



ADDIS ABABA UNIVERSITY
COLLEGE OF BUSSINESS AND ECONOMICS
SCHOOL OF COMMERCE

ASSESSMENT OF COST AND SCHEDULE PERFORMANCE ON AACRA PROJECTS:
THE CASE OF SHIROMEDA – HAMERENOH KIDANEMIHIRET ROAD
CONSTRUCTION PROJECT

BY

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JULY 2019

ADDIS ABABA, ETHIOPIA

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BY

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**A RESEARCH PROJECT SUBMITTED TO ADDIS ABABA UNIVERSITY FACULTY
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Approval Page

**Assessment of cost and schedule performance on AACRA projects: the case of Shiromeda –
Hamerenoh Kidanemihiret road construction project**

By

Benyam Getahun

Approved by the Board of Examiners

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Statement of Declaration

I, **Benyam Getahun Negash**, hereby declare that the project research entitled: “**Assessment of cost and schedule performance on AACRA projects: the case of Shiromeda – Hamerenoh Kidanemihiret road construction project**” has been carried out by me under the guidance and supervision of Dr. Adane Atara.

I also declare that all materials and Sources used for this project research have been duly acknowledged. The work had not been submitted to any educational institutions for the requirement of any award.

Benyam Getahun Negash

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Date _____

Statement of Certification

This is to certify that **Benyam Getahun** has carried out this research project work on the topic entitled “Assessment of cost and schedule performance on AACRA projects: the case of Shiromeda – Hamerenoh Kidanemihiret road construction project” under my supervision. This work is original in nature and it is sufficient for submission for the partial fulfillment for the requirements of the award of Masters of Art in Project Management.

Adane Atara (PHD)

Signature _____

Date _____

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Abbreviations

AACRA: Addis Ababa City Roads Authority

BOFED: Bureau of Finance and Economic Development of Addis Ababa

PHD: Doctor of Philosophy

PM: Project Management

PMBOK: Project Management Body of Knowledge

PMI: Project Management Institute

ROA: Right of Way

SPSS: Statistical Package for Social Sciences

Abstract

The purpose of this study is to assess the cost and schedule performance of a road construction project with particular emphasis to the Shiromeda – Hamerenoh Kidanemihiret road construction project held by AACRA. To address the two major issues of cost overrun and schedule delay, both primary and secondary source of data were used. Both close ended and open ended questions were included on the questionnaire while the interview was unstructured, these two were used as a primary source of data. Different texts, articles, journals and dissertations were used as a secondary source of data. Census inquiry was used to distribute the questionnaire. Out of the total 47, 44 questionnaires were filled and collected. In addition to the questionnaire 3 people were interviewed: the project manager, site engineer and another top level manager who are members of AACRA. The data obtained through questionnaire has been analyzed quantitatively using descriptive statistics namely frequency and percentages through SPSS version 20. In addition, the data obtained using interviews has been analyzed qualitatively. The findings of research are that the major causes of cost overrun and schedule delay include: Right of way (Weaknesses during the land takings process), poor project implementation strategies, duration of the period of bidding, Supervisor and contractor claims and disputes, delay of material delivery and, negligence of past experiences. As a result, some recommendations have been delivered under this study on what actions should be taken to tackle the major problems of cost overrun and schedule delay.

Key words: Cost overrun, Schedule delay, Project, Performance, AACRA

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

Construction project is a mission undertaken to create a unique facility, product or service within specified scope, quality, time and cost (Chitkara, 2004). Road is one of the most important construction projects and it has a great impact on the economy of all countries. It is not uncommon to see road construction projects exceed their budget and failing to achieve their mission of creating facilities within specified cost and time.

Road construction, plays a significant role in realizing economic development and for the expansion of investment. The role of construction of roads is crucial for sustainable development. Road development is also essential with the perspective of saving of time, minimizing traveling expenses and improving services in trade, education and health sectors. For the realization of sustainable social and economic development, building new roads, maintaining and upgrading of the existing ones is vital (BOFED, 2002).

Studies undertaken in the construction sector shows that road construction faces numerous challenges (Fans and Chang-Kang.C, 2005). A surprising number of the challenges are not construction issues but must be addressed and managed by the Project manager to ensure project success.

Although the aim of a project manager is to achieve success in all the different aspects of the project, the manager of a typical project would consider the task well done if the project is finished on time, according to its specified performance and within its budgeted cost. These three objectives; time, performance and cost are traditionally the basic parameters for measuring project success or failure (Lock, 2007).

Delay and cost overrun are inherent part of most projects despite the much acquired knowledge in project management. 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 (Buys, 2015).

Addis Ababa City Roads Authority is responsible for administration and construction of Asphalt surfaced and gravels surfaced Roads at the capital of Ethiopia. The authority has been responsible for undertaking and administering road construction projects since 1998 E.C. 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 (Tigist 2017).

1.2. Statement of the problem

The initiation for the study of this research is largely due to personal observation of the considerable cost overrun and delays in completion of road projects undertaken in Addis Ababa and the reworks and performance problems on the roads constructed.

Most construction projects in Ethiopia suffer time and cost overrun, (Nega, 2008). It is obviously known, Addis Ababa is the capital city of our country, political city of Africa and center of International organizations. Therefor the city demands a highly growing infrastructural development. Among the developments desired at all corners of the city is construction of standard asphalt roads.

A study ‘Analysis of factors to time over run on Addis Ababa City Roads Authority’ conducted by Siraw (2011) revealed that Addis Ababa City Roads Authority was short of achieving what was planned in all Ethiopian calendar years between 2000 and 2005 and 80 percent of the projects suffered time overrun.

Information from Addis Ababa City Road Authority Projects’ Progress and completion report indicates that 330 days was the planned project time for Shiromeda – Hamerenoh Kidanemihiret road construction project, while it took 1048 days. This shows 217.58% of schedule delay. With regard to the cost of the project, the budgeted amount was 154,485,787.41birr while it actually reached 181,139,826.67birr. This means 17.25% of cost overrun occurred. In addition to this there may exist more overruns because the project is not yet completed.

From a preliminary interview conducted with the project coordinator and the project manager of Shiromeda – Hamerenoh Kidanemihiret road construction project, the researcher was able to identify that the project has faced around 200 % schedule delay and 20% cost overrun. The project manager indicated that the project is still in progress and that it's not yet finished which implies that the problem of cost overrun and schedule delay will continue till the end of the project. Due to this problem in Shiromeda – Hamerenoh Kidanemihiret road construction project held by AACRA and the gaps from the conducted researches on this area, the researcher was attracted to conduct this assessment on the project cost overrun and schedule delay in AACRA on the selected project.

1.3. Research objectives

General Objective

The general objective of this study was examining the cost and schedule performance of Shiromeda- Hamerenoh Kidanemihiret road construction project.

Specific objectives:

- To assess cost and time management practices of Shiromeda – Hamerenoh Kidanemihiret road construction project.
- To examine the cost performance of Shiromeda – Hamerenoh Kidanemihiret road construction project.
- To examine the schedule performance Shiromeda – Hamerenoh Kidanemihiret road construction project.
- To identify the causes of cost overrun and schedule delay in the process.

1.4. Significance of the study

Conducting this assessment has much significance for the student researcher as well as the organization under study. The student was able to know the actual project management practices of the organization with regard to cost and schedule management. The researcher has also used the research project as an opportunity to see how the theoretical knowledge acquired during the duration of the course is being implemented in reality.

The paper have great advantage for the organization under study because the study identified those causes resulting in cost overrun and schedule delay on the project. So this help them to see and take urgent action to fulfill the goals of the projects of AACRA.

Moreover, the outputs will help project management practitioners by showing in which points they should give due emphasis when they implement their projects and professionals will also be the beneficiaries of the result (output).

The study also can benefit scholars who would wish to undertake further studies aimed at assessing and identifying causes that can have great influence on road construction projects' cost and schedule performance.

1.5. Scope of the study

The scope of this research project is to carry out review on time and cost overruns of road construction projects. There are many causes that affect project performance. Among these Causes, this study mainly focuses on the causes of cost overrun and schedule delay on project performance. When road construction projects are performed, time and cost overruns arise due to different causes by stakeholders. These risen overruns need time and cost management requirements, such as preventive and resolution. If these overruns can be controlled smoothly, it can minimize wastage of resources. This project research, therefore, took this context into consideration to develop the preventive and resolution methods to come up with a researchable problem, its methodology together with identifying information sources for the project research. The researcher conducts a quantitative statistical analysis approach in order to answer the research questions and the target population were all professionals participated on Shiromeda – Hamerenoh Kidanemihiret road construction project.

1.6. Limitation of the study

This study was limited to Addis Ababa road projects, and considered Shiromeda – Hamerenoh Kidanemihiret road construction project, a single case in the authority. In addition, the initial construction contract amount was used as the basis for overrun measurements: for simplicity, engineering estimates were not considered. The study did not consider the award-estimate difference factor: only the award amount was considered.

1.7. Organization of the Research

This paper comprised five chapters in which the first part illustrates introduction, the background of the study, statements of the problem, objectives, significance, scope and limitation of the study. The second chapter concerned with theoretical and review of related literature of the study. The third chapter describes research design and methodology of the study and the analysis used. Results and discussion would be discussed in the fourth chapter. Finally the last chapter deal with the research major findings, conclusion and recommendations.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1. Project

Many definitions had been given to project by different authors, due to the fact that project is a multidisciplinary word that has different meaning from different perspective and orientations. Engineers, Architects, Managers and so on, have their definitions coined out from their experiences as far as their professions are concerned. Their definition depends on their areas of studies and the point of view that each scholars used. But to have comprehensive understanding of a project, it is better to refer different definitions. Eric Verzuh (2005:1 cited in Modesto & Tichapondwa, 2009:P19) stated "we live in a world where change and the rate of change is constantly increasing. In order to survive and prosper, organizations need to continually modify their products and services. Projects are the means by which these innovations are effected. Greater change = more innovations = more projects." In this context, Verzuh see project as a means to cop up with changes. Accordingly, Modesto & Tichapondwa (2009:P20) define project as initiative to bring about change in order to achieve specific objectives, within a timescale, in a given context with allocated budget.

The Project management Institute (2013: P3) define project as a temporary endeavor undertaken to create a unique product, service, or result. In this study, the PMI's definition of project is used as an operational meaning. Larson and Grey (2011: P5) stated, "Like most organizational effort, the major goal of a project is to satisfy a customer's need. Beyond this fundamental similarity, the characteristics of a project help differentiate it from other endeavors of the organization". The definition is given based on two key characteristics of project. All projects are temporary and undertaken to create a product, service, or result that is unique. These two simple concepts create a work environment that mandates different management approach from that used by an operations manager, whose work is oriented toward continuous improvement of existing processes over longer periods of time.

