ADDIS ABABA UNIVERSITYCOLLEGE OF BUSINESS AND ECONOMICS SCHOOL OF COMMARCE GRADUATE STUDIES PROGRAMDEPARTMENT OF BUSINESS ADMINISTRATION AND INFORMATION SYSTEM

THE CAUSES OF PROJECT DELAY: THE CASE OF LIDETA LIMATE PRIMARY SCHOOL BUILDING PROJECT LIDETA SUB CITY ADMINSTRATION CONSTRUCTION OFFICE.

A Research Based Project Work Submitted to Addis Ababa University School of Graduate studies, In Partial Fulfillment of the Requirements for the Award of Master of Arts Degree in Project Management

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DECLARATION

I, hereby, declare that this research report entitled The Causes of Project Delay: The Case of Lideta Limate Primary School Building Project Lideta Sub City Administration Construction Office is my original work and has not been submitted earlier either to this university or elsewhere for an award of any other degree.

Declared by: **Confirmed by:**

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ADDIS ABABA UNIVERSITYSCHOOL OF COMMERCE

THE CAUSES OF PROJECT DELAY: A CASE STUDY ON LIDETA LIMATE PRIMARY SCHOOL BUILDING PROJECT LIDETA SUB CITY ADMINSTRATION CONSTRUCTION OFFICE.

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DEDICATION

I dedicate this research work to my mother W/ro ***Babedeche Jaba*** *and my Sister W/ro* ***Adanch Argaw****, for their passion, dedication and support.*

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I would like to thank all the people who have lent me their continuous support, encouragements and guidance throughout the period of doing this thesis. First, I am grateful to my advisor, Seifu Mamo for his support, supervision and valuable guidance in writing my thesis. Secondly, I am grateful to my family and my best friend Ali J Mohamed for their continuous support, encouragement and providing available time for my study. Their sacrifices and opportunities accorded to me have enabled me come this far.

The last but not the least, my sincere gratitude goes to different colleagues who assist me directly and indirectly.

Abstract

The objectives of this research was to identify the most common factors, effects and the way of elimination delay project of time overrun in Lideta Lemate primary school building construction projects of Lideta sub city administration.

In order to achieve this objective, the researcher implemented literature review research methodology and questionnaire survey. Employing these methods, the significance of factors contributing to delay overruns within the projects of interest were identified and evaluated.

The participants were selected from clients, contractors and consultants. A total of 36 questionnaires from client, consultants and contractors were collected. The agreement among the sets of rankings for delay overruns were tested using statistical methods.

The statistical significant difference in the delay factors between the different groups of the project participants with the mean rank for each Create stress on contractors, disputes, total abandonment, time overrun, litigation and acceleration losses. The most effective measures of eliminating delays in construction were; information sharing, total quality management), quality cycles, benchmarking, joint risk management, continuous trainings, automated material tracking and early involvement of contractor and subcontractors.

It is hoped that these findings will guide efforts to improve the performance of the construction industry in the future.

***Key words**: delay, cause, effect, rate, time overrun.*

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CHAPTER ONE

1.1 INTRODUCTION

This paper deals with the cause of Lideta Lemate primary school building project delays in the Lideta sub city administration construction office. Construction delay is a foremost problem facing the construction industry in almost all countries in the world. Delays occur in almost every construction project and their magnitudes vary considerably from project to project, ranging from a few days to years. It is generally understood that construction delay is the most critical factor affecting the delivery of construction projects in terms of time, budget and the required quality (Hancher and Rowings, 1981). However, it is very important to identify the exact causes and their significance in order to minimize and avoid the impact of delays in construction projects. Mansfield et al (1994) found that construction projects completed on time were a signal of project efficiency; however, construction processes depend on a number of unpredictable factors that occur from various sources. These sources include the performance of construction stakeholders, availability of resources, site conditions, contract types, weather conditions and the contractual relations between stakeholders, inadequate contractor experience, financing and payments, labor productivity, slow decision making, improper planning, and subcontractors. However, it rarely happens that a project is completed within the specified time and budget. This chapter also includes the research problem statement, research questions, aim and objectives of the research study, and an outline of the research methodology.

1.2 Background of the Study

Project success is usually defined as meeting the project goals and objectives as prescribed in the project plan. From the early days of project management, the direct project objectives of time, cost, and performance (as generally agreed to by the client and the organization actually doing the project) have been accepted as the primary determinants of project success or failure. (Jack R. Merd. and Samuel J. Mantel, Jr. 2009).Thus, Project implementation and management focuses on three basic parameters: Quality, cost and time. A successfully managed project is one that is completed at the specified level of quality, on or before the deadline, and within the planned budget (UNCRD, 2000).

Yet, large construction projects have been known for their cost overruns and late completion times (Pickrell 1990; Flyvberg H. & Buhl, 2003). A considerable number of international literatures opine that the inability to complete projects on time and within budget continues to be a chronic problem worldwide and a far worsening case (Ahmed, Azher, Castillo, and Kappagantula, 2002; Azhar and Farouqui, 2008). However, as the trend of construction projects cost overrun becomes severe, a number of adverse consequences such as project failure, reduction of profit margin, loss of belief of citizen in government funded projects, would certainly take place. Studies have even revealed that our status is worse; from the view point of cost, completion time and quality of the projects, the construction Industry of Ethiopia is not at required level compared to the rest of the world (Bereket, 2015).

Many factors might be responsible for cost overruns and late completion times and quality problems. Cost overruns are mostly caused by Underestimation of costs to make the projects more viable, addition of scope during later stages of project planning and even during construction, changed conditions, etc. One of the most important contributing factors to the magnitude of cost overrun in large transportation projects are project delays. Furthermore, the length of project development phase from planning to construction seems to be a major factor in the extent of cost overrun (Flyvbjerg, H. & Buhl, 2004).

Kouskili and Kartan (2004) identified the main factors affecting cost and time overrun as inadequate/inefficient equipment, tools and plant, unreliable sources of materials on the local market, and site accidents. Hence, the list of causes confirm above agree with the findings of AbdMajid and McCaffer (1998) who concluded that if such causes are effectively dealt with, then time overrun can effectively be mitigated.

Quality is one of the important key performance indicators of a construction project which may cause cost overrun and time delays (Construction Management & Economics, 2000). Quality can be defined as the level of conformance of the final deliverable to the customer's requirements. One cause of usual project failure is that quality is overlooked or scarified so that a tight deadline can be met. It is very helpful to complete a project on time, only to discover that the thing delivered will not work properly (PMBOK/PMI 2008).

Delay is mostly common in the traditional type of contracts in which the contract is awarded to the lowest bidder. This procurement method is mostly practiced in developing countries. Ensuring that the project is delivered on time is one of the most significant needs of the clients in construction industry (Latham, 1994). Moreover completion of projects within the estimated time is an indicator of how efficient the construction industry is (Nedo, 1988). Quality, time and Cost are of primary concern to the contractor, but most often construction projects are procured based on only two factors; time and cost (Bennette and Grice, 1990).

Thus, the studies have indicated that the factors affecting the success of projects might vary in different situations. This study is planned to identify the factors affecting the success of projects in the context of Lideta sub city administration construction office Lideta Limate primary school building project. The study of this paper will focus on the previously mentioned three dimensions of project success. As the organization under the study is involved in nonresidential government building project that are not executed for commercial purpose, the success dimensions that are linked with business functions will not be addressed in this study.

Lideta sub city is one of the ten sub cities in Addis Ababa City Administration. The population of Lideta sub city is estimated 214,769(CSA, 2012) with 918.sq.km. In a newly arranged administrative structure of Addis Ababa the sub city has there are 10 weredas. Lideta sub city administration construction office is responsible for administration and construction of nonresidential government office, school and health centers building project. Yet, the organization has been challenged to deliver its projects efficiently and confirming to the expected level of standard. Planned schedules and budgets are frequently missed and technical specifications of the deliverables fail to meet the standards.

As scholars argue, in order to improve projects' performance, the factors for project success are essentially important to be identified. The primary objective of this study is to identify the major factors resulting in schedule slippage problems. These problems also affect Lideta Lemate primary school building project success. This project lunched in 2012, integrated to the first renewal project of Lideta. Lideta Lemate primary school building project more focus on condominiums community project fund supported by sub city administration construction office is responsible for administration and construction of the project.

1.3 Statement of the Problem

The Success or failure of a Project Management can be evaluated in terms of, how is the quality of the project? Is the project completed with agreed time? Is the project completed within approved budget? In each of Quality, time and budget there are different points and issues that affect the success or failure of it. Moreover, to be successful at overall project management there should balance between managing cost, time and quality (PMI, 1999).The driving force for the study of this research is largely due to personal observation and low performance of nonresidential government building construction projects in Lideta sub city administration construction office in terms of time (delay) and cost. Addis Ababa demands a highly growing infrastructural development; among the developments desired at all corners of the city is construction of standard government school.

The construction sector is one of the key economic sectors and is the main force in motivating the economic development of nations (Mehamid, 2013). According to Majid *(2006),* a construction project is commonly acknowledged as successful when it is completed on time, within budget, in accordance with specifications, and to stakeholders' satisfaction.

Sadi A.et.al. (2006), completing projects on time is an indicator of efficiency, but the construction process is subject to many variables and unpredictable factors, which result from many sources. These sources include the performance of parties, resources availability, environmental conditions, involvement of other parties, and contractual relations. However, it is difficult to see a project is completed within the specified time.

The delay in completion of construction projects is a worldwide problem (Haseeb, *2011).*This statement again implies how delay in construction projects is common even globally. According to *Faridi, et.al* (2006), delays have an adverse impact (effect) on project success in terms of time, cost, quality and safety.

Most construction projects in this country (Ethiopia) suffer time and cost overrun, *(Nega, 2008).*Mohamed (2013), Time, cost and quality have their proven importance as a prime measures for project success. Project requirements are commonly assumed to be time, quality and cost of a project. Success and failure of any project will be measured by these three requirements (Siraw, 2016). Timely and with budget completion of a construction project is frequently seen as a major criterion of project success by clients, contractors, consultants and

related stakeholders (Luka and Muhammad, 2014; Ibrahim and Nabil, 2013; Abadir, 2011; Chabota et al., 2008).

Managing cost, schedule (time) and qualities are the triple constraints which inter-depend on each other. When large projects deviate from their objectives (either in cost, completion time, performance), the damage caused obviously transcends out of the contracting parties and affects the project stakeholders and the public at large (Abebe, 2003). Fugar, F D K and Agyakwah-Baah, A B (2010) delays in building construction projects in Ghana this study focused on delay of construction of building projects in Ghana. The study sought the views of clients, consultants, and contractors on the relative importance of the factors that cause delays in building construction projects in Ghana. The study showed that all the three groups of respondents generally agreed that out of a total of 32 factors the top ten influencing factors in causing delay arranged in descending order of importance are: delay in honoring certificates, underestimation of the costs of projects, underestimation of the complexity of projects, difficulty in accessing bank credit, poor supervision, underestimation of time for completion of projects by contractors, shortage of materials, poor professional management, fluctuation of prices/rising cost of materials and poor site management.

Ayman (2000) investigated the causes of delays on 130 public projects in Jordan. The projects included residential, office and administration buildings, school buildings, medical centers, and communication facilities. The results indicated that the main causes of delay in construction of public projects relate to designers, user changes, weather, site conditions, late deliveries, economic conditions, and increase in quantity. Odeh and Battaineth (2001) reported that among the top ten most important causes of delays in construction projects with traditional type contracts in Jordan were, from the view point of contractors and consultants: owner interference, inadequate contractor experience, financing and payments, labor productivity, slow decision making, improper planning, and subcontractors.

Considering the failures of Lideta sub city administration construction office to complete projects within the planned schedule, budget and to the acceptable level of quality, this paper aimed at exploring the significant factors resulting in these failures so that it will be possible to overcome them revealing an insight towards improving the project management practice of the organization by developing a framework.

1.4 Research Questions

This section encompasses the questions the researcher wants to ask to shape the study following research questions:

1 What are the critical factors that affecting time overrun on the Lideta Lemat primary school projects?

2 To investigate the effects of Lideta Lemat primary school construction projects delay?

3 How can delay in construction be mitigated??

1.5 General Objective of the Study

The main aim of this paper is to find out the factors that causes of Lideta Lemat primary school projects delay in Lideta sub city construction office and to come up with recommendations for further improvement of the project.

1.6 Specific objectives of the Study

- To identify the critical factors affecting on time completion of Lideta Lemat primary school projects.
- Assessing collective effects of these factors Lideta Lemat primary school projects on time completion.
- To identify the relevant ways of eliminating or mitigating the delays of construction.

1.7 Significance of the Project Work

The findings from this paper will serve as a guide line to construction project holders of Lideta sub city that is the government, business organizations, contractors, consultants and the community at large. They will be aware of the uncertain factors that can result to delay of projects right from the inception phase. This study will help construction professionals increase the success of construction projects completion by managing well the factors that will help their successful completion. The architects, engineers, quantity surveyors, construction project managers and site agents may benefit from this study by applying the results of its findings while carrying out construction projects. The study will also generate measures to mitigate or eliminate the effects of construction projects delay. Finally the study will also serve as a support of what other past researchers have written about factors causing delay in construction projects. It will

also provide some information for future researchers who wish to further investigate on this particular or related case.

