					
6	Time overrun					

*If any other factors you are experiencing or facing in your project implementation please state here*_____

_____

_____

_____

_____***Thank you ….***

Appendix-2 AAHDPO project area and status

ግንባታቸው በ2ዐዐ6 የተጀመሩ ቤቶች ማጠቃለያ										
ተራ ቁጥር	ክፍለከተማ	የአማካሪ ድርጅቱ ስም	የሳይቱ ስም	የብሎክ ብዛት	የቤት ዓይነት					ድምር
					ሱቆች	ሱቱዲዩ	ባለ አንድ መኝታ	ባለ ሁለት መኝታ	ባለሶስት መኝታ	
ፓኬጅ ------ 2A										
1	ፕሮጀክት 14		የካአባዶ	47	76	138	593	245	211	1263
2	አቃቂ	ፐርፌክት/ቨርቾዋል	ኮዬፈጨ	340	660	1485	4176	2674	1959	10954
3	አራዳ	ቴልዳ	ቦሌ ቡልቡላ	39	147	265	316	369	219	1316
4	ፕሮጀክት 18	ላይፍ	ኮዬ ፈጨ	119	282	0	3146	1584	1556	6568
5	ፕሮጀክት 11	ዳይናሚክ	ኮዬ ፈጨ	118	190	0	3156	1501	1532	6379
ንዑስድምር				663	1355	1888	11387	6373	5477	26480
	ፓኬጅ ------ 2B									
6	ፕሮጀክት 12	ሞሚ	ኮዬ ፈጨ	124	365	0	3236	1496	1530	6627
7	ፕሮጀክት 16	የሐንስ አባይ	ኮዬ ፈጨ	125	276	0	2982	1519	1551	6328
8	አዲስ ከተማ	ምስጋናው	ኮዬ ፈጨ	121	339	0	2966	1520	1464	6289
9	ፕሮጀክት 17		ኮዬ ፈጨ	124	352	0	3233	1692	1650	6927
ንዑስ ድምር				494	1332	0	12417	6227	6195	26171
ጠቅላላ ድምር				1157	2687	1888	23804	12600	11672	52651

SOURCE AAHDPO, 2009 E.C QUARTER REPORT

ሠንጠረዥ 2 ፣የፓኬጅ 2A የ26,480 ቤቶች የህዳር ወር 2009 ዓ.ም አፈፃፀምና ግንባታቸዉ የደረሰበት ደረጃ፤								
ተቁ	ቅ/ጽ/ቤት	ሳይት	አማካሪ	የብሎክ ብዛት	የቤት ቁጥር	ሰኔ/2008 የነበረበት	ወደ 2009 የተዛወ	ግንባታዉ የሚገኝበት

						ደረጃ	ረ	ደረጃ
1	ፕሮጀክት 14	የካአባዶ	Pace **G+4**	**28**	**740**	68.46	31.54	71.52
			Pace **G+4**	**19**	**488**	55.3	44.70	59.54
ድምር				**47**	**1263**		**35.75**	**64.91**
2	ኢቃቂ	ኮዬ ፈጬ2	Vertual Eng. **G+7**	**8**	516	18	82.00	18.98
			Vertual Eng. **G+4**	**161**	**4854**	62.02	37.98	73
			Perfect plan **G+7**	**15**	**968**	33.77	66.23	35.35
			Perfect plan **G+4**	**156**	**4616**	62.51	37.49	70
ድምር				**340**	**10954**		**42.34**	**65.86**
3	አራዳ	ቦሌ አራብሳ	Telda **G+7**	**5**	**426**	33.19	66.81	36.62
			Telda **G+4**	**34**	**890**	54.38	45.62	62.26
ድምር				**39**	**1316**		**52.48**	**53.96**
4	ፕሮጀክት 18	ኮዬ ፈጬ	Life consult **G+7**	**50**	**4522**	48.76	51.24	51.82
			Life consult **G+4**	**69**	**2046**	50.12	49.88	58.07
ድምር				**119**	**6568**		**50.82**	**53.77**
5	ፕሮጀክት 11	ኮዬ ፈጬ	Dynamic **G+7**	**70**	**4514**	65.91	34.09	65.91
			Dynamic **G+4**	**48**	**1865**	52.48	47.52	55.34
ድምር				**118**	**6379**		**38.02**	**62.82**
ጠቅላላድምር				**663**	**26480**		**43.59**	**61.49**