In contemporary business and science, Wikipedia (2015) defined a project as a collaborative enterprise involving research or design that is carefully planned to achieve a particular aim.

Project can be further defined as temporary rather than permanent social system or work systems that are constituted by teams within or across organizations to accomplish particular tasks under time constraints. An ongoing project is usually called (or evolves into) a program (Wikipedia, 2015).

Many other scholars and books prefer to define and explain project by describing the common characteristics of projects instead of giving a direct definition so that anyone can define project by integrating these features of projects. Different scholars provide the unique features of projects. Nicholas and Steyn (2008) provide comprehensive characteristics of projects. The following section is the discussion on these characteristics.

2.1.1. Characteristics of a Project

Regardless of specific features of particular projects, below are some common characteristics forwarded by Nicholas and Steyn (2008: Pxxvi) for all projects:

1. A project involves a single, definable purpose and well-defined end-items, deliverables, or results, usually specified in terms of cost, schedule, and performance requirements. Larson & Grey (2011: P6) stated that this singular purpose is often missing in daily organizational life where employees carry out repetitive operations daily.
2. Every project is unique in that it requires doing something different than was done previously. A project is a one-time activity, never to be exactly repeated again. Lock (2001:P2) discussed about the uniqueness of a project that "The principal identifying characteristic of any project is its novelty. It is a step into the unknown, fraught with risk and uncertainty. No two projects are ever exactly alike, and even a repeated project will differ from its predecessor in one or more commercial, administrative or physical aspects. "In a "routine" project such as home construction, variables such as terrain, access, zoning laws, labor market, public services, and local utilities make it unique.
3. Projects are temporary activities. Each is an ad hoc organization of personnel, material, and facilities assembled to accomplish a goal within a scheduled time frame; once the goal is achieved, the ad hoc organization is disbanded.
4. Projects cut across organizational and functional lines because they need skills and talents from multiple functions, professions, and organizations.

Larson & Grey (2011: P6) stated that instead of working in separate offices under separate managers, project participants, whether they be engineers, financial analysts, marketing professionals, or quality control specialists, work closely together under the guidance of a project manager to complete a project.

5. Given that each project is unique, it also involves unfamiliarity and risk.

It may encompass new technology or processes and, for the organization undertaking it, possess significant elements of uncertainty and risk.

6. The organization usually has something at stake when doing a project.

The work calls for special scrutiny or effort because failure would jeopardize the organization or its goals.

7. A project is the process of working to achieve a goal; during the process, projects pass through several distinct phases called the project life cycle. The tasks, people, organizations, and other resources involved in the project change as the project moves from one phase to the next.

2.1.2. Project Management

Project Management Institute, (2013: P5) defines Project management as an application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. Similarly, Chandra (1995) define Project management as an organized venture for managing projects, involves scientific application of modern tools and techniques in planning, financing, implementing, monitoring, controlling and coordinating unique activities or task produce desirable outputs in accordance with the determined objectives within the constraints of time and cost. This Chandra's definition of project management is used as operational meaning in this study. Project management is accomplished through the appropriate application and integration of the different logically grouped project management processes, which are categorized into five Process Groups. According to PMI (2013: P5), these five Process Groups are: Initiating, Planning, Executing, Monitoring and Controlling, and Closing. McNamara (2002: P1) stated that project management is a carefully planned and organized effort to accomplish a specific (and

usually) one-time effort, for example, construct a building or implement a new computer system. Project management includes developing a project plan, which includes defining project goals and objectives, specifying tasks or how goals will be achieved, what resources are need, and associating budgets and timelines for completion. It also includes implementing the project plan, along with careful controls to stay on the "critical path", that is, to ensure the plan is being managed according to plan. Project management usually follows major phases (with various titles for these phases), including feasibility study, project planning, implementation, evaluation and support/maintenance. (Program planning is usually of a broader scope than project planning, but not always.) Heerkens (2012: P11) Stated "The project management process calls for the creation of a small organizational structure (the project team), which is often a microcosm of the larger organization. Once the team has produced the desired outcome, the process then calls for the decommissioning of that small organizational structure."

2.2.Project Cost/Budget

Before starting any project we first need to ask how much the project is going to cost and how accurate the estimate is, both of which affect the outcome of any project. A realistic cost estimate is an important and significant factor for project success. If a project is lunched without having an accurate estimate it's bound to experience serious problems during the implementation phase. Having a budget is also an essential requirement of any projects, we need to aggregate the figures to produces a cost baseline and determine the projects' funding requirements (FME, 2014).

A budget is a clear picture of financial resources available to complete the project. No matter what type of organization and what type of projects we have, there will be a predetermined budget. When one undertakes different projects there is usually a delineated budget with in which one should complete the work of the project (Benator &Thumann, 2003).

The budget also serves as a standard for comparison, a baseline from which to measure the difference between the actual and planned uses of resources. When the project is being implemented the project manager can use the budget as a means of effective monitoring. This allows deviations from planned usage to be checked against the progress of the project, and reports can be generated if expenditures are not consistent with the project accomplishments.

Indeed, the pattern of deviation or variances can be examined to see if it is possible or reasonable, to forecast any significant departures from budget and hopefully take corrective actions (Meredith & Mantel 2009).

Determining the cost of a project requires a structured approach, but whichever method is used, the first thing is to decide the level of accuracy required, which depends on the status of the project and the information available. In many cases a client or sponsor requires only an approximate figure before deciding whether to proceed to the next stage. An estimate in such a situation does not have to be as accurate as an estimate for the final contract cost to which one is then committed. Estimating is an essential part of project management, since it becomes the baseline for subsequent cost control. If the estimate for a project is too low, a company may well lose (Lester, 2003).

Cost is one of the main considerations throughout a project's lifecycle and can be regarded as a significant parameter of a project and the driving force of project achievement. Project cost management includes the processes required to ensure that the project is completed within an approved budget. It is the process of ensuring that a project is completed within the approved budget and that cost variances are proactively managed throughout the project (Enas 2017).

2.2.1. What is cost overrun?

Definition

Cost overrun has been defined by different authors. I have presented here three definitions that are most relevant.

- **Cost overrun:** An instance in which the provision of contracted goods or services are claimed to require more financial resources than was originally agreed between a project and a contractor (User Guide, 2005)
- **Cost overrun:** The amount by which actual costs exceed the baseline or approved costs (Wideman, 2002)
- **Cost overrun:** The difference between the original cost and the actual cost when the project is completed (Avots, 1983)

For the purpose of this project research, cost overrun is defined as the difference between the final (actual) cost of construction project at completion and the original contract amount agreed by and between the client (the project owner) and contractor during signing of the contract.

In short cost overrun is the amount by which actual costs exceed the baseline or approved costs.

2.2.2. Causes of cost overrun

The causes of cost overrun on road construction project are varied, some are not only hard to predict but also difficult to manage. According to different studies, inflationary pressures, increase in material prices and workmen`s wages, difficulties on obtaining construction materials, construction delays, deficiencies in cost estimates prepared by public agencies, design changes, poor performance of contractors and unexpected sub soil conditions were the most important sources for cost overruns.

In addition to these deliberate underestimation, changes caused by unforeseen circumstances and inadequate cost management are also among the cause of cost overrun.

Stewart (1982), attributes cost overrun to several factors that are either not controllable or that to a varying degree unmanageable. They include the accuracy of original cost estimate, degree of government regulation and control, delays, number of design changes, and labor related matters such as their availability, skills and increases in fringe benefits.

According to Robert (2007), project owners identified five reasons for project cost overruns. These reasons were incomplete drawings, poor pre-planning process, escalating cost of materials, lack of timely decisions and excessive change orders.

Various studies have also shown that the size of a construction project influences the rate of cost overrun. For example large projects are generally more complex than small projects, and in large complex projects project studies are often not complete. Usually project studies documents of large and complex projects have missing and forgotten items. This leads to believe that the complexity and the size of projects may increase the rate of cost overrun.

Therefore, since the stakes are higher on large projects, more care is needed from conception of the project until completion of large projects.

As I discussed above factors that could influence construction costs are numerous. The construction project is a multidisciplinary activity and its work involves many parties such as the project owner and various professionals, contractors and suppliers. Thus, the total cost of a construction project does not depend only on a single factor but rather it depends on a cluster of variables that are related to the characteristics of the project and to the construction team as well as the market conditions.

However, it is possible to categorize those cost overrun factors as follows, and we must deal on these factors for the better performance of the construction industry:

- Poor project management.
- Construction cost underestimation.
- Force majeure
- Inappropriate/Inexperienced Contractors
- Shortage of construction materials and unexpected ground conditions.

2.2.3. Effects of cost overrun

Cost overruns have obvious effects on projects key stakeholders in particular, and on the construction industry in general. The various parties to a project contract do not necessarily have the same project goals and they have different understanding for project cost overrun.

- From the client point of view: cost overrun implies added costs over and above those initially agreed up on the onset, resulting in less returns on investment.
- To the end users: cost overrun is the added costs that is passed on as higher rental/lease cost or price.
- To the professionals: cost overrun implies inability to deliver value-for-money and could well tarnish their reputations and results in loss of confidence.
- To the contractor: it implies loss of profit through penalties for non-completion, and negative reputations that could jeopardize chances of winning other projects, if at fault.
- To the construction industry as a whole: cost overruns could bring about project abandonment and a drop in building activities, bad reputation, and inability to secure project finance or securing it at higher cost due to added risks.

Some researcher of the construction industry describe the effects of cost overrun in different ways. For example, Arditi (1985) stated that the effects of cost overrun are not confined to the construction industry but also reflected in the state of the overall economy of a country.

Similarly other researchers have signaled that delays and cost overruns in construction projects prevent the planned increase in property and service production from taking place, and this phenomenon in turn affects, in negative way, the rate of national growth.

Subramani et al. (2014), the study was based on the road projects in India. They found that inadequate project formulation, poor field investigation, bad cost estimates, poor planning during execution stage, inadequate equipment supply plan, lack of project management during the stage of execution, insufficient working, changes in scope of work, change of law and order were the major contributing factors for the cost overruns of road construction projects in India.

Abdullah (2013), The study was based on the 41 prime factors which were causing the overrun of cost in road projects, and conducted a survey to find out the most influencing factors. He concluded internal administrative problems, payment delays, poor communication between the project parties, delays in decision making were the most influencing factors for cost overrun.