Thus, the result of this study is believed to be useful for the following reasons:

- It helps to identify range of critical factors that influence the government nonresidential building projects that will help policy makers, administrators, designers, and programs evaluators.
- It enables the Lideta sub city administration construction office and Addis Ababa construction agency to gain practical valuable information about the major factors affecting the government nonresidential building projects.
- It also initiates other researchers to conduct further and detailed studies on nonresidential government building projects.
- The Project Work recommendations can help for the project shareholders, project manager & his team for the better achievements & practically improvements in their future work.

1.8 Research Scope

The scope or delimitation of this research paper focuses to assess the cause of delay government nonresidential construction projects Addis Ababa, the case of Lideta sub city construction office Lideta Lemtae primary school building project. The research paper focuses only on the lideta sub city administration. It concentrates specifically on the building constructions projects Lideta Lemate primary school building projects all the stakeholders such as; contractors, client and consultants are assessed. The research will use a mix of analysis with survey data and qualitative analysis with interview data. Research method is desirable for conducting descriptive research and the specific project survey targeted government nonresidential construction project in Lideta sub city; Lideta Lemate primary school government construction project 2012.

1.9 Limitation of the Project Work

In this project work, simple random sampling was used. During sample selection it may ignore some relevant sample. Due to the shortage of time frame the study focused on a single project and a single sub city; for this reason the result conclusions it may not be given the overall picture of the cause of project delay. But, during preparation of target population attention was given to include relevant group.

1.10 Organization of the research report

The study will be organized in five main chapters as following

- **Chapter one: Introduction:** This chapter will show background of study, statement of the problem, basic research question, and objectives of the study, definition of terms, significant of the study and scope and limitation/scope of the study.
- **Chapter two: Literature review:** This chapter will contain prior research conducted on the topic in order to explore and describe the current body of knowledge. Beginning with construction project basic concept and trying to understand how government construction projects in Addis Ababa are managed and implemented.
- **Chapter three: Methodology:** This chapter will discuss the methodology to be employed to carry out the research; will discuss the research structure along with the limitations and ethics.
- **Chapter four: Results analysis:** This chapter will analyze the data gathered employing the chosen research methodology. The main aim of this chapter is to discuss the findings to draw conclusions.
- **Chapter five: Conclusions and recommendations.** This chapter will provide the conclusions for the study, where the analysis and findings will be related to the literature. Also, limitations for the research process will be disclosed, finally recommendations for future research will be discussed.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This section summarizes the literature that is already in existence regarding the cause leading to delay in government construction projects in the Lideta sub city with specific emphasis on the Lideta Lemate primary school building construction projects. It presents an overview of previous work on related topics that provide the necessary background for the purpose of this research.

2.2 Definition of project Concepts

2.2.1 Project

There are number of definitions about project by different scholars having similar meaning. According to Kerzner (2009), a project can be considered to be any series of activities and tasks that have a specific objective to be completed within certain specifications, have defined start and end dates, have funding limits (if applicable), consume human and nonhuman resources (i.e. money, people, equipment), are multifunctional (i.e., cut across several functional lines). The other one is a definition from PMI (2013), a project is a temporary endeavor undertaken to create a unique product, service, or result.

According to Tayntor (2010), a project is a unique, finite set of multiple activities intended to accomplish a specific goal. A project is defined as having the following characteristics: Complex and numerous activities, unique-a onetime set of events, finite-with a begin and end date, limited resources and budget, many people involved (usually across several functional areas in the organizations), sequenced activities, goal oriented, end product or service must result (Weiss and Wysocki,1992).

All of the above definitions have basic similarity, i.e. a project is a temporary and unique activity and has clear goal or objective and specifications. To elaborate each points more, a temporary activity does not mean something accomplished with in short period of time rather it means every project has a starting and ending period.

2.2.2 Project Management

Project management can be defined from management concept, resource utilization point and as a system. According to Kerzner (2009), project management is the planning, organizing,

directing, and controlling of company resources for a relatively short-term objective that has been established to complete specific goals and objectives. It is a set of tools, techniques, and knowledge that, when applied, helps to achieve the three main constraints of scope, cost and time, (Charvat, J, 2003.). However, based on different literatures, 52.7% of projects were not able to complete on time and over cost, and 31.1% not fulfilled the scope (Charvat, J., 2003 and Clancy, T., 2008). The growth in new knowledge has increased the complexity of projects because projects encompass the latest advances. Today, many companies focus on project management, as it focuses on achieving project objectives. It is important as it applies managerial process and has its tools that give managers a good opportunity to succeed in achieving objectives.

A project manager can reform everything right from a project management perspective but the project can still fail depending on its success criteria to help to ensure project success. Project managers can use different techniques and tools that are useful to manage projects efficiently. These include network activity diagram, bar charts, macro and micro cost estimation approaches and resource scheduling techniques. The use of these techniques and tools could lead to better chance of project success. Today, emphasis on an integrated project management process is the focus of all project effort towards the strategic plan of an organization, and reinforces control of both the project management techniques and tools, and the interpersonal skills necessary to orchestrate successful project completion (Clancy, T., 2008). Furthermore, project management utilizes the systems approach to management by having functional personnel (the vertical hierarchy) assigned to a specific project (the horizontal hierarchy) (Kerzner, 2009).

Project management is an organized common-sense approach that utilizes the appropriate client involvement in order to meet sponsor needs and deliver expected incremental business value (Wysocki, 2014). Project management is about people and the systems, processes, tools, and methodologies they use. In order to manage any kind of project there should be some kind of system with group of people who can run the established system. There are also different tools and methodologies that help to manage a project. Project management is concerned with several objectives at once. The objectives typically fall under the headings of time, cost and quality (Roberts and Wallace, 2004). The benefits and advantages of project management are identification of functional responsibilities to ensure that all activities are accounted for, regardless of personnel turnover, minimizing the need for continuous reporting, identification of

time limits for scheduling, identification of a methodology for trade-off analysis, measurement of accomplishment against plans, early identification of problems so that corrective action may follow, improved estimating capability for future planning, knowing when objectives cannot be met or will be exceeded (Kerzner, 2009).

2.3 Project Management Process Groups

According to PMI (2013), these processes ensure the effective flow of the project throughout its life cycle. These processes encompass the tools and techniques involved in applying the skills and capabilities described in the Knowledge Areas (will be discussed later). There are five process groups in the life cycle of any project. These are:

- **The initiating process group**: consists of those processes performed to define a new project or a new phase of an existing project by obtaining authorization to start the project or phase. Within the Initiating processes, the initial scope is defined and initial financial resources are committed (PMI, 2013).
- **The planning process group**: according to PMI (2013), this process group consists of those processes performed to establish the total scope of the effort, define and refine the objectives, and develop the course of action required to attain those objectives. The Planning processes develop the project management plan and the project documents that will be used to carry out the project.
- **The executing process group**: according to PMI (2013), this consists of those processes performed to complete the work defined in the project management plan to satisfy the project specifications. This Process Group involves coordinating people and resources, managing stakeholder expectations, as well as integrating and performing the activities of the project in accordance with the project management plan.
- **The monitoring and controlling process group**: consists of those processes required to track, review, and orchestrate the progress and performance of the project; identify any areas in which changes to the plan are required; and initiate the corresponding changes (PMI, 2013).
- **The closing process group**: consists of those processes performed to conclude all activities across all project management process groups to formally complete the project, phase, or contractual obligations. This process group, when completed, verifies that the defined processes are completed within all of the process groups to close the project or a

project phase, as appropriate, and formally establishes that the project or project phase is complete (PMI, 2013).

2.4 Project Management Knowledge Areas

According to the PMI (2013), there are ten project management knowledge areas that every project addresses and these Knowledge areas represent a set of competency skills and processes that must be properly utilized by the PM throughout the life cycle (Richardson, 2015). These are:

- **Project scope management**: it includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully.
- **Project time management**: it includes the processes required to manage the timely completion of the project.
- **Project cost management**: includes the processes involved in planning, estimating, budgeting, financing, funding, managing, and controlling costs so that the project can be completed within the approved budget.
- **Project quality management**: it focuses on all aspects of both the product and project quality processes and therefore project quality management includes the processes and activities of the performing organization that determine quality policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken.
- **Project human resource management**: focuses on actions related to the human element of the project (Richardson, 2015) and therefore project human resource management includes the processes that organize, manage, and lead the project team(PMI, 2013).
- **Project communication management**: Thus, project communications management includes the processes that are required to ensure timely and appropriate planning, collection, creation, distribution, storage, retrieval, management, control, monitoring, and the ultimate disposition of project information.
- **Project risk management**: project risk management includes the processes of conducting risk management planning, identification, analysis, response planning, and controlling risk on a project and the primary focus is to minimize the probability of negative events hurting the outcome and maximizing any opportunities that exist for positive events.

- **Project procurement management**: it includes the processes necessary to purchase or acquire products, services, or results needed from outside the project.
- **Project stakeholder management**: it includes the processes required to identify the people, groups, or organizations that could impact or be impacted by the project, to analyze stakeholder expectations and their impact on the project, and to develop appropriate management strategies for effectively engaging stakeholders in project decisions and execution.
- **Project integration management**: it includes the processes and activities to identify, define, combine, unify, and coordinate the various processes and project management activities within the Project Management Process Groups (PMI, 2013).

From a high-level viewpoint, project management is integration management. Therefore, one way or another project manager and the project team are involved in performing the above knowledge management areas in the project life cycle.

2.5 Project Success

Success is an interesting word and a word that is so general and wide in nature that it is difficult to define and obtain mutual agreement when asked from different individual. Judgev and Muller (2005) in their article mentioned that in order to define what success means in the project context is like gaining consensus from a group of people on the definition of good art. Project success is a topic that is frequently discussed and yet rarely agreed upon (Baccarini, 1999). Based on a current study conducted by Crawford, Pollack and England (2006) to uncover the journal emphases over the last 10 years in the field of project management, it is found that the study of project evaluation and improvement has gained increase significance. This implies that more studies have been directed to the area of project management and project success (Judgev& Muller, 2005).

2.4.1. Measure success of Projects

Ibrahim M., (2013) indicated that time, cost and quality have their proven importance as a prime measures for project success. Project requirements are commonly assumed to be time, quality and cost of a project. Success and failure of any project will be measured by these three requirements. Construction projects are not exceptions. According to Majid (2006), a construction project is commonly acknowledged as successful when it is completed on time,

within budget, in accordance with specifications. Moreover, 'Success is determined by how well it performed against the defined objectives and conformed to the management processes outlined in the planning phase' (Jason W., 2006).

2.4.2. Factors affecting Success of Projects

Various researchers have studied different types of projects and identified different factors affecting successfulness of projects. The Factors that affect the projects' performance vary with the various project success dimensions we have discussed so far. Thus, it is planned to put the factors to the respective dimensions of success. Hence, the sections below will present various factors contributing for cost overrun, project delays and quality problems as identified by number of studies made in various countries. Effort is exerted to give special attention to studies made on construction projects. Conducted a quantitative analysis of construction delays by examining the records of 130 public building projects constructed in (Jordan during the period of 1990 -1997). The researcher presented regression models of the relationship between actual and planned project duration for different types of building facilities. The analysis also included the reported frequencies of time extensions for the different causes of delays. The researcher concluded that the main causes of delay in construction projects relate to designers, user changes, weather, site conditions, late deliveries, economic conditions, and increase in quantities.

2.6 Construction Project Delay

2.6.1 Theoretical framework project delay

Public construction projects in Ethiopia are parts of the country's development initiative. It shares considerable amount of the country's scarce financial resources. A construction project is commonly acknowledged as successful, when it is completed on schedule and within the agreed budget, with the highest quality and in the safest manner, in accordance with the specifications and to stakeholders' satisfaction. For any public or private construction firms, upgrading the project performance can be taken as one of their main objectives. This can be achieved by reducing cost, finishing projects on schedule, highly increasing stakeholders' satisfaction and increasing quality.

Sanders and Eagles, 2001 define delay as an event that causes extended time to complete all or part of a project. Delay may also be defined as the time overrun, either beyond the date for completion specified by the contract or schedule or beyond the extended contract period where

an extension of time has been granted. The type of delay we focus on in this study is the time overrun beyond the date for completion specified by project implementation schedule or by the contract not considering whether an extension of time has been granted. In construction, delay could be defined as the time overrun either beyond completion date specified in a contract, or beyond the date that the parties agreed upon for delivery of a project (Sadi.A.etal2006). It is a projects leaping over its planned schedule and it is considered as common problem in construction projects. Delay and cost overrun are inherent part of most projects despite the much acquired knowledge in project management. Although some may argue that this is negligible (Flyvbjerg, 2009), it is important to note that physical and economic scale of projects today is such that it is driven under the platform of profit to the parent organization, and of national interest by the degree of success defined within the iron triangle of cost, time, and scope. It is therefore much appreciated to look at some reasons of delays and cost overrun in project and their mitigation process, so as to increase the perception of project success. The construction industry is very large, complex, and requires huge capital investments.

