ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

ASSESSMENT OF PROJECT TIME AND COST OVERRUN: THE CASE OF PROJECTS AT ETHIOPIAN MINISTRY OF MINES

A Thesis Submitted to St. Mary's University School of Graduate Studies in Partial Fulfillment of The Award of Degree in Masters of Project Management

BY: Melaku Tesfaye

ID: SGS/0540/2013A

Supervisor: Chalachew Getahun (PhD)

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Approval of board of examiners

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DECLARATION

I hereby declare that this MASTER OF ART PROJECT MANAGEMENT, thesis is my original work, and all sources of material used for this thesis have been duly acknowledged.

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This MSc Thesis has been submitted for examination with my approval as thesis advisor.

Chalachew Getahun (Ph.D.)

Signature:

Date of submission: JUNE 2022

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Thank you all!

LIST OF ACRONYMS

PEMM= project of Ethiopian Ministry of Mines

MS = Mean Score

PERT = Program Evaluation and Review Technique

CPM = Critical Path Method

KPI = key performance indicator

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ABSTRACT

In Ethiopian project management, time and cost have been major issues. In general, most projects, particularly in the mining industry, are experiencing time and cost overruns. As a result, doing research in this area was critical in understanding the causes and effects of cost and time overruns in mining projects overseen by the Ministry of Mining of the Federal Democratic Republic of Ethiopia. The purpose of this study is to assess 3 projects in the Ministry of Mining of the Federal Democratic Republic of Ethiopia in terms of time and cost overrun. The study has adopted both quantitative and qualitative research approach. Data on project duration and cost was gathered via a desk review of various Progress Reports and Project Completion Reports. The second phase was used a questionnaire survey were developed to identify and score the effects of time and expense overruns, as well as control measures, using a Likert scale. A total of 50 questionaries were distributed and 100% or 50 questionaries were obtained valid which were used for analysis that shows the existing project time and cost management practices look like in the ministry as well as identifying the main Factors Influencing Time and Cost overrun in mining projects managed by Ethiopian ministry of mining. A related literature review was used to develop a list of factors relevant to the complete study.

Key word Assessment of project time and cost performance, time overrun, cost overrun

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Along with scope, cost and time are two of the three constraints of each project. The amount of time available to accomplish a project is referred to as the time constraint. The budgeted amount available for the project is referred to as the cost constraint. Ethiopia's mining industry has emerged as a critical component of the country's growth. It has offered work for many people. It makes extensive use of industrial materials and equipment, resulting in significant cash flow. As a result, economic activity grows, and the nation's economic progress is aided. Project delays have been identified as a recurrent issue in Ethiopia's mining industry, owing to underlying uncertainty and political volatility. In Ethiopia's mining industry, time, and cost overruns, which are the most serious consequences of delays, are a typical occurrence that casts a shadow over Ethiopia's mining sector, which is meant to generate money through sales, taxes, and royalties, as well as foreign currency revenues and hard currency savings by substituting for the country's imported mineral-related inputs.

The inability to execute projects on time and on budget is still a major issue around the world, and it's getting worse (Ahmed et. al., 2003). Cost and schedule overruns are a regular occurrence in all projects around the world. It is extremely difficult to complete a project within the time and budget constraints set forth in the initial contract documents. In many projects, time and cost overruns are a common occurrence.

An unacceptable pattern has emerged in which the majority of projects are not finished within the time and budget constraints laid out at the outset. This problem is not only prevalent in Ethiopia, but also throughout the world, including developed countries. Understanding the reasons of cost and schedule overruns due to design or changing conditions can assist project managers keep costs and schedules under control (Vidalis and Najafi, 2002). Because of time delay, all the stakeholders loses both tangible and intangible benefits during extended time. Cost overrun is considered as an additional cost over and above those agreed upon at the start, resulting in lower returns on investment for the client. The additional costs are passed on to the

end user in the form of higher rental/lease/costs or prices. To experts, cost overrun indicates a failure to give value for money, which could destroy their reputations and cause clients to lose faith in them. For the contractor, it means a loss of revenues due to non-completion, as well as defamation, which could damage future job opportunities. Cost overruns could result in project abandonment and a decline in construction activity for the sector as a whole, as well as a negative reputation, difficulty to acquire project funding or securing it at higher costs due to increased risks (Nkado and Mbachu,2004).