2.2.4. How to minimize cost overruns?

As discussed above, cost overruns are common occurrence in road construction projects. I have tried to cover the causes and effects of cost overrun in the above paragraphs. In this sub topic, I will present some important measures that are important to minimize or prevent projects from having cost overruns according to (Ferew 2015).

A) Pay a lot of attention to project planning

Planning is the most essential component of project management and it is the biggest weapon against cost overruns. Think of all the major scenarios and flesh out the complete scope of the project before making any decision on project initiatives is necessary. Once the scope is defined, it is also essential to get a sign-off from all stakeholders.

B) Check a vendor`s capabilities before hiring

Before hiring the project to the vendor, find out their teams capabilities and check if that matches with the project requirements because improper skill set match can cause a significant drag on the projects. In addition, it should be mandatory to find out if the project cost estimates are realistic.

C) Use good scheduling tools and charts

Improper scheduling can cause wrong cost estimation and increase the idle times of the some of the team members, so could use a simple Gantt chart or look for more advanced project scheduling tools to help you with scheduling.

D) Constantly track and measure the progress

A project manager has to constantly track the progress of the various task and have various metrics to measure the project progress. This will provide early signal of projects cost overruns, while also giving opportunities to fix the issue.

2.3. What is a delay?

Many researchers have different definitions for “delay”; however, in this study delay is defined simply as “the inability to meet the scheduled time”. Bramble and Callahan (2000) defined delay as the time period during which some part of the construction project has been extended beyond the initial time, or the incident affecting the performance of an activity of the project. Delays are classified into two main types, excusable and non-excusable. By and large, excusable delays are those that are understandable by the parties and non-excusable are the opposing type (Colin and Retik, 1997). Trauner (2009) argues that there are two types of excusable delays; which are compensable and non-compensable. Compensable delays are usually where the contractor is reimbursed in time and cost. These are usually client initiated delays but the non-compensable are the opposite. Construction project delays can be attributed to a variety of reasons and could be initiated by any of the stakeholders on projects. Atkinson (1999) claims that construction projects are continuously described as failing. Sweis et al. (2008) insist that despite the advanced technology and project management techniques available to the practitioners, construction projects experience delays.

2.3.1. Causes of delay

Baldwin et al. (1971) is one of the early studies to clearly present the causes of delays in construction in the USA. They identified 17 delay factors where the top five were weather, labour supply, subcontractors, design changes, shop drawings and foundation conditions. This was followed with the study of Arditi et al. (1985) conducted in Turkey and 23 causes of delay were found. Top on their findings were shortage of materials, difficulty in receiving payments from agencies, contractor's difficulties to get loans and credit purchase, and organizational characteristics. Then in the UK, the study of Sullivan and Harris (1986) established 19 causes of delays, with waiting for information, variation orders and ground problems ranked highest. Since then numerous researchers have examined the causes of construction delays in various countries. Among the studies, Hamzah et al. (2011), Sweis et al. (2008) and Fallahnejad (2013) produced a critical review on the causes of delays observed in literature. Hamzah et al. (2011), and Sambasivan and Soon (2007) concluded their critical review on causes of delay by identifying the main causes; these include, poor planning, poor site management, financial issues, delay of material delivery and management problems. Although Lim and Mohamed (2000) did identify planning (project management) as one of the main problems in construction in Malaysia, they ranked lack of experience, lack of site supervision and lack of appropriate skills in this order as the main problems. Sweis et al. (2008) believed that these main causes can be grouped into three categories, which are, input factors (concerned with labour, material and equipment), internal environment (contractor, owner and consultants) and exogenous factors (weather and government regulations). Fallahnejad (2013) presented 19 study reviews including his study on causes of delays around the world.

Although, literature has indicated that delay is a universal issue within construction, empirical study in the UK on the causes of delay in the twenty-first century is sparse (McCord et al., 2015). Sullivan and Harris (1986) is one of the main studies in the UK on the causes of delay where large construction projects were examined. A recent questionnaire survey conducted within the housing sector in the Northern Ireland by McCord et al. (2015) identified deficiencies in site management, ineffective communication strategies and a lack of coordination between key stakeholders involved in the construction process as the key findings.

The questionnaire survey by Fallahnejad (2013, pp. 143-145) concluded that the ten most important causes of delay were “imported materials, unrealistic project duration, client-related materials, land exploration, change order, contractor selection methods, payment to contractor, obtaining permits, suppliers and contractor’s cash flow”. A similar questionnaire survey conducted by Sambasivan and Soon (2007, p. 526) in Malaysia also concluded with ten causes of delays. These were “contractors improper planning, contractor’s poor site management, inadequate contractor’s experience, inadequate client’s finance and payments for the work, problems with subcontractors, shortage of materials, labour supply, equipment availability and failure, lack of communication between parties, and mistake during construction stage”. From these studies, it can be inferred that inappropriate planning and poor project management are significant causes of delay. Another study conducted in Malaysia by Memon (2014) identified slightly different top factors from Sambasivan and Soon (2007). Memon (2014) established the following as the top factors: frequent design changes, change in the scope of the project, financial difficulties of owner, delays in decisions making and unforeseen ground condition. The difference between the findings of these two studies could arguably be the years the research was conducted. The study of Sambasivan and Soon was conducted in 2007, which was just before the global recession and that of Memon was in 2014 after the recession.

Sepasgozar et al. (2015) argues that a key cause of delay is the continuous use of outdated construction technologies. Hamzah et al. (2011) concluded that the reduction of delay is not only limited to the consideration of technical factors, but also to issues of project management. Agyekum-Mensah et al. (2012) and Hubbard (1990), among other researchers, claim that many problems within construction are due to lack of effective project management. Equally, Sweis et al. (2008) ascertain that there are major failings in the traditional approaches to project delivery. Despite all the advances in project management theory and practice, Hartman and Ashrafi (2004) claimed construction project success is still below 40 per cent. Shehu et al. (2014) claim that delay in Malaysia is mainly associated with financial problems by the contractor.

Sambasivan and Soon (2007) and Fallahnejad (2013) reviewed on causes of delays and concluded that improper planning is the most likely cause of delay, followed by poor site management. According to Sweis et al. (2008), responses from both consultants and clients ranked poor planning as the main cause of delay. According to Colin and Retik (1997),

construction schedule, regardless of type plays a vital part in managing the construction process. They claim that the schedule is vital in identifying, preparing, analyzing or refuting delay claims because they provide a specific medium for comparing and measuring time and meaning. Furthermore, they claim that the construction schedule is significant when it is applied to measure delays. Similarly study in Libya, Tumi et al. (2009) identified improper planning, lack of effective communication, design errors, shortage of supply, slow decision making and financial issues ranked highest. A review conducted by Memon (2014) identified 30 causes of delay.

2.4. Discussion on the major Causes Contributing to Cost Overrun and Schedule delay in each phases of project.

During this research, the factors were classified according to project cycle: phases of planning and programming, design process, bidding procedures, project implementation, project control, and *ex post* evaluation which helped to understand how time delays or mistakes during one phase, could affect others.

2.4.1. Planning and Programming Phases

Insufficient planning and programming of projects is one cause of cost overruns and delays. Poor planning methods or unplanned projects have a high risk of cost overruns or project failure. Anderson et al. (2008) identified right-of-way costs as a crucial factor of cost escalation in highway projects. Specifically, Flyvbjerg and co-authors pointed out the use of deception and lying, to be sources of cost overruns during transportation project planning. Under the influence of politicians, or to increase project stake-holders revenues and profits, project planners deliberately underestimate project costs and overestimate the potential benefits. Such a “strategic misrepresentation” will quickly convince decision makers to authorize projects, implying increased economic self-interest of consultants and contractors to the detriment of taxpayers or funding agencies. However, de-biasing cost estimates can lead to the problem of higher costs which would prevent projects from being undertaken and cause slow economic development (Merewitz, 1973). According to this point of view, “technical” optimism or low estimating would be better than correct cost estimating.

2.4.2. Design Process

At the project design stage, Jergeas (2009) pointed out poor project implementation strategies that impacted the actual costs of projects in Canadian mega oil sand projects. In Nigeria, Okpala and Aniekwu (1998) indicated that mistakes and discrepancies in documents caused cost overruns. Similarly from Jergeas' (2009) research, another factor is under-estimating. In South Korea, Jin-Kyung (2008) wrote that unreasonable underestimation in the adjustments of project costs caused overrun issues during implementation. Furthermore, Ajibade and Odeyinka (2006), Anderson et al. (2007), Creedy et al. (2010) presented the design process as a potential source of cost overruns and time delays in projects. For illustration, Sweet and Schneier (2009) presented the case *Stanley Consultants, Inc. v. H. Kalicak Construction Co.*, where the design professional of a sixty-one-unit housing project in Zaire (Now Democratic Republic of Congo, Africa) did not use Zaire's data during his studies. As a result, the only bid submitted was double that of the design cost estimate.

2.4.3. Bidding Phase

Site conditions need to be known by project counterparts at all phases, mainly during the bidding phase for contractors (Bramble and Callahan, 2000). Visits should be mandatory (Pratt, 2004). The consequences of misunderstanding due to lack of site visits are cost escalation or abandonment. A key factor outlined by Okpala and Aniekwu (1998) seems to be the period of bidding, which often takes a long time for highway projects in developing countries. Site conditions can change noticeably between the time of bidding and contract award.

Furthermore, the level of competition based on the number of bidders and the difference between low bids and engineering estimates impact construction cost overruns. Projects in which low bids are less than the engineering estimates are prone to increased cost overruns (Hinze and Selstead 1991). In South Korea, Jin-Kyung (2008) criticized the lowest bid price system where irrational estimating occurred by the winning contractor, who might not efficiently complete the contract.

2.4.4. Project Implementation

Merewitz (1973) presented inflation, which is not controllable by contract parties, as a factor in cost overruns. Unforeseen scope changes can also affect project costs. The following excerpt from Merewitz presents “controllable cost overruns”:

Controllable overruns are due to poor administration of projects, starting with incomplete surveys of engineering, financial and legal problem which might have been anticipated ahead of time. Poor administration may also include overly complex organizational structures for planning and constructing projects, poor contracting practices, unnecessary scope changes, and simple inexperience of personnel for the type of project or the area in which the project is undertaken.