Delay in the completion of a construction project are one of the biggest problems facing by the construction industry and can be a major problem for construction's project participant leading to costly disputes and adverse relationships amongst project participants. Delays occur in every construction project and the significant of these delays varies considerably from project to project. Many researchers have studied the causes of project delays in public construction industry. The findings of such studies have been reviewed for this research.

2.6.2 Empirical Literature Review

A number of studies have been carried out to determine the causes of delay in construction projects. Fugar, F D K and Agyakwah-Baah, A B (2010) Delays in building construction projects in Ghana this study focused on delay of construction of building projects in Ghana. The study sought the views of clients, consultants, and contractors on the relative importance of the factors that cause delays in building construction projects in Ghana. The study showed that all the three groups of respondents generally agreed that out of a total of 32 factors the top ten influencing factors in causing delay arranged in descending order of importance are: delay in honoring certificates, underestimation of the costs of projects, underestimation of the complexity of

projects, difficulty in accessing bank credit, poor supervision, underestimation of time for completion of projects by contractors, shortage of materials, poor professional management, fluctuation of prices/rising cost of materials and poor site management.

About a decade earlier, Assaf et al. (1995) studied the causes of delay in large building projects in Saudi Arabia and their relative importance and reported that among the fifty-six (56) causes of delay included in the survey, the contractors, owners and architects/engineers interviewed all ranked financing group delay factors the highest. According to the contractors, the most important delay factors were preparation and approval of shop drawings, delays in contractors' progress payment by owners, and design changes by owners. In the opinion of architects and engineers, the most important causes of delay were cash flow problems during construction, the relationship between different subcontractors' schedules in the execution of the project, and the slowness of the owners' decision-making process. Owners, on the other hand, attributed delays in construction projects to design errors, excessive bureaucracy in project-owner organization, labor shortages, and inadequate labor skills.

Furthermore, Assaf, in a review of the literature, reported that studies by Chalabi and Camp (1984) had established that in developing countries where workers are relatively unskilled, adequate planning at the very early stages of the project was important for minimizing delay and cost overruns in most projects. It is however, interesting to note that financial difficulty as a factor in the delay of projects in Saudi Arabia was not reported as a major factor again in the Assaf et al. (2006) study.

Ayman (2000) investigated the causes of delays on 130 public projects in Jordan. The projects included residential, office and administration buildings, school buildings, medical centers, and communication facilities. The results indicated that the main causes of delay in construction of public projects relate to designers, user changes, weather, site conditions, late deliveries, economic conditions, and increase in quantity. Odeh and Battaineth (2001) reported that among the top ten most important causes of delays in construction projects with traditional type contracts in Jordan were, from the view point of contractors and consultants: owner interference, inadequate contractor experience, financing and payments, labor productivity, slow decision making, improper planning, and subcontractors.

Sambasvian and Soon (2007) identified the delay factors and their impact on project completion in the Malaysian construction industry. The results indicated that the ten from a list of 28

different causes of delay were: contractor's improper planning, contractor's poor site management, inadequate contractor experience, client's inadequate financial resources and payments for completed work, problems with subcontractors, shortage in material, labour supply, equipment availability and failure, lack of communication between parties and mistakes during the construction stage.

A similar study in Malaysia by Alaghbari et al. (2007) indicated that from a list of thirty-one (31) factors, clients, contractors and consultants agreed that financial problems were the main factors and coordination problems were the second most important factor causing delay in construction projects in Malaysia. This review has underscored that the factors that cause delay in construction projects are many and vary from country to country and from one circumstance to another. However, in developing economies Ogunlana et al. (1996) have reported that there are distinctive problems that cause delays in construction. They have classified them into three groups: problems of shortage or inadequacies in industry infrastructure (mainly supply of resources), problems caused by clients and consultants and problems caused by contractor incompetence/inadequacies.

In construction, the word delay refers to something happening at a later time than planned, expected, specified in a contractor beyond the date that the parties agreed upon for the delivery of a project (Pickavance,2005). Lo, Fung and Tung (2006) define delay as the slowing down of work without stopping construction entirely and that can lead to time over run either beyond the contract date or beyond the date that the parties have agreed upon for the delivery of the project. Syed, Azhar, etal., (2002)classify delays into non-excusable delays, excusable non-compensable delays, excusable compensable delays and concurrent delays. Non-excusable delays are delays, which the contractor either causes or assumes the risk for. Excusable non-compensable delays are delays caused by factors that are not foreseeable, beyond the contractor's reasonable control and not attribute able to the contractor's fault or negligence. Compensable excusable delays are excusable delays, suspensions, or interruptions to all or part of the work caused by an act or failure to act by the owner resulting from owner's breach of an obligation, stated or implied, in the contract. Concurrent delays occur when both owner and the contractor are responsible for the delay.

Nega *(2008)* concluded that, it is common to see construction projects failing to achieve their mission of creating facilities within the specified cost and time. This implies again the extent of

projects failure to meet their plan or requirement. Hardly few projects get completed on time and within budgets in construction project share exposed to uncertain environments because of such factors as complex nature of construction projects; presence of various interest groups such as the project owners, end users, consultants, contractors, financiers, materials, equipment, project funding, climatic environment, the economic and political environment and legal regulations. The delay incompletion of construction projects is a worldwide problem *(M. Haseeb, 2011).*This statement again sates how delay in construction projects is common even globally. For the client, construction delay refers to the loss of revenue, lack of productivity, dependency of existing facilities, and lack of rent able 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 construction projects on specified time or time agreed within parties indicates the work and construction efficiency.

According to Abbas (2006), let completion of works as compared to the planned schedule or contract schedule is what is known as delay. Delay occurs when the progress of a contract falls behind its scheduled program. It may be caused by any party to the contract and may be a direct result of one or more circumstances. A contract delay has adverse effects on both the owner and contractor (either in the form of lost revenue so expense) and it often raises the contentious issue of delay responsibility, which may result in conflicts that frequently reach the courts *(Apolot,* et al*,2009).*

According to Majid (2006), a construction project is commonly acknowledged as successful when it is completed on time, within budget, in accordance with specifications, and to stakeholders' satisfaction. In construction industry, contractors tend to maximize profit to increase market share. To achieve this aim, it is crucial for contractors to carefully identify the factors that affect the success of a project and estimate their impacts before the biding stage. A major criticism facing the Nigerian construction industry is the growing rate of delays in project delivery *(Aibinu, &. Jagboro, 2002).* Delay is a situation when the contractor or the project owners jointly or severally contribute to the non-completion of the project within the original or stipulated or agreed contract period. When projects are delayed, they are either accelerated or have their duration extended beyond the scheduled completion date. These are not without some cost consequence.

Aibinu, et al., (2006) The material related delays could include, but not limited to, delays that are behind the schedule of delivery, or it could be the condition of a given material or product. While labor related delays, are delays that are affected by the personnel of the project and could include motivation or even poor communication. Equipment related delays are delays that occur due to lack of planning for required equipment. The financial related delays are delays that relate to the payment delays and financial planning of a project. Poor control and chaotic conditions could result in improper planning and would cause delays in the project. Weak planning is a serious influence which could greatly disturb the completion of a project within the required time horizon. At the end is the subcontractor related delays, which are usually caused by both parties, the contractor and the agency as well, such delays could be caused by slow mobilization of assigned team.

2.7 Major Causes Contributing to Time Overrun on the Views of Three Project Participants.

The consequences of construction time overrun when undertaking a public sector road project affects all project parties, with issues such as extra cost. Although various methods for mitigating the problem have been developed in the previous studies, the limitation of using these methods raises the concern that probably the causes contributing to the time variance has not been adequately addressed. To investigate the causes, three interview workshops were arranged with relevant personnel in the public sectors. These discussions led to the identification of the following major categories of causes of time overruns (Wangetal2003).

2.7.1 Owner-Related Causes

A public sector project generally involves more changes, thus inducing delays in the process of implementing the project. The public sector owner in general, is less active in pushing project progress when compared with a private sector owner. There is a lack of skill in controlling construction programming. The bureaucracy exists in all procedures that a public sector project has to go through, which further induces progress delay. A public sector owner has to work with many governmental departments when changes to a project occur. He has to spend a substantial amount of time communicating with many other governmental departments, which again induces project delays (Wangetal2003).

2.7.2 Contractor-Related Causes

There are many ways in which a contractor's performance can delay a construction project. For typical examples, main contractors often have various disputes with subcontractors and materials suppliers, which can cause major delays. In fact, such disputes are considered a major cause for project delay. Other factors, such as the contractor's in sufficient financial resources, mistakes in making decisions on progress control and the overall inability when performing management functions, are also possible reasons for causing project delays. It is interesting to note that, a main contractor will sometimes deliberately demand an unreasonably short contract period although the contractor understands that the completion on contract time is impossible. In this situation, the contractors only want to secure a contract and thus agree with an unrealistic contract period imposed by a project owner. Consequently, project delay cannot be avoided (Takimetal2004).

2.7.3 Consultant-Related Causes

The consultant engaged in a construction project can affect the progress of construction programming through various monitoring measures such as issuing certificates, and endorsing the satisfaction of certain activities in the construction process. Progress delay can happen if these monitoring measures are not implemented properly. This appears a typical problem in the main land of China where a professional called the 'supervision engineer' is adopted for supervising construction performance, particularly in committing public sector projects. Supervision engineers are given the authority to endorse the satisfaction of certain procedures such as piling, steel fixing, the quality of key materials, before the construction programming can proceed forward. It has been found that supervision engineers often cannot endorse these procedures in time, thus construction delays are caused (Wangetal2003)

Table 2.1: The of causes of delay categorized into 7 groups

Categories	Cause of delay
Cause of delay by client	1. Delay in progress payments by owner
	2. Delay to furnish and deliver the site
	3. Change orders by owner during construction
	4. Late in revising and approving design documents
	5. Poor communication and coordination
	6.Slowness in decision making process
	7. Conflicts between joint-ownership of the project
Cause of delay by contractor	1. Difficulties in financing project by contractor
	2. Conflicts in sub-contractors schedule in execution of project
	3. Conflicts between contractor and other parties (consultant and owner)
	4. Ineffective planning and scheduling of project
	5. Improper construction methods implement
	6. Delays in sub-contractors work
	7. Inadequate contractor's work
	8. Poor qualification of the contractor's technical staff
	9. Delays in site mobilization
Cause of delay by consultant	1. Delay in approving major changes in the scope of work
	2. Poor communication and coordination
	3. Inadequate experience of consultant
	4. Mistakes and discrepancies in design documents
	5. Delays in producing design documents
	6. Unclear and inadequate details in drawings
	7. Insufficient data collection and survey before design
	8. Un-use of advanced engineering design software

Causes of delay by materials	1.Shortage of construction materials in market
	2. Changes in material types and specifications during construction
	3. Delay in material delivery
	4. Damage of sorted material while they are needed urgently
	5. Delay in manufacturing special building materials
	6. Late procurement of materials
Causes of delay by equipment	1. Equipment breakdowns
	2. Shortage of equipment
	3. Low level of equipment-operator's skill
	4. Low productivity and efficiency of equipment
	5. Lack of high-technology mechanical equipment
Cause of delay by labors	1. Shortage of labors
	2. Working permit of labors
	3. Low productivity level of labors
	4. Personal conflicts among labors
Cause of delay by external factors	1. Effects of subsurface conditions (e.g. soil, high water table, etc.)
	2. Delay in obtaining permits from municipality
	3. Hot weather effect on construction activities
	4. Traffic control and restriction at job site
	5. Accident during construction
	6. Changes in government regulations and laws
	8. Delay in performing final inspection and certification by a third Party

Source: Theodore, (2009)

MuraliSambasivan*, Yau Wen Soon, (2006) argue that Contract-related factors such as change orders (changes in the deliverables and requirements) and mistakes and discrepancies in the contract document result in cost overrun. Mistakes and discrepancies in the contract document can be in scope, deliverables, resources available and allocated, payment terms, achievement of various milestones, and the project duration. In most of the instances, time overrun leads to cost overrun.