Even though, there are very few researches that has been done by different academics sponsored by the Ministry, still the problem is abundant in the mining industry.so this study will be one of the documents to be referred to on the subject.

1.2 Statement of the problem

Project delays and cost overruns may raise the capital production margin in a given industry or elsewhere, lowering the investment's efficiency. Delays and cost overruns in mining project segments or productivity targets, in particular, have a big impact on the expected results. If cost overruns are persistent, they raise the capital-output ratio of a project and raise the investment's cost in real terms. Poor project design and implementation, insufficient project finance, bureaucratic hesitancy, and a lack of cooperation among different owners are all identified as contributing factors. There appears to be an assumption that the most significant causes of cost and time overruns are also the most difficult to control. Project control techniques are frequently recommended without additional suggestions in relation to the enabling environment required for their success because most studies have not engaged with practitioners in practice to understand the challenges, they face in their quest to control their projects. There seems to be an assumption that project control operates in isolation from the project environment.

Numerous studies have been conducted in recent years to identify the elements that influence project time and expense overruns around the world. Poor contract management, financing and payment of completed works, changes in site conditions, shortages of materials, imported materials and plant items, design changes, subcontractors and nominated suppliers are the most important variables causing construction delays and cost overruns, according to Mansfield et al

(1994). Price fluctuation, erroneous estimates, delays, and additional work were found as the top variables driving only cost overruns.

Even though there are no tangible research that have been conducted at the Ministry of Mines regarding project delays and cost overruns, still projects are being carried out without sufficient monitoring of proposed plans and timelines, resulting in project time overruns. Projects are also experiencing major cost overruns because of many influencing factors in the internal and external project environment. Low morale among the project's stakeholders and authorities, contracting parties' inability to perform work according to the contract document, paying less attention to project management issues, political liquidity, the government's inability to control its authorities (ministries and departments), and a lack of coordination between contractual states and the government are all influencing factors. As a result, there is a knowledge vacuum in terms of identifying the problems of effective project management in practice and providing deeper insights into the day-to-day practical issues that make good project cost and time control difficult. The study's aim was to make a contribution to the body of knowledge by assessing project time and cost performance in order to have a successful project in the current and future mining projects.

1.3 Research questions

1. What does the existing project time and cost performance looks like in Ethiopian ministry of mining?

2. What are the main Factors Influencing Time and Cost overrun in mining projects managed by Ethiopian ministry of mining?

3. What measurements must be taken to overcome Time and Cost overrun in mining projects managed by Ethiopian ministry of mining?

1.4 Research objectives

The overall objectives of this study were to evaluate project performance based on time (deliverability) and money (budget overrun) with the following specific goal in mind.

1. To describe the existing project time and cost performance looks like in Ethiopian ministry of mining.

2.To identify and analyze the main Factors Influencing time and cost overrun in mining projects managed by Ethiopian ministry of mining.

3. To outlay the main measurements that must be taken to overcome Time and Cost overrun mining projects managed by Ethiopian ministry of mining.

1.5 **Significance of the research**

Over 75% of Ethiopia's population is employed in agriculture and associated activities. The agricultural sector also contributes significantly to the country's exports. Despite the fact that the country is thought to have extensive mineral potential, the mining sector's contribution to the national economy has only achieved a maximum of 6% thus far. (USAID, 2022). To begin with, the conclusions of this study will serve as a lesson for new mining operations in terms of relating the effects of delays to their causes. This study was conducted on project personnel with the anticipation of the effects of schedule and expense overruns and controlling undesirable situations.

Secondly, the research was help to ensure timely completion of projects by analyzing various consequences of time and cost overrun and possible preventive and corrective measures to control them. Ultimately, the research was support timely delivery of service to the end goal within specified cost. This helps to discourage wastage of fund invested in the projects and supports the economy the country.

As time and cost of project are multi-dimensional, complex, and largely interrelated variables, the research was helping to find out the degree of dependency of the variables to each other and measures to decrease such dependency. With decreased dependency, the projects are more likely to finish within specified time and cost.