Other factors introduced by Anderson et al (2007) are delivery and procurement methods, scope creep, faulty execution, ambiguous contract provisions and conflicting contract documents. Moreover, according to Jergeas (2009), poor communication is another reason for cost overruns. Okpala and Aniekwu (1998) provided additional points from Nigeria’s experience including preparation and approval of shop drawings, shortage of materials, payment methods, lack of equipment and materials that were imported, construction errors, on-site test approval, unethical attitudes and kickbacks. Weather conditions also needed to be considered given the growing influence of climate change, although they did not consider the influence of weather in Nigerian projects. The studies of Naoum(1994), Ajibade and Odeyinka(2006), Tumi et al. (2009) and Sambasivan (2006) also focused on comparable problems to explain cost overruns and time delays.

2.4.5. Project Control and Evaluation

Few authors focused on work evaluation in their research. Jin-Kyung (2008) indicated that periodic reports on contract progress from contractors were not sufficiently studied by owners to detect causes of cost overruns and to solve problems: the consequence was cost escalation. Similarly, Okpala and Aniekwu (1998), Tumi et al. (2009) indicated that the period of inspection and testing after project completion could also influence costs.

Political risk can be found in all project phases above and can be critical when it is ignored. Political tensions and insecurity can dramatically affect project cost and time (Akinci and Fischer, 1998).

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1. Introduction

The designing and methodological aspect of a particular study is the roadmap that the study should follow in its pursuit of the desired outcome. Hence, due care shall be made while spelling out these roadmap. In view of that, a detailed account has been given to the description of the particular design the research would employ; the data sources and methods of collection; the target population, unit of analysis and respondents; the types of instruments and their development procedure; the variables and corresponding measurement items; and data processing, analysis and presentation procedures.

Thus, this chapter presents the research design, target population, sampling, types of data, tools of data collection, sources of data, method and procedures of data collection and methods of data processing and analysis.

3.2. Research Design

Research design is a blue print for selecting the sources and types of data relevant to the research questions and provides the basic direction for carrying out a research project to obtain answers to research questions (Zikgmund et al., 2010). One of the types (classifications of research) is descriptive research, and according to Kothari (2004) descriptive research studies are those studies which are concerned with describing the characteristics of a particular individual, or of a group. Since this study tries to assess the cost and schedule performance, it employs a descriptive study research design.

3.3. Sources of Data

To collect all pertinent information for the research, both primary and secondary data sources were used. According to Currie (2005), combining several methods in the same single study is important to triangulate the result of each method involved.

Primary data is data that's collected for specific research problem at hand using procedures that fit the research problem best. On every occasion that primary data is collected new data is added

to the existing stock of knowledge (Hox & Boeije, 2005). To collect relevant primary data for the study, questionnaire and interview were used.

Secondary data is the data that have been already collected and readily available from other sources. The researcher used different textbooks, journals, operational procedures, project plans, periodical reports and other relevant sources related with the project were reviewed as secondary source of data. These sources were used as a supplement to the primary data that was collected by the researcher.

3.4. Methods of data collection and Instruments used

In order to achieve the objective of this research, both primary and secondary sources of data were used. The instruments engaged in order to collect primary data, semi- structured interview and questionnaire was adopted from previous researches focusing on the causes of cost overrun and schedule delay and based on the related review of literature. The researcher has chosen to use the questionnaire survey because it is thought to be cheap and fast to administer; and even it increases the degree of reliability as well enhances the chances of getting valid data. In addition to the questionnaire adopted from previous research, interview was considered because it has the advantage of ensuring probing for more information, clarification and capturing facial expression of the interviewees.

Literature cannot be underestimated as it provides necessary background and much needed context both of which make re-use a more worthwhile and systematic endeavor. Secondary data is obtained through the use of published and unpublished literatures. These include various reports, tender documents, contract documents, etc.

Semi-structure interview was conducted with the project manager, a team leader, and site engineer of AACRA who participated in Shiromeda – Hamerenoh Kidanemihiret road construction project. Questionnaires also distributed for the project managers, team leaders, supervisors, team members and support staffs of the project. A closed- ended questionnaire was adopted from Bertin (2011) research paper on cost overruns and time delays in highway and bridge projects in developing countries- experiences from Cameroon and the response options for a closed-ended question was exhaustive and mutually exclusive. For this purpose a Likert scale measurement was considered. For the Likert scale, the items were scored on the 5 point Likert scale ranging from strongly agree (5) to strongly disagree (1).

3.5. Target population

It has been known from the project coordinator that professionals involving on the project are: 5 from client office; 34 from the contractor office and 8 from the consultant which is a total of 47 in number. Target population of this study was all of the professionals participated on the project.

Therefore the target population of the study was 47 in number from which the data was collected. According to Kothari (2004) Census inquiry needs to be emphasized that when the universe is a small one, it is no use resorting to a sample survey. Census is a complete enumeration of all items in the 'population'. It can be presumed that in such an inquiry, when all items are covered, no element of chance is left and highest accuracy is obtained. Thus, the Census inquiry was employed. Using Census was appropriate because the target population for this study was limited in number and manageable. In addition it enabled the highest accuracy on the finding of the study. Therefore all of the target population were addressed for information inquiry on the subject under study.

3.6. Method of Data Analysis

After the data were collected from different sources, it is organized and presented in different forms. Important numerical results are presented using tables and charts. Data that are used for qualitative analysis were presented in statement forms as part of the interpretation.

As Greener (2008) stated that in most types of research studies, the process of data analysis involves the following three steps: first preparing the data for analysis, then analyzing the data and finally, interpreting the data. The analysis was based on the statement of the problem, research objective and research questions. This study was qualitative in nature; therefore the collected quantitative and qualitative data were coded, analyzed and interpreted. The data from the closed ended questions were coded and entered to SPSS version 20.00 so as to analyze and summarize the data descriptively using tables, percentages and frequency. The open ended questions from the questionnaire and the interview questions were categorized by hand by the researcher in a generalizable format. Finally, all the data has been presented to the reader in a readable format by further explaining the case using discussions. After which conclusion was made about the particular case and recommendation were delivered by the researcher.

3.7. Validity and Reliability

To ensure the quality of the research and make it credible for the project management community, the researcher gave due care to both validity and reliability issues of the data, the research process in general as well as the research output.

Validity defined as the extent to which data collection method or methods accurately measure what they were intended to measure (Sounders et. al., 2003). Validity is concerned with whether the findings are really about what they appear to be about. The researcher used different source of data form literature, interview, questionnaire, observation and document review to triangulate the data. The need for triangulation arises from the ethical need to confirm the validity of the processes involved. On the other hand the validity of the questionnaire was done through consultations with the advisor in order to establish any built-in errors in the measurement of the questionnaire.

Reliability refers to the absence of random error, enabling subsequent researchers to arrive at the same insights if they conducted the study along the same steps again (Yin, 2003). To increase the reliability of the survey, five-scale system (Likert scale) questionnaire was used. The reliability in such scale is higher compared to a two - scale system (Hayes, 1992). The tendency toward consistency found in repeated measurements is referred to as reliability.

To make sure the research's reliability of the questionnaire the researcher conducted Cornbach's alpha reliability test by using SPSS (Statistical Package for the Social Sciences) and found that **0.811** Cornbach's alpha and it is generally considered acceptable. According to Hair and others (1992) an alpha of 0.70 or greater is deemed acceptable.

Table 3.1. Reliability Statistics

Cronbach's Alpha	N of Items
.811	46

3.8. Ethical Consideration

According to Saunders et al. (2001), ethics refers to the appropriateness of your behavior in relation to the rights of those who become the subject of your work, or are affected by it. Research ethics was put into consideration when developing and administering data collection tools and techniques, to avoid any form of destruction or violation. This was done through obtaining consent before the research; ensuring confidentiality of data obtained and learning more about the organization's culture and project before the research and where necessary absolute sensitivity and caution was exercised.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1. Introduction

This chapter presents the findings of the data obtained from the respondents using questionnaire and interview. The findings are presented by using descriptive statistics. To analyze the collected data SPSS Statistics version 20.00 was used. The interpretations and discussions were presented on the basis of the findings and supported by related literatures and information from different documents.

4.2. Response Rate

Among the total of 47 questionnaires distributed to professionals participated in Shiromeda – Hamerenoh Kidanemihiret road construction project, 44 questionnaires were appropriately filled and returned which gives 93.6% return rate which is assumed to be suitable for further analysis.

4.3. General Information about the respondents

The information about the respondents was the first section of the questionnaire and consists of five questions. This include respondent's organization/company; gender of the respondents; academic achievement or level; designation; and finally relevant working experience. The main purpose of the demographic analysis in this research is to describe the characteristics of the respondents so that the analysis could be more meaningful for readers.

Table 4.1. General Information about the respondents

Item		Frequency	Percent
Organization	Client	5	11.4
	Contractor	32	72.7
	Consultant	7	15.9
Gender	Male	37	84.1
	Female	7	15.9
Educational level	Diploma	12	27.3
	1st Degree	17	38.6
	Master's	7	15.9
	Other	8	18.2
Relevant working experience	<5 years	12	27.3
	5 – 10 years	12	27.3
	10 – 15 year	10	22.7
	>15 years	10	22.7

Source: Own survey, 2019

Among the 44(100%) respondents 5(11.4%) are from Client organization, 32(72.7%) are from Contractor organizations and the rest 7(15.9%) are from consultant organization. This shows majority of the respondents are from Contractor organizations and it is because much of the professionals participated in the project are them.

As shown in the above table, 37(84.1%) of the respondents are male and only the rest 7(15.9%) are female. This implies that the participation of women in the project is very low.

Regarding the respondent's educational level, 12(27.3%) are Diploma holders; 17(38.6%) have first degree; 7(15.9%) have Master's degree; and the rest 8(18.2%) of the respondents selected "other" category and mentioned they have level IV and V certificate from TVET.

Looking at responses regarding working experience, respondents falling in the range of <5 years and 5 – 10 years are both 12(27.3%) and those who fall in the range 10 - 15 years are 10(22.7%) which is the same to >15 years.

Table 4.2. Respondents designation/ Job title

Designation	Frequency	Percent	Valid Percent	Cumulative Percent
Civil Engineer	2	4.5	4.5	4.5
Construction Forman	4	9.1	9.1	13.6
Design Consultant	2	4.5	4.5	18.2
Labour Forman	5	11.4	11.4	29.5
Material Engineer	3	6.8	6.8	36.4
Office Engineer	6	13.6	13.6	50.0
Valid Operator	10	22.7	22.7	72.7
Procurement Officer	1	2.3	2.3	75.0
Project Coordinator	1	2.3	2.3	77.3
Project team member	2	4.5	4.5	81.8
Site Engineer	3	6.8	6.8	88.6
Structure Forman	5	11.4	11.4	100.0
Total	44	100.0	100.0	

Source: Own survey, 2019

From the total number of the respondents, 2 of them were Civil Engineers; 4 were Construction Forman; 2 were Design Consultants; 5 were Labour Forman; 3 were Material Engineer; 6 were Office Engineer; 10 were Operators; 1 was Procurement Officer; 1 was Project Coordinator; 2 were Project team members; 3 were Site Engineers; and 5 were Structure Forman.