Table 2.2 Major Delay Causes across Different Countries

	Major Causes					Author
	1	2	3	4	5	
Vietnam (a)	Poor site management and supervision	Poor site management and assistance	Financial difficulties of owner	Financial difficulties of contractor	Design Change	Le-Hoai et. Al. 2007
Malaysia (b)	Improper planning	Site management	Inadequate contractor experience	Finance and payment of completed works	Subcontractors	Sambasivian, 2007
Jordan (b)	Financial difficulties faced by contractor	Too many change order from the owner	Poor planning and scheduling by the contactor	Presence of unskilled labours	Shortage of Technical professionals with the contractor	Sweis, 2007
South Korea (b)	Public interruptions	Changed site condition	Failure to provide site	Unrealistic time estimation	Design error	Acharya et al. 2006
Hong Kong (b)	Inadequate resources due to contractor/lack of capital	Unforeseen ground conditions	Exceptionally low bids	Inexperienced contactor	Works in conflicts with exciting Utility	Lo, 2006
UAE (b)	Preparation and approval of drawings	Inadequate early planning of the project	Slowness of the owner's decisions making process	Shortage of manpower	Poor supervision and poor site management	Faridi, 2006
Nigeria (b)	Contractor's financial difficulties	Client's cash flow problem	Architects incomplete drawing	Subcontractor's slow mobilization	Equipment breakdown and maintenance problem	Aibinu, 2006
Saudi Arabia (b)	Changes in orders by owner during construction	Delay in progress payments	Insufficient planning and scheduling	Shortage of labour	Difficulties in financing contract	Assaf 2006
Kuwait (b)	Change orders	Financial constraints	Owner's lack of experience	Materials	Weather	Koushki, 2005
(c)	Contractor	Materials	Financial constraints	Change orders	Weather	
Ghana (a)	Monthly payment difficulties	Poor contract management	Material procurement	Inflation	Contractor financial difficulties	Frimpong, 2003
Jordan (b)	Poor design	Changes in orders/design	Weather	Unforeseen site conditions	Late deliveries	Al-Moumani 2000
Saudi Arabia (b)	Cash flow problem financial difficulties	Difficulties in obtaining permits	"Lowest bid wins" system			Al-Khal 1999
Lebanon (b)	Owner's more concern in financial issues	Contractors regarded the contractor relationship the most important	Consultant considered project management most important			Mezher et al. 1998
Saudi Arabia (b)	Slow preparation and approval of shop drawings	Delays in payment to contractors	Changes in Design/Design errors	Shortage of Labour supply	Poor workmanship	Assaf et al. 1995

Sources; Mohamed (2015)

2.8 Effects of Delay

A study by Aibinu and Jagboro, (2002) reveals six effects of delay on project delivery in Nigerian construction industry which are: time overrun, cost overrun, dispute, arbitration, total abandonment and litigation. Sambasivan and Soon (2007) disclose the same effects of delay in Malaysian construction industry. Haseebetal (2011) identifies effects of delays in Pakistan construction industry as clash, claims, total desertion and slowing down the growth of the construction sector. Ramabodu and Verster (2010) identify critical factors that cause cost overruns in construction projects as changes in scope of work on site, incomplete design at the time of tender, contractual claims(extension of time with cost), lack of cost planning and monitoring of funds, delays in costing variations and additional works. These critical factors in turn are the delay factors.

Chileshe and Berko (2010) indicate that causes cost overrun in Ghanian construction sector are delay in monthly payments to contractors; variations; inflation, and schedule slippage. Again, these explain the causes of delays and the effect of cost overrun. According to A.A. Aibinu*, G.O. Jagboro (2002), it was observed that the most frequent effects of delay on project delivery in Nigeria were time overrun. Therefore, based on the above articles, we can argue that delay in road construction projects affect everything negatively. Especially in developing countries, it might be worse than that as road and other infrastructures are needed badly to enhance the economic development of the country or the town in the case of this research. And again, developing countries didn't afford any compensation (additional cost) for a late completion of road construction projects. These fact among other things tells us about the very high extent of negative effects caused by road project delays in a given developing country or region. The effect of delay on government construction projects in the case of Lideta sub city could be worse than what we have tried to disclose above as the need for development and transformation is highly necessary.

2.8.1 Factors contributing to Cost over Runs

Cost Overrun is the expression which is used to represent the variance between the original sanctioned cost and the final cost incurred, would then provide no indication of managerial performance. Anything done to a project, including time overrun would be reflected in the cost. If a project is not managed well, its cost will go up; conversely, if a project is managed well, its

cost should come down. Therefore, cost can be used as an indicator for project management performance (TarunSoota, 2005).

Different studies have revealed that there are various factors responsible for cost overrun of Construction projects. Kaming, Olomolaiye, Holt, and Harris (1997), who studied 31 construction projects in Indonesia, found that from a contractor's point of view, cost overruns were mainly caused by inaccuracy of material take-off, increase in material costs and cost increase due to environmental restrictions. Le-Hoai et al. (2008) ranked the three top causes of cost overruns in Vietnam as material cost increase due to inflation, inaccurate quantity take - off, and labor cost increase due to environment restriction. Kaliba, et al. (2009) concluded that cost escalation of construction projects in Zambia are caused by factors such as inclement weather, scope changes, environment protection and mitigation costs, schedule delay, strikes, technical challenges and inflation.

Bubshait and Al-Juwait (2002) listed the following as factors that cause cost overrun on construction projects in Saudi Arabia; effects of weather, number of projects going on at the same time, social and cultural impacts, project location, lack of productivity standards in Saudi Arabia, level of competitors, supplier manipulation, economic stability, inadequate production of raw materials by the country, absence of construction cost data. In another study on construction projects in Nigeria, conducted by Okpala and Aniekwu (1988), it was found that architects, consultants and clients agreed that shortage of materials, finance and payment of completed works and poor contract management were the most important causes of cost overruns. Mansfield, Ugwu and Doran (1994) studied the performance of transportation infrastructure projects in Nigeria and concluded that material price fluctuations, inaccurate estimates, project delays and additional work contributed most to cost overruns. During a review of public sector construction projects in Nigeria, Dlakwa and Culpin (1990) found that the three main reasons for cost overruns are "fluctuations in material, labor and plant costs, construction delays and inadequate pre-planning. Kaming et al, (1997) and Mansfield et al,(1994) also identified design change, inadequate planning, unpredictable weather condition, and fluctuation in construction materials as factors influencing cost overruns. Another critical causes for time and cost overrun were identified: incomplete design at the time of tender, additional work at owner's request, changes in owner brief, lack of cost planning/monitoring during pre and post contract stages,

site/poor soil conditions, adjustment of prime cost and provisional sums, re-measurement of provisional works and logistics due to site location.

2.8.2 Factors contributing for Schedule Slippage

Pourrostam and Ismail(2012), shows the following as the top ten causes of schedule overruns: poor site management, delay in progress payments by client, change orders by client during construction, ineffective planning and scheduling of project by contractor, financial difficulties by contractor, slowness in decision making process by client, delays in producing design documents, late in reviewing and approving design documents by client, poor contract management by consultant and problems with subcontractors. Researches in developing countries especially Africa have made progress in determining the causes behind project delays. (ABJ Journal of advanced research, 2016) Kaliba, Muya, and Mumba (2009) explained in their study that, the major causes of delay in construction projects in Zambia were delayed payments, financial deficiencies on the part of the client or contractor, contract modification, economic problems, material procurement, changes in design drawings, staffing problems, equipment unavailability, poor supervision, construction mistakes, poor coordination on site, changes in specifications, labor disputes, and strikes.

In Uganda, Agaba (2009) attributes delays in construction projects to poor designs and specifications, and problems associated with management and supervision. In their study, El-Razek, Bassioni, Mobarak, (2008) found that delayed payments, coordination difficulty, and poor communication were important causes of delay in Egypt. Studies outside the African continent seem to also have identified almost similar causes. Sambasivan and Soon (2007), and Alinaitwe (2008) established that poor planning, poor site management, inadequate supervisory skills of the contractor, delayed payments, material shortage, labor supply, equipment availability and failure, poor communication and rework were the most important causes of delays in the Malaysian Construction Industry. Kouskili and Kartan (2004) identified the main factors affecting cost and time overrun as inadequate/inefficient equipment, tools and plant, unreliable sources of materials on the local market, and site accidents. Hence, the list of causes confirm above agree with the findings of AbdMajid and McCaffer (1998) who concluded that if such causes are effectively dealt with, then time overrun can effectively be mitigated.

Causes of schedule overruns are factors that lead to construction projects not being finished according to the planned scheduled time at the inception of project. Ade-ojo and Babalola(2007) states that there are 6 major causes that would lead to schedule overruns, the identified causes were ranked as follows: design error, poor site condition, delay in payment, financial incapability of client, financial incapability of contractor and non-availability of subcontractor and supplier. Further, Akinsiku and Akinsulire(2009) show that, financial or cash flow difficulties, financial difficulties faced by contractors and public agencies, frequent change order and design, failure to pay for completed works, shortages of resources, considerable additional work, escalations of material prices, increases in the scope of work, delay in design work and late delivery of materials are the top ten causes of schedule overruns on construction projects.

However, Ali, Smith, Pitt and Choon (2014) shows that labor Shortage, contractor's financial difficulties, construction mistakes and defective works, coordination problem, material shortage and poor site management are the major factors that contribute to schedule overruns con construction projects in Malaysia. Furthermore, Memon et al.(2014) revealed that design and documentation issues, financial resource management, project management and contract administration, contractors site management, information and communication technology, material and machinery resource, labor (human) resource and external factors as the major factors affecting time performance on construction projects.

2.8.3 Factors affecting the Quality of Projects

Quality is one of the important key performance indicators of a construction project which may cause cost overrun and time delays (Construction *Management & Economics*, 2000) . Quality can be defined as the level of conformance of the final deliverable to the customer's requirements. One cause of usual project failure is that quality is overlooked or scarified so that a tight deadline can be met. It is very helpful to complete a project on time, only to discover that the thing delivered will not work properly (PMBOK/PMI 2008).

Researchers have explored various factors affecting quality of projects fundamentals of which are discussed below. Special attention is once more given for identifying the factors influencing construction projects. The quality is a key function in all infrastructure development environments like cost and time. It becomes one of the vital factors in any construction project (P. E. Love, and Heng Li, Construction *Management & Economics*, 2000). Quality is affected by shortage of materials, equipment, design changes, error in cost estimation and lack of budget (R.

R. a. L. Tan, Y.G., 1995). The other factors affecting quality are deficiencies in scheduling, inappropriate planning and unclear evaluation standards (D. I. OT Ibironke, 2011). The significance of these factors depends on type of projects, working environment and local culture. In construction projects, lack of quality results in delays, cost overrun and unsafe structure (FIDIC Quality of Construction - Online). There are three types of costs associated with quality. First one is appraisal cost: the cost of testing and inspection, second one is failure cost: the cost of rework and third one is prevention cost: the cost of maintenance and better design (J. L. Ashford, Management of Quality in Construction – Online,1994). Many researchers have been carried out both in developed and developing countries to investigate the factors that have a substantial effect on the quality of construction projects. Below is presented a highlight of the factors affecting quality of construction projects.

Factors that cause quality problems in Pakistan are material prices escalation, inflation, procurement, selection of material, lack of communication, and poor on site supervision (S. M. A. Rizwan U. Farooqui, and Sarosh H. Lodi, 2008). K. N. J. K. C. IYER, 2006 as sited by (M. Abas1, S.B. Khattak, 2015) have identified adverse factors on quality of Indian construction projects, which are bad weather condition, communication problem, lack of project management skills, and low bids due to excessive competition. Construction project quality in Gaza strip is significantly affected by availability of construction materials, political environment, site staff experience and proper documentation (M. I. A. Rifat N. Rustom, 2006).

M. I. A. Rifat N. Rustom, (2006) studied the factors affecting the quality performance of building projects in Hong Kong. The major factors are effective project management, building effective construction team, and environment in which project is conducted. The findings of C. M. T. Albert P.C. Chan, (2006) show that continuous improvement, training of employees, effective communication, and building an effective project team are the factors affecting quality. The quality problems are due to management, improper planning, and carelessness, lack of training and improper use of materials (P. S. B. A. Bezelga, 2002).

A. R. A. Ilias, (2013) said studied the major problems with quality performance in the Malaysian construction Industry. These problems are lack of technical person availability, lack of awareness about quality management system, and lack of training workers.

R. H. Abdel -Razek, El -Dosouky, A.I. and Solaiman, A.M, (2016) discussed the factors that can improve the quality of construction projects. These factors are correct estimation of cost,

implementation of ISO 9000, effective utilization of resources, implementing new technologies, proper planning and improving quality control system.

2.8.4 Methods of minimizing and management of delay

At the time of construction delay, owners face a financial problem. However they try to compensate this from the income of the contractors, and more importantly minimize the risk that such delays will occur, depends largely on how the construction contract was drawn up. Based on several studies of project success factors and rectification of delays in construction project, a total of 14 methods have been identified as follows:

Table2.1: Methods of minimizing and management of delay

Methods	Delay minimizing methods
Methods of Minimizing and Management of Delay	Frequent progress meeting Majid, (2006)
	Use up-to-date technology utilization Majid, (2006)
	Use proper and modern construction equipment Majid,(2006)
	Use appropriate construction methods Majid, (2006)
	Effective strategic planning Majid, (2006)
	Proper material procurement Majid, (2006)
	Clear information and communication channels Majid, (2006)
	Frequent coordination between the parties involved Majid, (2006)
	Proper emphasis on past experience Majid, (2006)
	Proper project planning and scheduling Majid, (2006)
	Complete and proper design at the right time Assaf, (2006)
	Collaborative working in construction Kumaraswamy,(1997)
	Compressing construction durations Long, (2008)

2.9 Conceptual Framework

Based on the above literature review the below conceptual frame work is developed.