SOURCE AAHDPO, 2009 E.C QUARTER REPORT

ሠንጠረዥ 3 ፣የፓኬጅ 2B የ26,171 ቤቶች የህዳር ወር 2009 ዓ.ም አፈፃፀምና ግንባታቸዉ የደረሰበት ደረጃ፤

ተቁ	ቅ/ጽ/ቤት	ሳይት	አማካሪ	የብሎክብዛት	የቤትቁጥር	ሰኔ/2008 የነበረበት ደረጃ	ወደ 2009 የተዛወረ
1	**ኘሮጀክት 12**	**ኮዬ ፈጬ**	Nomy **G+7**	69	**4502**	27	73.00
			Nomy **G+4**	**55**	**2125**	34.1	65.90
ድምር				**124**	**6627**		**70.72**
2	**ኘሮጀክት 16**	**ኮዬ ፈጬ**	Yohannes Abbay **G+7**	54	**3584**	40.37	59.63
			Yohannes Abbay **G+4**	**71**	**2744**	43.94	56.06
ድምር				**125**	**6328**		**58.08**
3	**አዲስ ከተማ**	**ኮዬ ፈጬ**	Misganaw Alem **G+7**	56	**3777**	35.38	64.62
			Misganaw Alem **G+4**	**65**	**2512**	**43.45**	56.55
ድምር				**121**	**6289**		**61.40**
4	**ኘሮጀክት 17**	**ኮዬ ፈጬ**	**Bereket Tesfaye G+7**	80	**5180**	**40.01**	59.99
			Bereket Tesfaye G+4	**44**	**1747**	**44.73**	55.27

ድምር	**124**	**6927**		**58.80**
ጠቅላላ ድምር	**494**	**26171**		**62.27**

SOURCE AAHDPO, 2009 E.C QUARTER REPORT

Appendix-3 GTP 1 progress report

ሰንጠረዥ2 የመጀመሪያው ዕድገትና ትራንስፎርሜሽን ዕቅድ ዘመን የግንባታ አፈጻጸም

የግንባታ ዘመን	**ግንባታቸው የተጀመረ ቤቶች ቁጥር**	**ለተጠቃሚ የተላለፉ**	**መግለጫ**
ከ2003 በፊት	20,354		
2003	17,187		
2004	44,876	20,354	ሙሉ ለሙሉ ተጠናቆ ለተጠቃሚው የተላለፈ
2005	33,726		
2006	53,969	22,497	ሙሉ ለሙሉ ተጠናቆ ለተጠቃሚው የተላለፈ
2007	40,000	35,323	የነባር ግንባታ ምድብ 1፣ 33,633 እና የካአባዶ 1,690 ቤቶች
ድምር 2003-2007	**189,758**	**78,174**	ግንባታቸው በመካሄድ ላይ ካሉ ቤቶች ውስጥ 38,806 የሚሆኑት ግንባታቸውከ85 በመቶ በላይ ተጠናቋል፡፡

SOURCE AAHDPO 2007 EC

Appendix-4 construction input report

የዋና ዋና ግብዓቶች የስርጭት መጠን (ከ2003 - 2008)

የዕቅድዘመን	ጠጠር (ሜ.ኩ)			ሲሚንቶ (ቶን)			ብረት (ቶን)		
	ዕቅድ	ክንውን	አፈጻጸም	ዕቅድ	ክንውን	አፈጻጸም	ዕቅድ	ክንውን	አፈጻጸም
2003	266,964	50,202	19%	395,400	95,500	24%	27,178	4,650	17%
2004	638,970	379,336	59%	696,770	212,500	30%	120,438	78,494	65%
2005	1,282,658	929,010	72%	572,600	572,600	100%	115,025	110,794	96%
2006	487,000	344,028	71%	404,100	373,343	92%	61,300	38,627	63%
2007	879,240	544,245	62%	494,808	299,394	61%	128,600	80,000	62%
2008	1,522,077	785,923	52%	380,405	358,987	94%	157,532	89,932	57%
ድምር	**5,076,909**	**3,032,74**	60%	**2,944,08**	**1,912,32**	65%	**610,07**	**402,49**	66%

		4		**3**	**4**		**3**	**7**	

ምንጭ፡-ከ2003 ዓ.ም እስከ 2ዐዐ7 ዓ.ም ድረስ ያለው የመጀመሪያው እድገትና ትራንስፎርሜሽን ዕቅድ አፈፃፀም የተጠቃለለ ሪፖርት ላይ የተወሰደነው