4.4. Cost management practice

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 (PMBOK). This section includes items that are selected to examine the cost management practice of the organization under study (AACRA).

Mean Values were used to interpret the level of agreement of the respondents for the given item. For Likert type scale in this study ranging from 1 (Strongly agree) to 5 (Strongly Disagree); mean up to 2.9 is considered as Agree, from 2.9 to 3.1 means neutral or neither disagree nor agree and mean above 3.1 is considered as disagree.

Table 4.3. Cost management practice of the organization

Item	Strongly Agree		Agree		Neither		Disagree		Strongly Disagree		Mean	Std. Deviation
	F	%	F	%	f	%	f	%	f	%		
A realistic cost estimation was developed	1	2.3	5	11.4	4	9.1	19	43.2	15	34.1	3.95	1.056
The estimated cost was allocated to individual work items effectively	3	6.8	5	11.4	9	20.5	17	38.6	10	22.7	3.59	1.168
There is a contingency plan	3	6.8	2	4.5	9	20.5	23	52.3	7	15.9	3.66	1.033
The project manager closely monitored the cost performance of the project	0	0	2	4.5	7	15.9	20	45.5	15	34.1	4.09	.830
Variation to the project cost were managed properly	2	4.5	3	6.8	3	6.8	20	45.5	16	36.4	4.02	1.067
Overall											3.86	1.031

Source: Own survey, 2019

The first question the respondents were asked regarding cost management practice was if a realistic cost estimation was developed. From their response, 2.3% strongly agree, 11.4% agree

and 9.1 % were neutral. But 43.2% of them disagree and 34.1% strongly disagree about the issue. Therefore, it can be seen here that there was problem in the cost estimation process.

The second was weather estimated cost was allocated to individual work items effectively. Here 6.8% of the respondents strongly agree; 11.4% agree; 20.5% neither; 38.6% disagree; and 22.7% strongly disagree. From the interview also it was understood that estimated cost was not allocated to individual work items effectively due to various reasons like: problem in right of way; weather condition; price fluctuation of materials and; unexpected increase in inflation rate.

Another question asked in this section was if a contingency plan was there and only 6.8% and 4.5% of the respondents strongly agree and agree respectively; 20.5% replied neither; 52.3% disagree; and 15.9% strongly disagree. But the project manager mentioned there was a contingency plan in the interview. This shows that the top management only kept the contingency plan without being transparent and using it when needed.

While the respondents were asked if the project manager closely monitored the cost performance of the project, 4.5% agree; 15.9% neither; 45.5% disagree and; 34.1% strongly disagree. Also the project manager described that he's managing several projects at a time so is difficult to him for monitoring every detail in every projects.

The last question regarding cost management practice was if variation to the project cost were managed properly. It's found that 4.5% of the respondents strongly agreed; equal number of respondents (6.8%) agreed and stayed neutral; 45.5% disagreed and; 36.4% strongly disagreed.

Generally the cost management practice of AACRA is found poor since all the questions asked in this area have results of disagreement by the respondents.

4.5. Schedule management practice

This section includes items that are selected to examine the time management practice of the organization under study (AACRA). The findings from the questionnaire are given in the next table followed by interpretation and discussion.

Table 4.4. Schedule management practice of the organization

Item	Strongly Agree		Agree		Neither		Disagree		Strongly Disagree		Mean	Std. Deviation
	f	%	F	%	F	%	.925	%	f	%		
Schedule activities were specifically identified and enough time was assigned for each activity	2	4.5	0	0	8	18.2	.900	52.3	11	25.0	3.93	.925
Enough resource was assigned for each activity team members perform	1	2.3	2	4.5	7	15.9	.976	52.3	11	25.0	3.93	.900
Realistic time was imposed for the project	1	2.3	2	4.5	9	20.5	1.029	38.6	15	34.1	3.98	.976
Top management ensured the proper completion of each milestone through strict supervision	2	4.5	4	9.1	8	18.2	1.021	50.0	8	18.2	3.68	1.029
Project team members received proper guidance and support from superiors to avoid any time delays	2	4.5	5	11.4	9	20.5	22	50.0	6	13.6	3.57	1.021
Overall											3.82	.970

Source: Own survey, 2019

As shown in the above table, 4.5% strongly agree; 18.2% responded neither; 52.3% disagree and; 25% strongly disagree with the first question saying Schedule activities were specifically identified and enough time was assigned for each activity. In the interview also it have been seen that there is doubt about proper identification and sufficient time assignment for every activity. According to Schwalbe (2014), identification and definition of each project activity is crucial to a projects success as it helps determine the duration of each activity and also helps in developing an overall schedule for the project. Since most of the respondents (77.3%) disagree or strongly

disagree about the issue, it can be said that the activities were not identified and defined they were not sequenced and their relationship and dependency has not been determined.

The second question asked here was if enough resource was assigned for each activity team members perform and 2.3% strongly agree; 4.5% agree and; 15.9% replied neither. While 52.3% disagree and 25% strongly disagree. From the responses it can be understood that there is problem in the allocation of resources for each activities and result in delays in team members' performance.

The next question was if realistic time was imposed for the project, 2.3% strongly agree; 4.5% agree; 20.5% neither; 38.6% disagree and 34.1% strongly disagree. As can be seen from their reply, the respondents don't feel the time imposed for the project is realistic.

Another question in this section was if top management ensured the proper completion of each milestone through strict supervision and, 4.5% strongly agree, 9.1% agree and 18.2% were neither about it but most of the respondents disagree and strongly disagree with percentage of 50.8% and 18.2% respectively.

The final one asked here was if project team members received proper guidance and support from superiors to avoid any time delays. It's found that 4.5% and 11.4% of the respondents strongly agree and agree respectively while 20.5% replied neither. The remaining 50% and 13.6% disagree and strongly disagree accordingly.

Similar to the responses for cost management practice, the respondents showed there disagreement for items given with regard schedule management practice. Therefor the organization has also schedule management problems.

4.6. Causes of cost overrun and schedule delay on the project

Table 4.5. Causes in Planning and programming

Cause	Strongly Agree		Agree		Neither		Disagree		Strongly Disagree		Mean	Std. Deviation
	F	%	F	%	F	%	f	%	f	%		
Lack of Project Planning/Programming	9	20.5	24	54.5	3	6.8	7	15.9	1	2.3	2.25	1.123
Inadequate Project Planning/Programming	5	11.4	18	40.9	13	29.5	8	18.2	0	0	2.55	1.210
Poor pre-planning process	14	31.8	18	40.9	8	18.2	1	2.3	3	6.8	2.11	1.355
Weaknesses during the land takings process	24	54.5	19	43.2	0	0	0	0	1	2.3	1.52	1.206
Legal environmental requirements	5	11.4	23	52.3	13	29.5	2	4.5	1	2.3	2.34	1.395
Overall											2.15	1.258

Source: Own survey, 2019

The first question asked in this section was if lack of project planning/programming is the cause for cost overrun and schedule delay. 20.5% strongly agreed, 54.5% agreed, 6.8% neither, 15.9% disagreed and 2.3% strongly disagreed about it.

Inadequate project planning/programming was the second cause mentioned and 11.4% strongly agreed, 40.9% agreed, 29.5% replied neither and 18.2% disagreed.

Another cause in this list was poor pre-planning process. 31.8% of the respondents strongly agree and 40.9% of them agree with this while 18.2% were neutral about it. Respondents that don't agree and strongly disagree with this cause are 2.3% and 6.8% respectively.

The next cause assumed for schedule delay and cost overrun was weaknesses during the land takings process. Almost all respondents 54.5% and 43.2% strongly agree and agree respectively with this cause except only one (2.3%) respondent who strongly disagreed about the issue.

Finally legal environmental requirements was stated as a cause and 11.4% strongly agreed and 52.3% agreed. 29.5% of the respondents were uncertain if this is a cause for cost overrun and schedule delay. The remaining 4.5% and 2.3% of the respondents are found to disagree and strongly disagree with the issue accordingly.

Weaknesses during the land takings process is the major cause of cost overrun and schedule delay in AACRA with a mean value of 1.52. Tadesse (2009), for instance, some projects delayed for years only due to right of way problem. In other words, it can be inferred that the delay to deliver the site (ROW problem) has a high impact of delay and cause time overrun in Addis Ababa road construction projects.

Table 4.6. Causes in Design process

Cause	Strongly Agree		Agree		Neither		Disagree		Strongly Disagree		Mean	Std. Deviation
	F	%	F	%	f	%	F	%	F	%		
Weak and insufficient technical studies	2	4.5	15	34.1	11	25.0	13	29.5	3	6.8	3.00	1.416
Underestimating of cost estimates and schedules/ Overestimating of Benefits	0	0	11	25.0	9	20.5	14	31.8	10	22.7	3.52	1.119
Poor project implementation strategies	7	15.9	15	34.1	1	2.3	14	31.8	7	15.9	2.98	1.601
Mistakes and discrepancies in documents	0	0	15	34.1	12	27.3	10	22.7	7	15.9	3.20	.952
Overall											3.18	1.272

Source: Own survey, 2019

The above table shows list of causes for cost overrun and schedule delay in the design process and respondents' level of agreement with each. From this list the first cause was weak and insufficient technical studies and 4.5% of the respondents strongly agree, 34.1% agree and 25% replied neither. On the other hand 29.5% of them disagreed and 6.8% strongly disagreed.

When the respondents were asked if underestimating of cost estimates and schedules/ overestimating of benefits was the cause for cost overrun and time delay; 25% agreed, 20.5% replied neither, 31.8% disagreed and 22.7% strongly disagreed.

15.9% of the respondents strongly agreed and 34.1% of the respondents agreed that poor project implementation strategies were causes for cost overrun and time delay while 2.3% replied neither. The rest 31.8% disagreed and 15.9% strongly disagreed.

Mistakes and discrepancies in documents was the last one in the list and 34.1% of the respondents agree and 27.3% were uncertain that it is the cause for cost overrun and schedule delay. The remaining respondents disagree and strongly disagree with percentages of 22.7% and 15.9% respectively.

From the causes listed in the design process, poor project implementation strategies is found comparatively the cause for delay and cost overrun. Other causes mentioned here are not rated that significant and hence can be said activities in the design process are not causing cost overrun and schedule delay in AACRA.