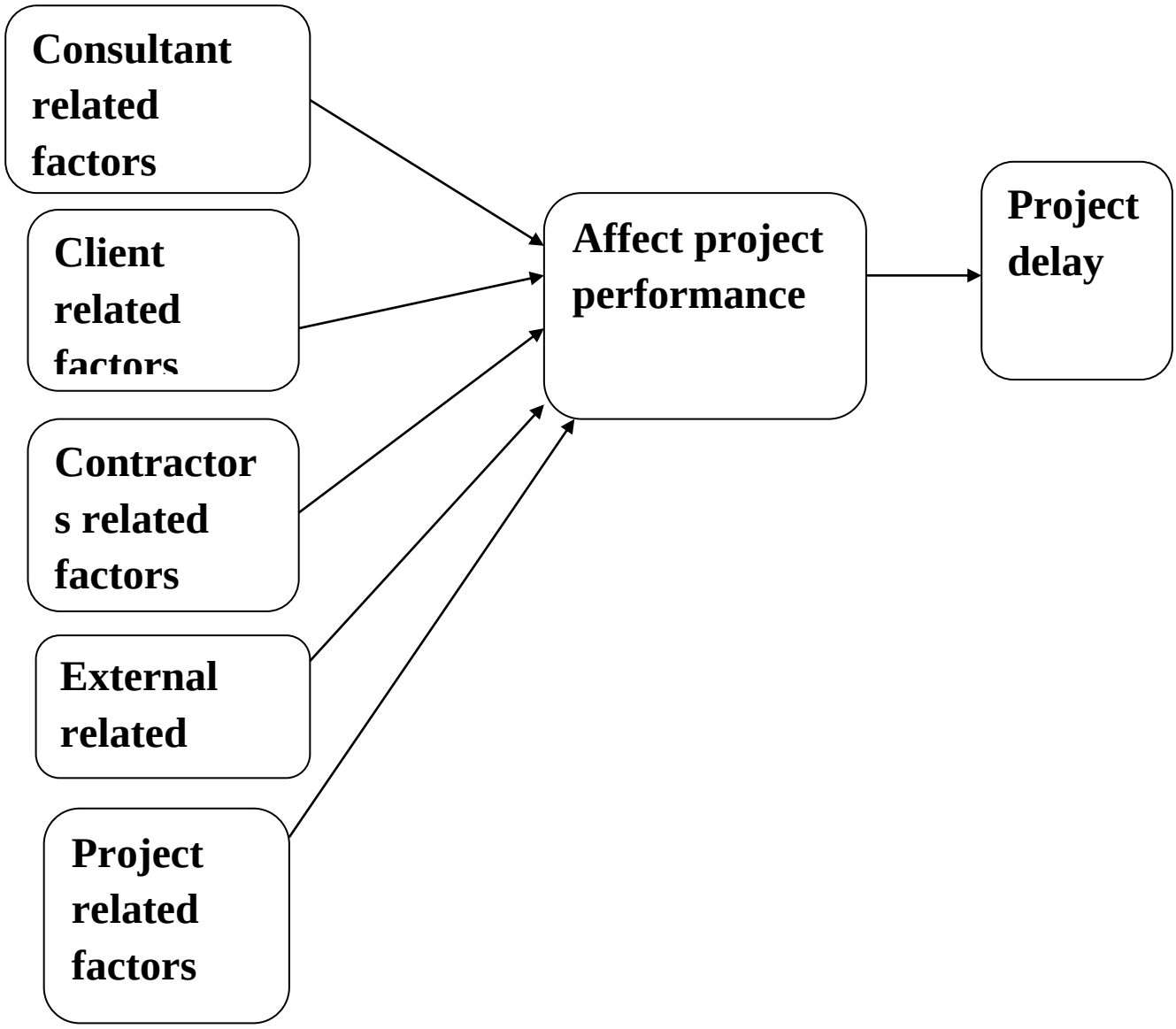

Fig.1: Conceptual Framework

Source: Developed based on from the above theory.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter comprises of the method and the design that was used to conduct the research. It was a quantitative research in which the data was collected using questionnaires. The population was made of clients, contractors and consultants who were selected by random sampling and convenience sampling technique. There was collection of both primary and secondary data. The primary data was obtained using questionnaires while the secondary data was gathered from the literature. In addition this chapter also presents the questionnaire design, the different sections of the questionnaires, the scale as well as the pilot study that was conducted to ascertain the reliability of the questionnaire.

The research methodology chosen for this study comprised of intensive literature review to building construction stake holders in Lideta sub city and a statistical analysis of the Survey.

3.2 Research Design

The three types of research designs are widely used by the researchers which include quantitative, qualitative and mixed method. Moreover, the study shall provide an in-depth analysis of the factors responsible for delay and their impact on the construction projects. As stated by Flick (2015), the use of quantitative design shall provide consistent results of the collected data as the data gathered will be quantified using statistical tools.

The research was designed to get opinions from clients, consultants and contractors of construction companies in regards to the factors causing delays and effects of delays. The possible causes, effects and way of mitigating delays were identified from the literature and these factors were tested with the stakeholders of the Lideta Lemate building construction.

A total of 42 delay factors were identified from the literature and stake holders of the Lideta Lemate building construction were asked to give their opinion on these causes in the form of ranking. Also 9 effects of construction projects delay were also identified from the literature and questions were designed according to these factors to get the opinion from stake holders of Lideta Lemate building construction project. Similarly, way of8 mitigating associated with construction projects delays was also identified. Total 59 questioners are design for all project participants. To enhance the reliability of the information to be obtained the researcher will use

both closed ended and open ended questionnaires, and structured interview data collection instruments. The variables to be treated in each instrument are the critical success factors; realistic schedules, effective project management skills/methods, support from top management, user/client involvement, clear requirements and specifications and clear objectives and goals and other related factors collected from the open ended questionnaires affecting Lideta Lemate primary school constructions projects in Lideta sub city Addis Ababa.

3.3 Sample design

A sample the representative part of the total population chosen for analysis during a research (Bryman and Bell, 2007). The importance of the sampling process was crucial. The characteristic of the interest sample of the population were project managers, Lideta sub city construction office and contractors, subcontractors, supervisors, Lideta finance and economic office managers. Simple random sampling method was used. The study used an questionnaire survey as the data collection tool to collect views on the cause of government Construction Projects delay at the Lideta Lemate primary school building project.

This research study collected a sample size of about 40 using purposive sampling as the targeted sample needed to have an exposure to project management. A questionnaire was used to collect feedback from the potential respondents. The questionnaire was divided into 3 sections. The first section is aimed to collect personal details and organization information, followed by second section which aimed to assess in the respondents' experience in project management. The third section aimed to investigate the criteria used in the factors that influence the success implementation of project delay, effect and followed by the most important section which aims to find out the ways of mitigation project delay.

The researcher population will be the project managers, Lideta sub city construction office and contractors, subcontractors, supervisors, Lideta finance and economic office managers. Project experience will be used a criteria to determine the population of the study based on this population of the study will be 40 sample in sub city and this will comprises of the project managers, Lideta sub city construction office managers and contractors, subcontractors, supervisors, Lideta finance and economy office managers. By dividing the population into three stratus i.e.; Project manager, contractors, subcontractors, supervisors, and construction and finance and economy office executive stratus then a representative sample size of 40 will be

randomly chosen (selected). The selected Stratified sampling technique will use to project managers, Lideta sub city construction office managers and contractors, subcontractors, supervisors, Lideta finance and economy office executives.

3.4 Research Approach

The researcher will use a mixed method approach to examine and identify the issues confronting client, project managers and contractors and supervisors in their successful implementation of government construction projects. Specifically, the research will use a mix of quantitative analysis with survey data and qualitative analysis with interview data. Research method is desirable for conducting descriptive research. The scope of this study covered lideta sub city public sector building projects Lideta Lemate primary school which is administrated by lideta administration in Addis Ababa. As revealed in the literature review, the delay causes in construction could be supposed to be generic; though, some are project and country-specific.

3.5 Population and Population size

The population was made of client, consultants and contractors with over different level of experience in the construction industry and private clients or owners. Moreover all respondents had attained tertiary education. This implied the high position, lengthy years of work experience and educational background provided our respondents with enough knowledge of the construction industry with issues relating to causes, effects and way of mitigating associated with construction delay.

The population size consisted of 36 respondents, which included 8 contractors, 13 consultants and 15 clients. The population size was limited to this number to effectively maximize the time and cost allocated for the research since the questionnaires had many questions and will be time consuming which might discourage some respondents from participating. Also the wide nature of the questionnaire may not be within the competence of some construction stakeholders. However effective selection of the target respondents with high competence and experience proved to shield these weaknesses.

3.6 Sampling Techniques

There are two types of sampling methods used by the researchers which include probability sampling technique and non-probability sampling technique. The researcher will use

convenience non-probability sampling technique as it will help the researcher to collect data from the respondents who readily volunteer for the purpose and this technique is cost effective also (Saunders et al, 2012). The sample size selected for this research would be 36 respondents which will include client, contractor and consultant at different levels of construction project processes. In this study, we used sampling techniques because of the quantitative nature of the research. A random sampling method was then used to select the contractors and consultants. Random sampling is defined as the probability of choosing people or things in a random manner, without any criteria with the aim of eliminating bias (Komb and Tromp, 2006).

3.7 Data Collection

This is referred to as the gathering or the collection of information from customized target respondents to suitably answer the research questions or the research objectives or give answers to findings.

3.8 Primary data collection

The primary data refers the first hand information obtained by the researcher himself in his or her study. This information is made available for the first time only by the researcher. The information can be collected through direct personal investigations, through respondents, and survey using questionnaires. The collection modes could also be through self-administered survey. The advantages of this method of data collection include; reliability and accuracy and moreover it is a better method for intensive investigation. On the other hand, the disadvantages will be high cost and too much time spent, and the method is not suitable for extensive enquiry. Because of the quantitative nature of our study, the primary data was collected in the survey by making use of questionnaires. The questionnaires were distributed on hand to our target respondents who were expected to fill the hard copy of the questionnaires and returned.

3.9 Secondary data collection

The secondary data refers to that information which have already been collected, analyzed, documented and published by some other researchers or people. The researcher therefore uses this information to support his or her current study or findings. Obtaining this information is faster, less expensive, and vigorous activities such as surveys are not required. However, this

information collected is not always available for free and will cost money, the information are not always enough, some are old or expired meanwhile some are false information.

3.10 Questionnaires

In order to determine the perception of different stake holders in Lideta Lemate primary school building project regarding factors causing delays, a questionnaire was developed. This was the main tool used to collect the data from our target respondents. The questionnaire was structured into 4 sections to meet all 3research objectives.

Section A had questions to determine the respondents' background.

Section B was to design to get the opinions of construction stake holders regarding causes of construction delay.

Section C questions were design to ascertain the effects of delay.

D. Section was design to determine the measures to mitigate risks of construction delays.

We distributed the questionnaires to some contractors, consultants and client working in Lideta sub city administration. The questionnaire had a total of 59 questions. 42 questions were related to the causes of construction delays, 9 questions were related to the effects and 8 questions were related to way of mitigating the project delays. For the factors causing delays and the effects of delay, the questions were design based on the 5 point Likert Scale which measures from 1-5 according to the level of contribution and impact of each factor.

Strongly Agree (5)
Agree (4)
Moderate (3)
Disagree (2)
Strongly Disagree (1)

For questions relating to mitigating due to construction delays, a total measures were identified from the literature and the questionnaires were design using the 5 point Likert scale to determine the effectiveness of each of these measures.

Very highly effective (5)
Highly effective (4)
Effective (3)

Lowly effective (2)

Very lowly effective (1)

3.11 Data Analysis

For the purpose of analyzing the collected data the statistical tools are used by the researchers. In the current research the SPSS software will be used by the researcher to critically analyze the data collected and evaluate the results. Frequencies and percentages were used to demonstrate experience, education status, and sex of respondents. In addition, statistical analyzing method was employed to identify factors that affect project delay. Statistical techniques and indexing were used to analyze collected data.

The most frequent indices used for construction delays analyses are frequency index, severity index, and importance index in construction industry. It also presents the results of the questionnaires which were carried out using the SPSS statistics version20 and excel. The results were represented using tables and descriptive statistics such as the figures and the mean. Before the results obtained from the questionnaires received were being analyzed, a Cronbach analysis was carry out to ascertain the reliability of the questions. The Cronbach Alpha test that's shows the validity of the questionnaire. Werku and Jha(2016), Assaf and Hejji, (2006), and Apolot et al. (2012) used Severity Index (SI), Frequency Index (FI) and Importance Index (II) data analysis methods to identify, to rank and to examine the importance of the root causes of delay factors. The same method is adopted in this study to analyze and assess the research data collected.

3.12 Reliability Test

Before the results obtained from Likert type questionnaires were analyzed, Cronbach Analysis of reliability of the questions was carried out to measure internal consistency. Before the results obtained from the questionnaires received were being analyzed, a Cronbach analysis was carry out to ascertain the reliability of the questions. This is a test of reliability that that measures the internal consistency of the questions using the Likert scale. In this study ethical consideration was applied by maintaining confidentiality of information about the organization and respondents. In addition to this, the gathered data were only used for this study, not used for other purpose, or not transferred to other party. Furthermore, the respondents were ordered not to write any information like their name and other personal code while responding to the questionnaire.

CHAPTER FOUR

Data Analysis and Findings

4.1 INTRODUCTION

This chapter presents the way the questionnaires are distributed, responses are retrieved and subsequent analysis of the data collected from professionals working for clients, consultants and contractors, who are involved in Lideta Lemate primary school building Project, are made. The main purpose of this survey is to rank the already identified delay factors of the construction project and to find out the critical factors that are required to be given due attention in order to substantially minimize delay problems in the construction projects. To this effect, the questionnaire was systematically designed so as to properly extract information on the causes of project delay. The relative importance of the factors to the delay of the project from the viewpoints of client, contractor, and consultant are assessed; different sorts of ranking analysis is employed to discuss the results. The agreement between the responses of client, contractor and consultant on delay factors are also investigated.

This chapter presents a series of statistical tests and analysis carried out for the factors of each of the sections. These include the causes of delay, effects of delay, and ways of mitigating delays. It also presents the results of the questionnaires which were carried out using the SPSS. The results were represented using tables and descriptive statistics. The Cronbach Alpha test that's shows the validity of the questionnaire used is also presented in this chapter.

4.2 Cronbach Alpha Test (Reliability Testing)

Before the results obtained from the questionnaires received were being analyzed, a Cronbach analysis was carry out to ascertain the reliability of the questions. This is a test of reliability that that measures the internal consistency of the questions using the Likert scale. That is the questions were correlated to each other as a group. This reliability test was conducted for the four different sections as indicated on the research objectives. The results were represented on the table below.

Table 2.1: Client reliability Statistics

Cronbach's Alpha	N of Items
.722	40

Source: SPSS output

Table 4.2: Consultant reliability Statistics

Cronbach's Alpha	N of Items
.895	35

Source: SPSS output

Table 4.3: Contractor reliability Statistics

Cronbach's Alpha	N of Items
.730	36

Source: SPSS output

Table 4.5: Shows the Cronbach's Alpha reliability test total variables

Cronbach's Alpha	N of Items
.723	59

Source: SPSS output

The results from the Cronbach analysis indicate that all the items for the sections are correlated. There is internal consistency and the items functions as group for each section. This is because the Cronbach Alpha coefficient of questions .723. Impliedly, the survey instrument used was reliable and acceptable and that an agreement exists between construction industry practitioners in ranking the factors of variations accordingly. Reynolds and Santos specify that an alpha greater than 0.7 implies the instrument is acceptable.

4.3 Demography

4.3.1 Response Rate

Response rate refers to the number of people who participated in survey. A total of 40 questionnaires were distributed and 36 were collected having been filled completely. This constituted a response rate of (88.9%) which is adequate for analysis according to Mugenda(1999) that states a response rate of 50% is adequate for analysis and reporting. Table 4.6 is a summary of the response rate in this study.

Table 4.6: Response Rate

Category	Questionnaires Distributed (N)	Returned (N)	Responses (%)	Rate from total Response (%)
Client	15	15	100%	41.70%
Contractor	12	8	66.70%	16.60%
Consultant	13	13	100%	41.7%
Total	40	**36**	**88.90%**	100%

Source: own survey (2018)

4.3.2 Age respondents

Age bracket in this study refers to the range between two particular ages. The researcher required the respondents to identify the age bracket for analysis. And the result of the survey is summarized in the table 4.7 below

Table 4.7:Age of respondents

Age of respondents	Frequency	Percent	Valid Percent	Cumulative Percent
From 20 to 25	4	11.4	11.4	11.4
From 26 to 30	7	20	20	31.4
From 31 to 35	5	14.3	14.3	45.7
From 36 to 40	9	25.7	25.7	71.4
From 41 to 45	8	22.9	22.9	94.3
From 46 to 50	2	5.7	5.7	100

Source: own survey (2018)

Table 4.7 above shows that majority of the respondent are aged between 20 to 25 years , 26-30, 31-35, 36-40,41-45 and 46-50 representing 11%, 20%, 14.3%,25.7%,22.9 %and 5.7% of the respondents respectively. The majority of the workforce in these projects are in their most active and productive years.

4.3.3 Gender

In this study the term gender is used to refer to male or female. Respondents were asked by the researcher to give their gender as part of the moderating variable of the study.

Table 3: Gender of respondents

Gender		Frequency	Percent	Valid Percent
Valid	Male	19	54.3	54.3
	Female	16	45.7	45.7
	Total	35	100	100

Source: own survey (2018)

The data presented in Table 4.8 demonstrates that there was a disparity in the representation of both male and female in the survey at 54.3% and 45.7% respectively. This could be due to the

fact that the project requires masculine and therefore engages more on manual labor. The high representation of male could be for the reason that male gender is perceived to be able to perform hard jobs which require masculine engagement, essential in the Constructions projects which the researcher believe is subject to further study.

4.3.4 Education Background

Information relating to the level of education attained by the respondents was also analyzed. This information would enable the researcher to determine if the employees are professional enough to understand the questions and provide reliable data to the study. In this paper respondents were asked by the researcher to give their history in terms of the academic experience.

Table 4.9: Education background respondents

Education background		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Certificate	1	2.9	2.9	2.9
	Diploma	10	28.6	28.6	31.4
	Degree	21	60	60	91.4
	post graduate	3	8.6	8.6	100
	Total	35	100	100	

Source: own survey (2018)

Table 4.9, Represents the findings on the level of education attained by the respondents. The study found out that, majority of the respondents had attained bachelor degree; this represented 60% of the respondents, 2.9 of the respondents had attained certificate, 28% of the respondents had attained diploma and 8.6% of the respondents had attained post graduate. It can be observed that the projects contain staffs with various qualifications at different levels with majority having attained a bachelor degree. The education qualifications of the respondents suggest the availability of sufficient educational qualification to make the information acquired reliable.

4.3.5 Year of Experience respondents

Table 4.10: Experience background respondents

Experience of respondents		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	below 2 years	7	20	20	20
	From 3 to 5	5	14.3	14.3	34.3
	from 6 to 10	13	37.1	37.1	71.4
	From 11 to 15	8	22.9	22.9	94.3
	above 15	2	5.7	5.7	100
	Total	35	100	100	

Source: own survey (2018)

Concerning the experiences of respondents in construction projects are in generally low. As illustrated in table below,7(20%) respondents have only below 2 year of experience in construction project; while, 5(22.9%) of the respondents have 3-5 years of experiences. In addition, 13(37.1%),8(22.9%) and 2(5.7) of respondents have 6-10, 11-15 and above 15years of experience in construction project respectively. Majority of the respondents have indicated that they have medium experiences in construction.

4.3.6 Responsibility of respondent

Table 4.11: Responsibility respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Project managers	7	20	20	20
	project officer	7	20	20	40
	project contract worker	7	20	20	60
	project supervisor	7	20	20	80
	project consultant	5	14.3	14.3	94.3
	others	2	5.7	5.7	100
	Total	35	100	100	

Source: own survey (2018)

4.4 Data Presentation and Analysis

The objective of conducting the analysis for this section is to establish the groups of causes identified from the literature review and the ranking according to their significant influence towards construction project delays. A ranking method was used to achieve this objective and the significant of using these methods is it can reveal the most influential causes within each category of delays. The causes related to client, contractor, consultant and external factors were analyzed and presented as follows.

4.5 Factors and Groups That Causes Project Delays

50 causes of delay have been identified and grouped into 4 sets: contractors, consultants, clients and external factors. Factors that contribute to the delay of building construction project in Enugu State were ranked based on relative importance index (RII) (Frimpong, 2004) from the view point of contractor, consultant, client and external factors.

4.5.1 Factors of Client Related Delay

Table4.12 below shows that ranked the results of survey analysis of factors of client related delays. Based on the ranking (R) of the weighted average of the mean item score (MIS) for the

listed causes of delays, it was observed that the most dominant cause of delays that are client related on construction project delivery on time in Lideta Lemate school building project. Results from mean score analyses using the significant factors the respondents perceived that the ten top factors listed below were most important causes of project delays in the Lideta Lemate primary school building construction project. Top ten important client related factors change in scope of the project with a mean score of 4.4 , inadequate communication between owner and designer during the design phase with a mean score of 4.2, lack of complete definition of project scope and delay in issuing of change orders by the owner the same effect with a mean score of 4.00 , in scope of the project and inadequate and unclear details in drawings the same effect with a mean score of 3.93, late in revising and approving design, and deficiencies in activity sequencing the same effect with a mean score of 3.86 , owner's poor communication with the construction parties and slow decision-making by the owner's organization the same effect with a mean score of 3.8. However, the study of wei (2010) identified late revising and approving design documents as the major cause of delays cause by the client.

Table 4.12: Factors influencing time overruns from point view of client

client related factors	N	Minimum	Maximum	Mean	Rank
change in scope of the project	15	3	5	4.4	1
Inadequate communication between owner and designer during the design phase	15	3	5	4.2	2
Lack of complete definition of project scope	15	2	5	4	3
Delay in issuing of change orders by the owner	15	2	5	4	3
Conflicts between joint-ownership of the project	15	3	5	3.9	4
Inadequate and unclear details in drawings	15	2	5	3.9	4
Late in revising and approving design	15	2	5	3.8	5
Deficiencies in activity sequencing	15	2	5	3.8	5
Price escalation	15	1	5	3.8	6
Owner's poor communication with the construction parties	15	2	5	3.8	6
Slow decision-making by the owner's organization	15	2	5	3.8	6
Delay in the settlement of contractor claims by the owner	15	2	5	3.8	6

Lack of complete definition of project scope	15	2	5	3.7	7
Uncooperative owner with the contractor complicating contract administration	15	2	5	3.7	7
Unrealistic contract duration	15	2	5	3.7	7
Dependency on imported materials	15	1	5	3.6	8
Repeated design change	15	2	5	3.6	8
Legal dispute between project participants	15	1	5	3.6	9
Excessive bureaucracy in the owner's administration	15	1	5	3.6	9
Inadequate investigations by the designer during the design phase	15	2	5	3.6	9
Delay in progress payments by the owner	15	2	5	3.6	10
Poor coordination by the owner with the various parties during construction	15	1	5	3.6	10
Inadequate communication between owner and designer during the design phase	15	2	5	3.6	10
Owner's failure to coordinate with government authorities during planning	15	1	5	3.6	10
Under estimating activity duration	15	2	5	3.6	10
Delay in furnishing and delivering the site to the contractor	15	2	5	3.5	11
Accidents during construction	15	1	5	3.4	11
Suspension of work by the owner's organization	15	2	4	3.4	12
Lack of proper defining project goal, scope and requirements (planning & scoping) of the project, which is later manifested in many change orders, redesigns and reworks	15	2	5	3.3	13
Inadequate definition of project complete requirements	15	2	5	3.2	13

Source: own survey (2018)

4.5.2 Factor of Contractor related delays

The study further revealed the causes of delays that are contactor related and the following were the results as presented in Table 4.13 below shows that ranked the results of survey analysis of factors of contractor t related delays. Based on the ranking (R) of the weighted average of the mean item score (MIS) for the listed causes of delays, it was observed that the most dominant cause of delays that are client related on construction project delivery on time in Lideta Lemate school building project top ten important contractor related delay factors deficiencies in activity sequencing with a mean score of 5, inadequate contractor experience with a mean score of 4.75 , inaccurate cost estimates, and inaccurate time estimates the same effect with a mean score of 4.75, inadequate construction tools and poor site management and supervision the same effect the same effect with a mean score 4.5, under estimating activity duration with a mean score 4.5, unreliable subcontractor with a mean score 4.37 and dependency on imported materials with a mean score 4.25.However the studies of Wei (2010) and Hasseb et al (2011) identified delays in sub-contractors work as the major cause of contractor related causes of delays.

Table 4.13: Factors influencing time overruns from point view of contractor factors

Factor of Contractor related delays	N	Minimum	Maximum	Mean	Rank
Deficiencies in activity sequencing	8	5	5	5	1
Inadequate contractor experience	8	4	5	4.75	2
Inaccurate cost estimates	8	4	5	4.75	2
Inaccurate time estimates	8	4	5	4.62	3
inadequate construction tools	8	4	5	4.62	3
Poor site management and supervision	8	4	5	4.62	3
Poor site management and supervision	8	4	5	4.5	4
Under estimating activity duration	8	4	5	4.5	4

Unreliable subcontractor	8	4	5	4.5	4
Dependency on imported materials	8	3	5	4.37	5
Incompetent project team	8	3	5	4.25	6
Repeated design change	8	2	5	4.25	6
Price escalation	8	2	5	4.25	6
Inadequate and slow supply of materials	8	3	5	4.12	7
Shortage of construction materials in the market	8	2	5	4.12	7
Inappropriate construction methods	8	1	5	4.12	7
Late in revising and approving design	8	1	5	4.12	1.3562
Inadequate communication between owner and designer during the design phase	8	2	5	4.12	0.991
Inadequate and unclear details in drawings	8	2	5	4.12	77
Improper project planning and scheduling	8	1	5	4	8
Inadequate contractor experience	8	1	5	4	9
inadequate definition of project complete requirements	8	1	5	3.87	10
Shortage of Materials in the Market	8	1	5	3.75	11
Lack of proper defining project goal, scope and requirements (planning & scoping) of the project, which is later manifested in many change orders, redesigns and reworks	8	2	5	3.75	11
Accidents during construction	8	1	5	3.62	12

Inadequate investigations by the designer during the design phase	8	1	5	3.37	13
Lack of complete definition of project scope	8	1	5	3	14
Valid N (listwise)	8				

Source: own survey (2018)

4.5.3 Factor of consultant related delays

When the respondents were asked to rate the consultant related causes of construction project delays in Lusaka, the following results were obtained as shown in table 4.14 below shows that ranked the results of survey analysis of factors of consultant related delays. Based on the ranking (R) of the weighted average of the mean item score (MIS) for the listed causes of delays, it was observed that the most dominant cause of delays that are client related on construction project delivery on time in Lideta Lemate school building project top ten important consultant delay factors delays in performing inspection and testing by the consultant engineer with a mean score 4.4, under estimating activity duration with a mean score 4.3, late in revising and approving design with a mean score 4.15, inadequate investigations by the designer during the design phase with a mean score 4.00, inadequate communication between owner and designer during the design phase and deficiencies in activity sequencing the same effect with a mean score 3.92 , repeated design change with a mean score 3.84, inadequate design specifications with a mean score 3.76, shortage of construction materials in the market with a mean score 3.69, Poor contract management and delay in the approval of contractor submissions by the consultant the same effect with a mean score 3.61.