Table 4.7. Causes in bidding phase

Cause	Strongly Agree		Agree		Neither		Disagree		Strongly Disagree		Mean	Std. Deviation
	F	%	F	%	f	%	F	%	F	%		
Bidding Procedures	0	0	2	4.5	9	20.5	30	68.2	3	6.8	3.77	.979
Duration of the Period of Bidding	7	15.9	22	50.0	2	4.5	11	25.0	2	4.5	2.52	1.235
The Lowest Bid Price System	1	2.3	18	40.9	11	25.0	11	25.0	3	6.8	2.93	1.184
Unreasonable adjustment of project cost by contractors	6	13.6	16	36.4	12	27.3	7	15.9	3	6.8	2.66	1.329
Overall											2.97	1.182

Source: Own survey, 2019

As table 4.7 indicates, respondents were asked if bidding procedures were causes for cost and schedule overruns in the project, and 4.5% agreed that it was a cause, 20.5% replied neither, 68.2% disagreed that it was a cause and the remaining 6.8% of them strongly disagreed.

While the respondents were asked if duration of the period of bidding was the cause for cost overrun and schedule delay, 15.9% strongly agreed; 50% agreed; 4.5% replied neither; 25% disagreed and 4.5% strongly disagreed.

Another cause in this list was the lowest bid price system. 2.3% of the respondents strongly agree and 40.9% of them agree with this while 25% were neutral about it. Respondents that don't agree and strongly disagree with this cause are 25% and 6.8% respectively.

The final one stated as a cause here was unreasonable adjustment of project cost by contractors and 13.6% strongly agreed and 36.4% agreed. 27.3% of the respondents were uncertain if this is a cause for cost overrun and schedule delay. The remaining 15.9% and 6.8% of the respondents are found to disagree and strongly disagree with the issue accordingly.

The utmost cause for the delay in the bidding phase is duration of the period of bidding. The mean value gained here was 2.52.

Table 4.8. Causes in Project implementation

Cause	Strongly Agree		Agree		Neither		Disagree		Strongly Disagree		Mean	Std. Deviation
	F	%	F	%	f	%	F	%	F	%		
Negligence of Site Visits Before/During the Bidding Process- Unknown Site Conditions.	1	2.3	19	43.2	14	31.8	8	18.2	2	4.5	2.80	1.018
Mismanagement Due to Inexperienced Supervisors.	0	0	9	20.5	15	34.1	17	38.6	3	6.8	3.32	1.047
Supervisor and Contractor Claims and Disputes	17	38.6	21	47.7	1	2.3	3	6.8	2	4.5	1.91	1.503
Many Stakeholders	5	11.4	13	29.5	20	45.5	4	9.1	2	4.5	2.66	.895

Poor Communication Among Contract Stakeholders	12	27.3	17	38.6	4	9.1	9	20.5	2	4.5	2.36	1.045
Unethical Activities And Kickbacks	10	22.7	22	50.0	0	0	11	25.0	1	2.3	2.34	1.177
Equivocal/Unclear Contracts	0	0	16	36.4	10	22.7	13	29.5	5	11.4	3.16	.927
Changes in Scope of Contracts	1	2.3	16	36.4	9	20.5	15	34.1	3	6.8	3.07	1.129
The Displacement of Existing Networks	13	29.5	14	31.8	6	13.6	6	13.6	5	11.4	2.45	1.428
Construction Errors and On Site Testing Approval	9	20.5	8	18.2	4	9.1	20	45.5	3	6.8	3.00	.927
Building on unexpected archaeological sites	8	18.2	10	22.7	4	9.1	18	40.9	4	9.1	3.00	1.224
Shortages of Materials	20	45.5	9	20.5	5	11.4	9	20.5	1	2.3	2.14	1.514
Delay of material delivery	16	36.4	19	43.2	6	13.6	1	2.3	2	4.5	1.95	1.413
Material Price Fluctuation	9	20.5	19	43.2	8	18.2	7	15.9	1	2.3	2.36	1.540
Methods of Payment	7	15.9	15	34.1	12	27.3	8	18.2	2	4.5	2.61	1.394
Lack of Equipment	6	13.6	17	38.6	7	15.9	9	20.5	5	11.4	2.77	1.140
Lack of timely decisions and excessive change orders	10	22.7	8	18.2	14	31.8	10	22.7	2	4.5	2.68	1.480
Weather Conditions	7	15.9	10	22.7	9	20.5	7	15.9	11	25.0	3.11	1.434
Political Tensions/Insecurity	9	20.5	17	38.6	5	11.4	8	18.2	5	11.4	2.61	1.284
Overall											2.65	1.238

Source: Own survey, 2019

Table 4.8 shows the responses given with regard to causes of cost overrun and schedule delay in the project implementation stage. According to the table if negligence of site visits before/during the bidding process - unknown site conditions was asked. 2.3% and 43.2% of the respondent agreed that it is a cause while 31.8% of the respondents were uncertain about it. In the contrary, 18.2% disagreed and 4.5% strongly disagreed that it is a cause.

When the respondents were asked if mismanagement due to inexperienced supervisors was cause for the cost overrun and schedule delay, 20.5% of them agree; 34.1% was uncertain; 38.6% disagree and 6.8% strongly disagree.

Supervisor and contractor claims and disputes was given as another cause for cost overrun and schedule delay and 38.6% of the respondents strongly agreed, 47.7% agreed and 2.3% replied neither. The remaining 6.8% disagreed and 4.5% strongly disagreed that it is a cause.

The existence of many stakeholders was mentioned if it was the cause for cost overrun and schedule delay. 11.4% and 29.5% of the respondents strongly agreed and agreed respectively while 45.5% were uncertain about it. Oppositely 9.1% and 4.5% of the respondents disagreed and strongly disagreed accordingly.

The next was poor communication among contract stakeholders and 27.3% of the respondents strongly agreed and 38.6% agreed that it was a cause for the cost overrun and schedule delay. 9.1% of the respondents were uncertain while 20.5% of them disagreed and 4.5% strongly disagreed about it.

Another cause in this list was unethical activities and kickbacks. 22.7% of the respondents strongly agree and 50% of them agree that it was cause for the delay and cost overrun. Respondents that don't agree and strongly disagree with this cause are 25% and 2.3% respectively.

In response to the question that was intended to know if equivocal/unclear contracts were cause for cost overrun and schedule delay, 36.4% of respondents agreed, 22.7% of respondents were uncertain, whereas 29.5% disagreed and 11.4% strongly disagreed.

Changes in scope of contracts was given as another cause for cost overrun and schedule delay and 2.3% of the respondents strongly agreed, 36.4% agreed and 20.5% replied neither. The remaining 34.1% disagreed and 6.8% strongly disagreed that it is a cause.

The next cause assumed for schedule delay and cost overrun was the displacement of existing networks. 29.5% and 31.8% of the respondent strongly agreed and agreed respectively that it is a cause while 13.6% of the respondents were uncertain about it. In the contrary, 13.6% disagreed and 11.4% strongly disagreed that it is a cause.

20.5% of the respondents strongly agreed and 18.2% agreed that construction errors and on site testing approval was a cause for cost overrun and schedule delay while 9.1% replied neither. On the other hand 45.5% of the respondents disagreed and 6.8% of them strongly disagreed about it.

Building on unexpected archaeological sites was given as another cause for cost overrun and schedule delay and 18.2% of the respondents strongly agreed, 22.7% agreed and 9.1% replied neither. The remaining 40.9% disagreed and 9.1% strongly disagreed that it is a cause.

When the respondents were asked if shortages of materials was cause for the cost overrun and schedule delay, 45.5% of them strongly agreed; 20.5% of them agreed; 11.4% was uncertain; 20.5% disagreed and 2.3% strongly disagreed.

Another cause in this list was delay of material delivery. 36.4% of the respondents strongly agree and 43.2% of them agree that it was cause for the delay and cost overrun. Respondents that don't agree and strongly disagree with this cause are 2.3% and 4.5% respectively. The remaining 13.6% replied neither.

Material price fluctuation was given as another cause for cost overrun and schedule delay and 20.5% of the respondents strongly agreed, 43.2% agreed and 18.2% replied neither. The remaining 15.9% disagreed and 2.3% strongly disagreed that it is a cause.

When the respondents were asked if methods of payment was cause for the cost overrun and schedule delay, 15.9% of them strongly agreed; 34.1% of them agreed; 27.3% was uncertain; 18.2% disagreed and 4.5% strongly disagreed.

It's stated that lack of equipment was one the causes for cost overrun and schedule delay and 13.6% Of the respondents strongly agreed; 38.6% agreed and; 15.9% were uncertain. Oppositely 20.5% of them disagreed and 11.4% strongly disagreed.

Response indicated in table 4.11 shows that 22.7% of the respondents strongly agreed, 18.2% of them agreed and 31.8% replied neither that lack of timely decisions and excessive change orders was the cause for cost overrun and schedule delay. The remaining 22.7% disagreed and 4.5% strongly disagreed that it is a cause.

The next cause in this list was weather conditions. 15.9% of the respondents strongly agree and 22.7% of them agree with this while 20.5% were neutral about it. Respondents that don't agree and strongly disagree with this cause are 15.9% and 25% respectively.

Political tensions/insecurity was the last one in the list and 20.5% of the respondents strongly agree, 38.6% agree and 11.4% were uncertain that it is the cause for cost overrun and schedule delay. The remaining respondents disagree and strongly disagree with percentages of 18.2% and 11.4% respectively.

Supervisor and contractor claims and disputes and delay of material delivery are primary causes in the implementation stage of the project. High level of agreement was given for these causes by the respondents with mean values of 1.91 and 1.95 respectively.

Table 4.9. Causes in Project control and ex post evaluation

Cause	Strongly Agree		Agree		Neither		Disagree		Strongly Disagree		Mean	Std. Deviation
	f	%	f	%	F	%	F	%	f	%		
No Action Taken After Contract Progress Reports	4	9.1	3	6.8	7	15.9	13	29.5	17	38.6	3.82	.905
Periods of Inspection and Testing After Contract Completion	11	25.0	15	34.1	7	15.9	8	18.2	3	6.8	2.48	1.173
Lack of Contract <i>ex post</i> Evaluation	10	22.7	28	63.6	3	6.8	3	6.8	0	0	1.98	.976
Negligence of Past Experiences	21	47.7	13	29.5	10	22.7	0	0	0	0	1.75	.811
Overall											2.51	.966

Source: Own survey, 2019

As table 4.9 shows, respondents were asked if the absence of action taking after contract progress reports was the cause for cost and schedule overruns in the project, and 9.1% strongly agreed that it was a cause, 6.8% agreed, 15.9% replied neither, 29.5% disagreed that it was a cause and the remaining 38.6% of them strongly disagreed.