Whilst, the studies of Sambasivan and Soon (2007) and Hasseb et al (2011) identified contract management by consultants as the major cause of delays of construction projects in their study. Further, Motaleb and Kishk (2010) identified that inadequate consultant experience was the major cause of delays associated with consultants in their study.

Table 4: Factors influencing time overruns from point view of consultant

consultant related factors	N	Minimum	Maximum	Mean	Rank
Inadequate consultant experience	13	3	5	4.4615	1
Under estimating activity duration Delays in performing inspection and testing by the consultant engineer	13	3	5	4.3077	2
Late in revising and approving design	13	2	5	4.1538	3
Inadequate investigations by the designer during the design phase	13	3	5	4	4
Inadequate communication between owner and designer during the design phase	13	2	5	3.9231	5
Deficiencies in activity sequencing	13	2	5	3.9231	5
Facing Unforeseen conditions (such as hard rock)	13	2	5	3.8462	6
Repeated design change	13	2	5	3.8462	6
Inadequate design specifications	13	2	5	3.7692	7
Shortage of construction materials in the market	13	2	5	3.6923	8
Legal dispute between project participants	13	2	5	3.6923	9
Poor contract management	13	2	5	3.6154	10
Delay in the approval of contractor submissions by the consultant	13	2	4	3.6154	10
Lack of complete definition of project scope	13	2	5	3.6154	10

Lack of proper defining project goal, scope and requirements (planning & scoping) of the project, which is later manifested in many change orders, redesigns and reworks	13	2	5	3.5385	10
Delays in performing inspection and testing by the consultant engineer	13	2	4	3.5385	10
Poor communication between the other parties involved consultant engineer and contractors	13	2	4	3.5385	10
Accidents during construction	13	2	5	3.4615	11
Inadequate and unclear details in drawings	13	2	5	3.4615	11
Dependency on imported materials	13	2	5	3.3846	12
Poor planning and coordination by the consultant engineer with other parties involved	13	1	4	3.3846	12
Delay in the preparation of drawings	13	2	4	3.3846	12
Poor qualification of consultant engineer's staff assigned to the project	13	2	4	3.3077	13
inadequate definition of project complete requirements	13	2	4	3.3077	13
Slow response from the consultant engineer to contractor inquires	13	2	4	3.1538	13
Valid N (listwise)	13				

Source: own survey (2018)

4.6 Effects of Construction Delay

The results were also analyzed by using SPSS to calculate the mean score of each factor. The mean score of the factors were ranked in descending order according to the scale chosen by the respondents. The factors with the highest mean score were considered to be the most severe.

Table 4.15: Reliability of effects variables

Cronbach's Alpha	N of Items
.877	9

Table 4.16: Shows Mean score and ranks of effects of construction delays.

Effect of delays	N	Minimum	Maximum	Mean	rank
Create stress on contractors	36	1	5	3.2	1
Disputes	36	1	5	3.2	1
Total abandonment	36	1	5	3.0571	2
Time overrun	36	1	5	3.0571	2
Litigation	36	1	5	2.8286	3
Acceleration losses	36	1	5	2.8286	3
Bankruptcy	36	1	5	2.7143	4
Cost overrun	36	1	5	2.7143	4
Arbitration	36	1	5	2.6857	5
Valid N (listwise)	36				

Source: own survey (2018)

Discussion

1. **Acceleration of losses**

When construction projects are delayed, the organization losses a lot of money and time in terms of increase cost and not being able to meet with its customers demand.

2. Cost overrun

This is one of the most common effects of construction delays. Delay in construction might lead to an increase in price of construction materials as well as price of labor.

3. Time overrun

Delay will cause the project to fall behind schedule. This is detrimental to the owner because he might not be able to meet up with his objectives on time.

4. Disputes

Conflict will arise amongst project participants as to who will bear the responsibilities as a result of the delay.

5. Bankruptcy

When construction projects are delayed possibly due to finance, the organization will utilize most of its assets in order to complete the projects. If the delay persists, in attempt to finish the project, the company may run out of cash.

6. Litigation

If there is no agreement amongst the project participants as to who will bear the responsibilities of the project delay, either of them may file a law suit against each other.

7. Total Abandonment

Prolong project delay might lead to abandonment by the owner or contractor. This may be due to inadequate finance or expertise to successfully complete the project.

8. Create stress on contractors

When construction projects are delayed possibly due to finance, experience and low availability of construction tools and methods cause stress on contractors.

9. Arbitration

4.7 Ways of eliminating or mitigating the delays of Construction Delays

The data obtained from respondents were analyzed using SPSS by computing the mean score for each factor according to the respondent's responses. The mean scores were ranked from the highest to the lowest and represented on a statistical table. The mitigating factor that scored the

highest mean was considered to be a very highly effective means of eliminating risks associated with construction delay in the Lidet Lemate primary school building construction industry. This is showed on the table below.

Table 5: Reliability Statistics ways of eliminating or mitigating

Cronbach's Alpha	N of Items
.918	8

Table4.18: Ways of eliminating or mitigating factors due to construction delay

way of mitigation	**N**	**Minimum**	**Maximum**	**Mean**	**Rank**
Cross firms Incentive System	36	1	5	3.2571	1
Quality circles	36	1	5	3.2571	1
Automated Material Tracking	36	1	5	3.1143	2
Continuous trainings	36	1	5	2.9714	3
Collaborative Logistics	36	1	5	2.8286	4
Information sharing	36	1	5	2.8286	4
Performance-based Contracting	36	1	5	2.7429	5
Benchmarking	36	1	5	2.7429	5
Valid N (listwise)	36				

Source: own survey (2018)

Discussions

1. Information sharing

This involves exchange of information amongst the project stakeholders throughout the course of the project construction. This will play a very important role in minimizing the delay factors.

2. **Total Quality Management** The organization's management including the project participants to always strive to provide for their customers and clients the best quality products within the allocated time will greatly reduce the chances of delay..

3. Benchmarking

Information from already completed or ongoing projects should be used to compare the performance of the construction project in question.

4. Continuous training

Training in both onsite and offsite should be a continuous process in the project construction. This will add up to the employees' efficiency to perform their tasks within the shortest time possible without a fall in the quality of the job done.

5. Automated material tracking

Regular monitoring of the construction materials will easily signal when there is shortage. Thus this will reduce the risks of delay due to material shortages.

6. Early involvement of Contractor

Involving the contractor at the early stage of the project will give him enough time to plan recruit the best talents to work with him.

7. Collaborative logistics

All the project stakeholders should corporate in the transportation of construction materials from and to the site. It should not be left alone to the contractor. This will reduce the causes of delay due to late delivery of materials.

8. Cross firm incentive system

The incentive system should cut across all members of the organization and should be similar to what other firms are giving to their employees. With this system the employees will feel motivated to perform their tasks effectively.

CHAPTER FIVE
CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

The aim of this research is analyzing the major causes of project delay, to analyze different delay problems with their effect and presenting way of minimizing construction delay.

5.2 Discussion

Based on the results, the major factors that contributed to the causes of delays in building construction projects in Lideta sub city administration construction office delay in revising and approving design documents, delays in sub- contractors work, poor communication and coordination, change orders by owner during construction and inadequate contactor's work. Other factors include, delay in approving major changes in the scope of work, shortage of labors; ineffective planning and schedule in execution of project are among the findings. The results of research revealed that the site management and supervision, clear information and communication channels, collaborative working construction and proper project planning and scheduling can reduce the delay in building construction projects in Lideta Lemate School building project by contractors and consultants. The site management and supervision is the most important factor.

In construction projects, coordination among the various professionals, supervise construction quality and standard compliance will ensure that the contractors meets the required timetables, without attempting to take shortcuts or deviate from budgetary test to ensure that the material used are those agreed to the contract and they meet the standards.

Company as it will give the direction and measurement tools needed to be competitive in the industry. Among various type of construction, the influence of market pressure on the timing of initiating a facility is most obvious in industrial construction. In order to gain time, effective strategic planning is needed to precede the project without any major mistakes. Communication is essential when managing activities. Communication is the passing on of ideas and information, therefore site supervisor must ensure that their workers are able to understand his command before starts any site activities.

5.3 Conclusion

The main aim of this study was to determine the critical delaying factors in Lideta Lemate school building projects in Lideta sub city administration. This study has identified critical delaying factors and main problems faced by most of the Lideta sub city administration construction office. A literature review and questioners with professionals from the Lideta sub city administration was conducted. A total of 59 critical delaying factors were tested and divided into four groups. The top most critical delaying significant factors were concluded through ranking results based on the view of client, owners and contractors. Delays are inevitable; however, they can be avoided or minimized when their causes are effectively identified and analyzed. In summary, delays in construction projects are a widely researched area for which more researches are constantly being carried out. Due to the wide coverage of construction projects in terms of size, type, geography and so on, there is still the need to investigate the causes and assess the effect of delays on various construction projects at various levels. This may eventually lead to the much needed development in the industry.

The consequences of building construction projects are always negative thus delay should be avoided at all cost. To avoid construction delays, it is imperative for project participants to first of all identify the possible factors that can cause delay and label them as critical success factors. Once these factors have been identified, suitable preemptive measures can also be put in place to counter the negative effects that may arise as a result of their occurrence. For this reason, this researcher sought to analyze the construction of Lideta Lemate school building projects in Lideta sub city to address the inefficiencies in the system and prescribe some solutions to mitigate them.

Literature review showed that the causes of delays are at different level ranging from those caused by the contractor, consultant and client or owner to those that are caused by other external factors. Literature also showed that each category of causes of delays had different factors that can lead to delays on construction projects. This study examined causes of construction project delays from the four identified categories as compiled from an extensive literature review.

The study identified the critical success factors of construction projects. The results of this study suggest that the following ten factors critically cause of Lideta Lemate school building construction project delays factors are change in scope of the project, inadequate communication between owner and designer during the design phase, lack of complete definition of project

scope and delay in issuing of change orders by the owner, in scope of the project and inadequate and unclear details in drawings, late in revising and approving design, deficiencies in activity sequencing, owner's poor communication with the construction parties, slow decision-making by the owner's. deficiencies in activity sequencing, inadequate contractor experience, inaccurate cost estimates, inaccurate time estimate, Conflicts between joint-ownership of the project, inadequate construction tools , poor site management and supervision, under estimating activity duration, unreliable subcontractor, dependency on imported materials ,shortage of construction materials in the market, price escalation, facing unforeseen conditions (such as hard rock), Legal dispute between project participants and accidents during construction. Based on the above finding delays factors cause affect all project parties. Those effects are creating stress on contractors, disputes, total abandonment, time overrun, cost overrun and acceleration losses.

Finally the most effective measures of eliminating delays in construction were; information sharing, total quality management, quality cycles, benchmarking, joint risk management, continuous trainings, automated material tracking and early involvement of contractor and subcontractors. Most of the findings are related to Mohamed Babikir Ibrahiem Mohamed(2015) identified that the cause, effect and mitigation way of delays associated with consultants in their study.

5.4 Recommendations

The following points are recommended to all parties in order to minimize and control time overruns in construction projects.

5.4.1 Clients or owner are recommended to:

1. Give attention on the right of way problem. Proper preliminary study about the project should be performed early. Before the construction starts the client has to fulfill all the necessary requirements for delivering the site. Failure to deliver the site will cause time overrun.

2. Determine the required duration of project and impose realistic duration to avoid time and cost overruns. Client recommended to have technical staff who is able to manage the different stages of any project and to follow the performance percentages, and also able to compare the actual performance with the planned one.

3. Giving sufficient time for bid documents such as technical specifications, drawings, bill of quantities and designing of the project and revising it in a good way. This is because any

discrepancy in bid documents will lead to disputes between projects parts and so delay may occur. Pay progress payment to the contractor on time because it impairs the contractors' ability to finance the work.

4. All managerial levels should be participated with sensitive and important decision-making. Minimizing change orders as possible as they can in order to avoid any time overruns. The communication and coordination between the stake holders also have to be improved to minimize time overruns.

5. These continuous training courses will lead to success performance through construction projects such as availability of resources as planned through project duration, availability of personals with high experience and qualification, proper quality of equipment and raw materials used in project. In addition, training system will assists for improvement of construction time performance.

5.4.2 Contractors are recommended to:

1. Use advance payment properly to eradicate the financial problems. It is advised to conduct breakeven analysis from time to time.