While the respondents were asked if periods of inspection and testing after contract completion was the cause for cost overrun and schedule delay, 25% strongly agreed; 34.1% agreed; 15.9% replied neither; 18.2% disagreed and 6.8% strongly disagreed.

Another cause in this list was lack of contract *ex post* evaluation. 22.7% of the respondents strongly agree and 63.6% of them agree with this while 6.8% were neutral about it. Respondents that disagree with this cause are only 6.8%.

The final one stated as a cause here was negligence of past experiences and 47.7% strongly agreed and 29.5% agreed. The remaining 22.7% of the respondents replied neither while none of them are found to disagree or strongly disagree with the issue.

Among the causes given in the project control and ex post evaluation, negligence of past experiences had a mean value of 1.75 that implied most of the respondents agree it is paramount cause for cost overrun and schedule delay.

In general, when the overall mean value of possible causes in each stage is seen, causes in planning and programming are more important with mean value of 2.15. According to the respondents' reply, the least important causes are listed in the design process having 3.18 mean value.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter is the final part of the study. First, important findings are summarized from the previous chapter. Then, based on the summary of findings conclusions are inferred. Finally, recommendations have been provided as per the findings of the study to improve the cost performance and schedule delay in the project, and also similar projects held by AACRA.

5.2. Summary of the Major Findings

The major purpose of the study was to identify the causes of cost overrun and schedule delay in Shiromeda – Hamerenoh Kidanemihiret road construction project. In addition the research aimed to assess the cost management practice and the time management practice and also identified the major causes that led to the cost overrun and schedule delay of the project and made recommendations on areas that need improvement and correction. According to this, major findings of this study are given below.

- Project cost management practice of AACRA is found poor. The major problem identified here was the absence of project manager's close monitoring and supervision of the cost performance in the project.
- There is also very poor schedule management practice in the authority. The existence of unrealistic time imposing for the project is found the considerable problem regarding the schedule management practice of the organization.
- In the planning and programming stage, Weaknesses during the land takings process is found the major cause of cost overrun and schedule delay in AACRA projects.
- From the causes assumed in the design process, poor project implementation strategies is found comparatively the visible cause for delay and cost overrun. But generally activities in the design process are not causing cost overrun and schedule delay in AACRA.
- The utmost cause for the delay and cost overrun in the bidding phase is duration of the period of bidding.

- Supervisor and contractor claims and disputes is the significant cause for cost overrun and schedule delay in the authority followed by delay of material delivery as seen from the implementation stage of the project.
- Among the causes given in the project control and ex post evaluation, negligence of past experiences is found paramount cause for cost overrun and schedule delay.

5.3. Conclusions

Effective project management has been frequently defined as completing projects within time, cost and quality constraints. And project performance can be improved by studying and improving the factors that affect these three success dimensions. Accordingly, this research has strived to identify the causes responsible to project delays and cost overrun in Addis Ababa City Roads Authority.

The first objective of this study was to assess cost and time management practices of Shiromeda–Hamerenoh Kidanemihiret road construction project. The study found the cost and time management practice of the organization under study is poor.

From the study findings, it can also be concluded that existence of Schedule delay and cost overrun made the project to have performance problem. The major cause resulting cost performance problem in the project was the absence of close monitoring by the project manager. And for the schedule performance was imposing unrealistic time for the project.

The major causes identified for the performance indicators are: weaknesses during the land takings process; poor project implementation strategies; duration of the period of bidding; Supervisor and contractor claims and disputes; delay of material delivery; and negligence of past experiences.

5.4. Recommendations

Based on the results of the study, the following recommendations are suggested for consideration:

- Use of project management tools and techniques for planning, executing and control of the project cost and time is important for effective management of the two elements.
- AACRA should give attention on the right of way problem. Before the construction starts, all the necessary requirements for delivering the site should be fulfilled.

- The authority shall have clear, complete, and unambiguous definition of projects and the scope of work involved before executing projects; moreover, planning projects shall include prioritized and detailed work schedule, drawn from the work breakdown structure.
- There should be well defined schedule for the bidding phase and the process shall be undertaken with regard to it under the supervision of delegated individuals. Accordingly they should give 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.
- The organization should adopt efficient information distribution systems to guard against communication gaps. Moreover AACRA shall give capacity building so as to develop the performance of the professionals.
- Documentation practice of AACRA shall get improved so that it would be possible to easily trace progress of ongoing projects and to learn lessons from completed projects with the intentions that mistakes would not be repeated.

References

Abd El-Razek, et al. (2008), *Causes of Delay in Building Construction Projects in Egypt*, Journal of Construction Engineering and Management. ASCE. Vol 134, No 11, 831-841.

Abdullah Alhomidan. (2013). *Factors Affecting Cost Overrun in Road Construction Projects in Saudi Arabia*, Journal of Management in Engineering J. Manage. Eng., 32(1), 04015032.

Abdul-Rahman, et al. (2006), *Delay Mitigation in the Malaysian Construction Industry*, Journal of Construction Engineering and Management. ASCE. Vol 132, No 2, 125-133.

Agyekum-Mensah, G., Knight, A. and Pasquire, C. (2012), 'Adaption of structured analysis design techniques methodology for construction project planning', in Smith, S.D. (Ed.), Procs. 28th Annual ARCOM Conference, ARCOM, Edinburgh, pp. 1055-1065.

Ajibade, A.; Odeyinka, H. (2006). *Construction Delays and their Causative Factors in Nigeria*, Journal of Construction Engineering and Management. ASCE, 132 (7) 667-677.

Anderson, L. T., Klein, W. R., Meck, S. 'Plan Making' in APA (2006), Planning and Urban Design Standards, John Wiley and Sons, Inc. Hoboken, NJ.

Anderson,S et al. (2007)-NCHRP Report 574: guidance for cost estimation and management for highways projects during planning, programming, and preconstruction. National Cooperative Highway Research Program-TRB, pp. 13-17

Anderson,S.;Moleenar,K.; Schexnayder,C..(2008)-NCHRP Web-Only Document 132: right-of-way methods and tools to control project cost escalation. National cooperative highway research program-TRB, pp. 06-17

Arditi, D, Akan (1985), *Cost overrun on public project*, Journal of project management. 3(4):218-234

Arditi, D., Akan, G.T. and Gurdamar, S. (1985), 'Reasons for delays in public projects in Turkey', Construction Management and Economics, Vol. 3 No. 2, pp. 171-181.

Atkinson, R. (1999), '*Project Management: cost, time and quality, two best guesses and a phenomenon, it's [its] time to accept other success criteria*', International Journal of Project Management, Vol. 17 No. 6, pp. 337-342.

Avots, I (1983), *Cost Relevance Analysis for Overrun Control*, International Journal of project management.1(3)

Baldwin, J.R., Manthei, J.M., Rothbart, H. and Harris, R.B. (1971), *Causes of delay in the construction industry*, Journal of the Construction Engineering Division, Vol. 97 No. 2, pp. 177-187.

Benator, B., &Thumann, A.(2003). 'Project Management and Leadership Skills for Engineering and Construction Projects', Lilburn, Georgia: Fairmount press.

Bernstein, S.; Berstein, R. (1999), 'Elements of Statistics II: inferential statistics', Mc Graw-Hill, New York.

Biya, P. (1987), 'Communal Liberalism', Macmillan Publishers Ltd, London, Great Britain.

Bramble, B. B.; Callahan, M. T. (2000), 'Construction Delay Claims 3rd Edition', Aspen Law and Business, New York.

Bureau of Finance and Economic Development of Addis Ababa (BOFED) August, 2010.

Buys, F. (2015), Five Causes of Project Delay and Cost Overrun, and Their Mitigation Measures.

Chandra, Prasanna. (1995). *Projects: Planning, analysis, Selection, Implementation, and Review*. 4th ed. New Delhi: Tata Mcgraw-Hill Publishing Company Limited.

Colin, J. and Retik, A. (1997), 'The applicability of project management software and advanced IT techniques in construction delays mitigation', International Journal of Project Management, Vol. 15 No. 2, pp. 107-120.

Creedy, G. D., Skitmore, M., Wong, J. K. W. (2010), *Evaluation of Risk Factors Leading to Cost Overrun in Delivery of Highway Construction Projects*, Journal of Construction Engineering and Management. ASCE, Vol. 136 (5) 528-537.

Cui, Y., Olsson, N. O. E. (2009), *Project Flexibility in Practice: An Empirical Study of Reduction Lists in Large Governmental Projects*, International Journal of Project Management, 27, 447-455.

Enas M. (2017), 'An assessment of the causes of cost overrun and schedule delay on an it project: the case of NBE application virtualization project', Addis Ababa University, Ethiopia.

Fallahnejad, M.H. (2013), 'Delay causes in Iran gas pipeline projects', International Journal of Project Management, Vol. 136, pp. 136-146.

Ferew Gutae(2015), *Cost Overrun Factors in Road Project: Pedestrian and Cyclist Bridge at Skansen*, Addis Ababa University, Ethiopia.

Fink, A.; Kosecoff, J. (1998), 'How to Conduct Surveys A Step-by-Step Guide 2nd Edition', Sage Publications, London.

Fisk, E. (1997), 'Construction Project Administration Fifth Edition Prentice Hall', Columbus, OH
Flyvbjerg, B. (2008), 'Public Planning on Mega-Projects: Overestimation of Demand and Underestimation of Costs in Priemus', H., Flyvbjerg, B., Wee, B.V. (Eds.) Decision Making on Mega-Projects. Edward Elgar, Northampton, MA , pp. 120-144

Flyvbjerg, B., COWI (2004), 'Procedures for Dealing with Optimism Bias in Transport Planning', The British Department of Transport, Report No 58924, Is. No 1

Flyvbjerg, B., Holm, M. K. S., Buhl, S. L. (2003), 'How Common and How Large are Cost Overruns in Transport Infrastructure Projects?' *Transport Reviews*, Vol.23, No 1, 71-88.

Flyvbjerg, B., Holm, M. K. S., Buhl, S. L. (2002), *Cost Underestimation in Public Works Projects: Error or Lie?* *Journal of the American Planning Association*, 68 (3).

Flyvbjerg, B., Holm, M. K. S., Buhl, S. L. (2004), 'What Causes Cost Overrun in Transport Infrastructure Projects?' *Transport Reviews*, Vol.24, No 1, 3-18.