2. Use modern technology tools, construction methods, skilled and experienced man power to perform his work according to the specification and drawing.

3. Have a proper planning and good site management system in the different activities of the project so as to avoid any mistakes that may lead to rework of activities, resulting time overruns. Contractors are advised to setup stores for required construction materials, and especially that are scarce or that are in limited quantity in the markets to avoid time overruns.

4. Carry out planning and scheduling: they are continuing processes during construction and match with the resources and time to develop the work to avoid time overrun. Site management and supervision: administrative and technical staff should be assigned as soon as project is awarded to make arrangements to achieve completion within specified time with the required quality, and estimated time.

5. Contractors are recommended to minimize waste rate through project implementation in order to improve cost performance. They should be more interested with conformance to project specification to overcome disputes, time and cost performance problems. Quality materials

should be more interested with contractors to improve cost, time and quality performance. This can be done by applying quality trainings and meetings which are necessary for performance improvement.

5.4.3 Consultants are recommended to:

1. Continuous coordination and direct communication with contractors and clients, which will eliminate design discrepancies and errors as well as omissions in design and also provide an opportunity to review the contract documents thoroughly. This would help in eliminating change orders or variations due to discrepancy in contract documents.

2. Hire a qualified technical staff to manage the project in a good way, so he would be able to overcome any technical or management problems that happen. It is also advised for consultant to have high qualification to give suitable instruction in a suitable time and to be able to answer any question stated by contractor to avoid time and cost overruns. They nhave to Review and approve design documents, shop drawings, and the payments of contractor to avoid any delay or cost overruns at the project.

3. Adopt efficient information distribution systems to guard against communication gaps; respond as quickly as possible to contractor and client questions and requests for clarification to avoid associated delays and confusions which consequentially will lead to time and cost overrun.

4. Consultants should be more interested with design cost by using multi criteria analysis and choosing the most economic criteria in order to improve their performance and to increase owner's satisfaction and facilitate and quicken orders delivered to contractors to obtain better time performance and to minimize disputes and claims.

References

AbdMajid, M.Z. and McCaffer, R. (1998) Factors of nonexcusable delays that influence contractor's performance. *Journal of Management and Engineering*.

AbdissaDessa, (2003), "claims in Ethiopian construction Industry". Addis Ababa

AbdoAbatemam,(2006),Delay in public building construction projects and their consequence, MSc thesis, Addis Ababa.

Acharya, N.K., Lee, Y.D., Kim, S.Y. and Lee, J.C. (2006). Analysis of construction delay factor: A Korean perspective. *Proceedings: The 7th Asia Pacific Industrial Engineering and Management Systems Conference*. Bangkok, Thailand.

Aibinu, A. and Jagboro, G. (2002). The effects of construction delays on project in Many countries construction industry. *International Journal of Project Management*.

Aibinu, A. A., and Odeyinka, H. A., 2006, Construction delays and their causative factors in Nigeria, Journal of Construction Engineering and Management.

Al-Khalil, M.I. and Al-Ghafly, M.A. (1999).Important causes of delay in public utility projects in Saudi Arabia.*Construction Management and Economics*.

Al-Kharashi, A., and Skitmore, M., 2009, Causes of delays in Saudi Arabian public sector construction projects, Journal of Construction Management and Economics.

Assaf, S. A., Al-Khalil, M. and Al-Hazmi, M., Causes of delay in large building construction projects, Journal of Management and Engineering, 1995.

Assaf, S. A. and Al-Hejji, S., Causes of delay in large construction projects, International Journal of Project Management, 2006.

Assefa, "School of Graduate Studies Faculty of Technology Department of Civil Engineering Time – Cost Relationships for Public Road Construction Projects in Ethiopia Time Cost Relationships for Public Road Construction Projects in Ethiopia," no. May, 2008.

Arditi, D., Akan, G. T., and Gurdamar, S., 1985, Reasons for delays in public projects in Turkey, Construction Management and Economic.

Bernard Ogweno<<Determinants of Timely Completion of Road construction Projects Financed by Kenya Roads Board In Kisumu County>>, Vol. IV, Issue 11, November 2016.

Faridi, A. S., and El-Sayegh, S. M., 2006, Significant factors causing delay in the UAE construction industry, Journal of Construction Management and Economics.

Fugar, F.D. and Agyakwah-Baah, A.B. (2010).Delays in building construction projects in Ghana.*Australasian Journal of Construction Economics and Building*.

Hamzah N, Khoiry M, Arshad I, Tawil N, CheAni A. Cause of construction delay-theoretical framework.Procedia Engineering 2011.

Kaliba, C, Muya, M &Mumba, K. (2009).Cost Escalation and Schedule Delay in Road Construction Projects in Zambia, International Journal of Project Management.

Koushki, P.A., Al-Rashid, K. and Kartam, N. (2005). Delays and cost increase in the construction of private residential projects in Kuwait. *Construction Management and Economics*.

Kaming Peter, Olomolaiye Paul, Holt gary, and Harris Frank C., 1997, Factors influencing construction time and cost overruns on high-rise projects in Indonesia, Journal of Construction Management and Economic.

Lo, T. Y., Fung, I. W. H., and Tung, K. C. F., 2006, Construction delays in Hong Kong civil engineering projects, Journal of Construction Engineering and Management.

Memon A.H., RahmanI.A., Ismail,I.,andZainun N.Y.(2014).Time management practices in Large Construction Projects.

Mahdavinejad, M. and Molaee, M. (2011).The result of delayed projects on publics' satisfaction in Tehran. Paper presented at *2nd International Conference on Construction and Project Management IPEDR*. Singapore

Ministry of Finance and Economic Development (MoFED), Development Planning and Research Department. Ethiopia: The Millennium Development Goals (MDGs) Needs Assessment Synthesis Report. (December 2010). Addis Ababa.

Nega, F., 2008. Causes and Effects of Cost Overrun on Public Building Construction Projects in Ethiopia. Master Thesis, Addis Ababa University, Civil Engineering Department, Addis Ababa, Ethiopia.

OdehAbdalla and BattainehHussien T., 2002, Causes of construction delay: traditional contracts. Inter P. Mo, R. J. Orr, and J. Lu, "Addis Abbaba Ring Road Project: A Case Study of a Chinese Construction Project in Ethiopia," Int. Conf. Multi-National Constr. Proj, 2008.national Journal of Project Management.

PMBOK (2000) A guide to Project Management Body of Knowledge, project management Institute, Newton square Pennsylvania, USA.

Scott,S.,(1993) "The nature and effects of construction delays", Construction Management and Economics.

Sweis, G., Sweis, R., Abu Hammad, A. and Shboul, A. (2008) 'Delays in construction projects: The case of Jordan', *International Journal of Project Management* **26** (6) 665-74 Wahab KA (1997) 'Improving efficiency in the building sector', *West Africa Tech Rev,* 81–9.

Tadesse A.,Dakhli Z.,Lafhaj (2016).Assessment on Performance and Challenge of Ethiopian Construction Industry, Journal of Architecture and Civil Engineering.

T. Zewdu and G. T. Aregaw, "Causes of Contractor Cost Overrun in Construction Projects : The Case of Ethiopian Construction Sector," Int. J. Bus. Econ.Res.

Trauner, T.(2009).Types of Construction Delays. Available at: http://www.downloadit. org/learningresources.php?promoCode=&partnerID=&content=steowery&storyID=1581e.

Toor S.R, Ogunlana O.S. (2008) Problem causing delays in major construction projects in Thailand. Construction Management and Economics.

Annexes

Annex-A-1: Survey Questionnaire

Addis Ababa University College of School of Commerce Business and Economics Masters of Art in Project Management

Survey Questionnaire

For client, contractor and consultant

Dear Participant,

My name is Tibebu Argaw, I am MA student in Project management Addis Ababa University School of Commerce. As part of my MA project work, research as partial fulfillment of the requirements for the Master's Degree in Project Management (MPM). The topic of the research that I am conducting is, **Cause of delay in the construction project in Lideta Limate primary school project implemented** by Lideta sub city administration construction office.

The purpose of this study is to investigate the problems related to the causes of delay in by Lideta sub city administration construction office; Lideta Limate primary school project. To successfully undertake this research it is mandatory to look into the issues from different perspectives by involving professionals who have experience in construction project. I would like confirm you that your information will be strictly kept confidential and used for only for academic research purpose. I thank you for your invaluable time scarification and patience to complete all questions and returned back on time.

Sincerely!

TibebuArgaw

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Section. 1; General Instruction and information:

The questioner has close-ended and open ended questions please indicate the extent to which you select the correct your expectation answer with the following statements by putting "X" on the box which most accurately reflects your opinion. There is no right or wrong answer assuring you that all responses will be uses only as an input for this study.

Part one: - General Information

1. Age A.20-25 ☐ B. 26-30 ☐ C. 31-35 ☐ D. 36-40 ☐ E. 41-45 ☐
   F. 46-50 ☐ F. 51-55 ☐ G. 56-60 ☐ H. Above 60 ☐
2. Sex A. Male ☐ B. Female ☐
3. Level of Education: A. Below grade 12 ☐ B. Certificate ☐
   C. Diploma ☐ D. Degree ☐ E. Postgraduate (MA/MSC) ☐
   F. Others ☐ please specify,_____
4. Years of work experience A. Below 2 years ☐ 3-5 Years ☐ -10Years ☐
   D. 11-15 Years ☐ E. Above 15 Years ☐
5. Your present responsibility A. project managers ☐ B. Project Officer ☐
   C. Project contract worker ☐ D. Project Supervisor ☐
   E. Project consultant ☐ F. Other……..

Part two: General Questions: Assessment of Degree of Causes of Delay

Instruction: Tick in the box provided in front of each suggested delay factors in accordance of your agreement /opinion as the causes of project delay.

Pleas tick the box with proper box or fill the proper number the following questions are factors affect and effect the construction of Lideta Lemate primary school building project, give the correct answer based on your experience in your project office.

5 – Strongly Agree	4 – Agree	3 – Neutral
2 – Disagree	1-Strongly Disagree	

And the elimination or mitigation ways of delays

Very highly effective (5	Highly effective (4)	Effective (3)
Lowly effective (2)	Very lowly effective (1)	

Variables Both Client , Contractors And Consultant Related	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1
BOQ1.Inadequate definition of project complete requirements.					
BOQ2.Lack of complete definition of project scope.					
BOQ 3.Under estimating activity duration					
BOQ4 . Deficiencies in activity sequencing					
BOQ 5. Lack of proper defining project goal, scope and requirements (planning & scoping) of the project, which is later manifested in many change orders, redesigns and reworks.					
BOQ.6Inadequate and unclear details in drawings					
BOQ 7.Inadequate communication between owner and designer during the design phase					
BOQ 8.Inadequate investigations by the designer during the design phase					
BOQ 9. Repeated design change					
BOQ 10. Late in revising and approving design					
Client related					
Cle11.Delay in furnishing and delivering the site to the contractor					
Cle12.Unrealistic contract duration					
Cle13. Delay in the settlement of contractor claims by the owner					
Cle14. Suspension of work by the owner's organization					

Cle15. Delay in issuing of change orders by the owner					
Cle16. Slow decision-making by the owner's organization					
Cle17.Interference by the owner in the construction operations					
Cle18. Uncooperative owner with the contractor complicating contract administration					
Cle19.Delay in progress payments by the owner					
Cle20.Owner's poor communication with the construction					
Cle21.Owner's failure to coordinate with government authorities during planning					
Cle22. Poor coordination by the owner with the various parties during construction					
Cle23.Excessive bureaucracy in the owner's administration					
4. Contractor Related					
Con24.Inadequate contractor experience					
Con25.Inappropriate construction methods					
Con26.Inaccurate time estimates					
Con27.Inaccurate cost estimates					
Con28. Poor site management and supervision					
Con29.Improper project planning and scheduling					
Con30. Incompetent project team					
Con31. Unreliable subcontractor					
Con32 Inadequate and slow supply of materials					

5. Consultant Related					
Cons34.Poor qualification of consultant engineer's staff assigned to the project					
Cons35. Delay in the preparation of drawings					
Cons36.Delay in the approval of contractor submissions by the consultant					
Cons37.Poor communication between the other parties involved consultant engineer and					
Cons38.Poor planning and coordination by the consultant engineer with other parties involved					
Cons39.Delays in performing inspection and testing by the consultant engineer					
Cons40.Slow response from the consultant engineer to contractor inquiries					
Cons41.Inadequate design specifications					
Cons42.Poor contract management					
6. Effects of construction delays.	Degree of Agreement				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
	5	4	3	2	1
43..Acceleration losses					
44.Cost overrun					
45.Time overrun					
46.Disputes					
47.Negative social impact					
48.Litigation					
49.Bankruptcy					

50.Total abandonment					
51.Acceleration losses					
6. Ways of eliminating or mitigating factors due to construction delay	Degree of Agreement				
	Very highly effective (5)	Highly effective (4)	Effective (3)	Lowly effective (2)	Very lowly effective (1)
52.Information sharing					
53.Total Quali**t**y Management					
54.Quality circles					
55.Benchmarking					
56.Joint Risk Management					
57.Continuous trainings					
58.Automated Material Tracking					
59. Performance-based Contracting					