FME, (2014), 'Project Cost Management'

Fowler, F. J. (1995), 'Improving Survey Questions, Design and Evaluation', Vol. 38, Sage Publications, London.

Frimpong, Y., Oluwoye, J., Crawford, L. (2003), *Causes of Delay and Cost Overruns in Construction of Groundwater Projects in a Developing Countries, Ghana as a Case Study*, *International Journal of Project Management*, 21, 321-326.

Frisby, T. (1989) Preconstruction Phase, in: Kimmons, R. L., Loweree, J. H.(Eds) 'Project Management: A Reference for Professionals. Marcel Dekker, Inc.', New York and Basel. 265-275.

Hamzah, N., Khoiry, M.A., Arshad, I., Tawil, N.M. and Ani, A.C. (2011), "Cause of construction delay – theoretical Framework", *Procedia Engineering*, Vol. 20, pp. 490-495.

Hartman, F. and Ashrafi, R. (2004), "*Development of the SMARTTM project planning framework*", *International Journal of Project Management*, Vol. 22 No. 6, pp. 499-510.

Heerkens, Gary R. (2002). *Project Management*. New York: Mcgraw-Hill Publishing Companies, Inc.

Hinze, J.; Selstead, G. A. (1991), 'Analysis of WSDOT Construction Cost Overruns', Washington State Department of Transportation, Report No WA-RD 218.1, Olympia, WA.

Hubbard, D.G. (1990), “*Successful utility project management from lessons learned*”, Project Management Journal, Vol. 21 No. 3, pp. 19-23.

Larson E.W. and Gray, C.F. (2000), ‘Project Management: The managerial Process’ (Fifth Edition). New York: McGraw-Hill.

Lester, A. (2003), ‘Project Planning and Control (4th ed.)’ Burlington: Elsevier Lt.

Lim, C.S. and Mohamed, M.Z. (2000), “*An exploratory study into recurring construction problems*”, International Journal of Project Management, Vol. 18 No. 4, pp. 267-273.

Lock, D. (2007). ‘Project Management (9th ed.)’, England: Gower Publishing Limited.

McCord, J., McCord, M., Davis, P.T., Haran, M. and Rodgers, W.J. (2015), “*Understanding delays in housing construction: evidence from Northern Ireland*”, Journal of Financial Management of Property and Construction, Vol. 20 No. 3, pp. 286-319.

McNamara, Carter. (2002). ‘Project Management’ [Online]. Available from: http://www.mapnp.org/library/plan_dec/project/project.htm (1 of 4). [Accessed: February 14th 2015].

Memon, A.H. (2014), “*Contractor perspective on time overruns factors in Malaysian construction projects*”, International Journal of Science, Environment and Technology, Vol. 3 No. 3, pp. 1184-1192.

Meredith, J., & Mantel, S. (2009), ‘Project Management; A Managerial Approach (7th ed.)’ Danver, MA: John Wiley & Sons.

Modesto, S. Tichapondwa. And Stephen P. Tichapondwa. (2009). *Successful Project Management: Insights from Distance Education Practices*. [Online]. Available from: <http://creativecommons.org/licenses/by-sa/3.0>. [Accessed: January 1st 2015].

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.

Nicholas, John M. and Herman Steyn. (2008). *Project Management for Business, Engineering, and Technology: Principles and Practices*. 3rd ed. New York: Elsevier Inc.

Sambasivan, M. and Soon, Y.W. (2007), “*Causes and effects of delays in Malaysian construction industry*”, International Journal of Project Management, Vol. 25 No. 5, pp. 517-526.

Saunders, M.; Lewis, P.; Thornhill, A. (2000), ‘Research Methods for Business Students’ 2nd Edition, Prentice Hall, New York.

Sepasgozar, S.M.E., Razkenari, M.A. and Barati, K. (2015), “*The importance of new technology for delay mitigation in construction projects*”, American Journal of Civil Engineering and Architecture, Vol. 3 No. 1, pp. 15-20.

Shehu, Z., Endut, I.R. and Akintoye, A. (2014), “*Factors contributing to project time and hence cost overrun in the Malaysian construction industry*”, Journal of Financial Management of Property and Construction, Vol. 19 No. 1, pp. 55-75.

Siraw Y. T. 2011, *Analysis of Factors Contributing to Time Overruns on Road Construction Projects under Addis Ababa City Administration*, Addis Ababa University, Ethiopia-International Journal of Science and Research (IJSR).

Stewart (1982). ‘Cost estimating’. John Wiley and Sons, New York.

Subramani T. (2014). *Causes of Cost Overrun In Construction*. IOSR Journal of Engineering IOSRJEN, 4(6), 01-07.

Sullivan, A. and Harris, F.C. (1986), “*Delays on large construction projects*”, International Journal of Operations & Production Management, Vol. 6 No. 1, pp. 25-33.

Sweis, G., Sweis, R., Hammad, A.A. and Shboul, A. (2008), “*Delays in construction projects: the case of Jordan*”, International Journal of Project Management, Vol. 26 No. 6, pp. 665-674.

Tadesse Ayalew, (2009), ‘Causes and Effects of Variations in Ethiopian Federal Road Projects’, MSc thesis, Addis Ababa University, Civil Engineering Department.

Tigist T. (2017), ‘Factors Affecting Success of Projects in Addis Ababa City Roads Authority’, Addis Ababa University, Ethiopia.

Trauner, T.J. (2009), ‘Construction Delays’, 2nd ed., Elsevier Butherworth-Heinemann, Burlington.

Tumi, S.A.H., Omran, A. and Pakir, A.H.K. (2009), “*Causes of delay in construction industry in Libya*”, The International Conference on Economics and Administration, pp. 265-272.

Wideman, R. (1995). ‘Wideman comparative Glossary of Project Management Terms’, V.3.1

Wikipedia. (2015). **Project**. [Online]. Available from: en.m.wikipedia.org/wiki/project. [Accessed: February 3rd 2015].

Appendix: Questionnaire

Addis Ababa University College of Business and Economics
School of Commerce
Department of Project Management

QUESTIONNAIRE TO BE FILLED BY PARTICIPANTS

This questionnaire is prepared to conduct a study in the partial fulfillment of a Master’s Degree in project management (MAPM) program entitled with “Assessment of Cost and Schedule performance on AACRA projects: the case of Shiromeda – Hamerenoh kidanemihiret road construction project”. So your responses are very much important for the success of the study and I would like to assure you that your responses are kept confidential. Hence, you are kindly requested to fill the questionnaire attentively.

N.B You do not need to write your name and address.

Please check the Questionnaire has five pages.

Contact of researcher:

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Section A: General Information

You are simply required to put a tick mark “✓” on the space provided or give short description where necessary.

1. State respondent organization/company type.

A. Client

B. Contractor

C. Consultant

2. Sex

A. Male

B. Female

3. Educational level

- A. Diploma E. Other
 B. 1st Degree Specify _____
 C. Master
 D. PhD

4. Respondents designation/ Job title: _____

5. Relevant working experience:

- A. <5 years C. 10 – 15 year
 B. 5 – 10 years D. >15 years

Section B: Cost management practice on the project.

Please, Circle your Answer to Each Question	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
A realistic cost estimation was developed	1	2	3	4	5
The estimated cost was allocated to individual work items effectively	1	2	3	4	5
There is a contingency plan	1	2	3	4	5
The project manager closely monitored the cost performance of the project	1	2	3	4	5
Variation to the project cost were managed properly	1	2	3	4	5

Section C: Schedule management practice on the project.

Please, Circle your Answer to Each Question	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
Schedule activities were specifically identified and enough time was assigned for each activity	1	2	3	4	5
Enough resource was assigned for each activity team members perform	1	2	3	4	5
Realistic time was imposed for the project	1	2	3	4	5

Top management ensured the proper completion of each milestone through strict supervision	1	2	3	4	5
Project team members received proper guidance and support from superiors to avoid any time delays	1	2	3	4	5

Section D: Causes of cost overrun and schedule delay on the project.

Please, Circle your Answer to Each Question	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
The causes of cost overruns and schedule delays in Shiromeda – Hamerenoh kidanemihiret road construction project are:					
Planning and Programming					
Lack of Project Planning/Programming	1	2	3	4	5
Inadequate Project Planning/Programming	1	2	3	4	5
Poor pre-planning process	1	2	3	4	5
Weaknesses during the land takings process	1	2	3	4	5
Legal environmental requirements	1	2	3	4	5
Design Process					
Weak and insufficient technical studies	1	2	3	4	5
Underestimating of cost estimates and schedules/ Overestimating of Benefits	1	2	3	4	5
Poor project implementation strategies	1	2	3	4	5
Mistakes and discrepancies in documents	1	2	3	4	5
Bidding Phase					
Bidding Procedures	1	2	3	4	5
Duration of the Period of Bidding	1	2	3	4	5

The Lowest Bid Price System	1	2	3	4	5
Unreasonable adjustment of project cost by contractors	1	2	3	4	5
Project Implementation					
Negligence of Site Visits Before/During the Bidding Process- Unknown Site Conditions.	1	2	3	4	5
Mismanagement Due to Inexperienced Supervisors.	1	2	3	4	5
Supervisor and Contractor Claims and Disputes	1	2	3	4	5
Many Stakeholders	1	2	3	4	5
Poor Communication Among Contract Stakeholders	1	2	3	4	5
Unethical Activities And Kickbacks	1	2	3	4	5
Equivocal/Unclear Contracts	1	2	3	4	5
Changes in Scope of Contracts	1	2	3	4	5
The Displacement of Existing Networks	1	2	3	4	5
Construction Errors and On Site Testing Approval	1	2	3	4	5
Building on unexpected archaeological sites	1	2	3	4	5
Shortages of Materials	1	2	3	4	5
Delay of material delivery	1	2	3	4	5
Material Price Fluctuation	1	2	3	4	5
Methods of Payment	1	2	3	4	5
Lack of Equipment	1	2	3	4	5
Lack of timely decisions and excessive change orders	1	2	3	4	5
Weather Conditions	1	2	3	4	5
Political Tensions/Insecurity	1	2	3	4	5

Project Control and <i>ex post</i> Evaluation					
No Action Taken After Contract Progress Reports	1	2	3	4	5
Periods of Inspection and Testing After Contract Completion	1	2	3	4	5
Lack of Contract <i>ex post</i> Evaluation	1	2	3	4	5
Negligence of Past Experiences	1	2	3	4	5

Comments and Others:

Any other cause that may have contributed to cost overrun please specify

Any other cause that may have contributed to schedule delay please specify

How can cost overruns and schedule delays be reduced?

Thank You!