In general, the study was raised awareness among different stakeholders in the mining projects, eliminate ignorance about the subject, and contribute to the body of information for a better understanding of the mining projects and other projects as well. Furthermore, the study may

serve as a resource for certain academics who are interested in conducting additional research on related topics.

1.6 Scope of the research

The study was greatly concern on causes and effects of time and cost overrun on 6 projects managed or run by the Ethiopian Ministry of mining, which are in fact the most important effects of delay, are very common disease in the mining sector of Ethiopia. Regardless of the size of the project, the research was undoubtedly representing the Ethiopian mining industry's delay and cost overrun scenario, the impacts of time and cost overrun, and the essential actions to be taken by the authorities to control the situation.

1.7 Limitations of the research

The study may not necessarily be effective to all the problems in the subject. Due to the time constraints no site works was conducted. There is also a very little prior research on the topic mainly in the mining sector at the ministry level.

1.8 Organization of the Study

The study comprises five chapters. Chapter one discusses the background, problem statement, scope, significance, and objectives for undertaking this research project. Chapter Two looks at existing literature related to the study to gain an understanding of the research topic. Chapter Three presents the research methodology that the researcher used to undertake the study. Chapter Four comprises the findings and discussions of the findings to the study. Chapter five summarize the findings of the study and also make recommendations that would contribute to solving the problem raised, as well as a recommendation for further study.

CHAPTER TWO

RELATED LITERATURE REVIEW

This chapter identifies previous literature on the subject of time and cost overruns and provides a brief discussion of past findings. Also, the chapter reviews standard classification that has been used in this area. The definitions, causes, effects and resolutions for time and cost overruns, as found in the previous studies are provided and discussed.

2.1 Conceptual literature

Surbhi (2014) defines cost in a conceptual understanding as the total expense on inputs such as land, labor, capital, enterprise, and so on, for creating any product, i.e., the amount of money spent by a company in the manufacturing of a product, or any project supplied.

2.1.1 what are time and cost overruns?

2.1.1.1 Time overrun

- ✓ Choudhry (2004) and Chan (2001), defined time overrun as the difference between the actual completion time and the estimated completion time. It is measured in number of days.
- ✓ Construction project time overrun can be defined as an extension of time beyond the contractual time agreed during the tender, Al- Gahtani and Mohan (2007).
- ✓ According to Kaming et. al. (1997) and Trigunarsyah (2004), time overrun is the extension of time beyond planned completion dates usually traceable to contractors.
- ✓ Elinwa and Joshua (2001), defined it as the time lapse between the agreed estimation or completion date and the actual date of completion.
- ✓ Bramble and Callahan (1987), describe time overrun as the time during which some part of construction project is completed beyond the project completion date or not performed as planned due to an unanticipated circumstance.
- ✓ Dolage and Rathnamali (1992) defined time overrun as the non-completion of the project within the original or stipulated or agreed contract period.
- ✓ Lo, Fung & Tung (2006) and Assaf & Al-Hejji (2006), mentioned that time overrun is either beyond the contract date or beyond the date that the parties have agreed upon for the delivery of the project.

2.1.1.2 Cost overrun

- Cost overrun is defined as excess of actual cost over budget. Cost overrun is also sometimes called "cost escalation," "cost increase," or "budget overrun", Zhu ET. al. (2004).
- Cost overrun is defined as the change in contract amount divided by the original contract award amount. This calculation can be converted to a percentage for ease of comparison, Jackson (1990).
- Choudhry (2004) defined the cost overrun as the difference between the original cost estimate of project and actual construction cost on completion of works of construction project.
- Cost overrun occurs when the final cost of the project exceeds the initial estimate or budget, Yehen Rosenfield (2002).
- the amount by which actual costs exceed the baseline or approved costs, Widman (2002).
- The difference between the original cost and the actual cost when the project is completed, Avotts (1983). Actually, Avotts (1983), used the word cost growth instead of cost overrun.
- It is perceived to be the difference between the final project cost and the original contract amount, Hinze and Selstead (1991).

The goal of project control in the construction business is to guarantee that projects are completed on schedule, on budget, and meet other project objectives. In actuality, project managers have a difficult job that entails regularly measuring progress, evaluating goals, and taking remedial action when necessary. Kerzner is a character in the film Kerzner (2003). Numerous project control approaches, such as the Gantt Bar Chart, Program Evaluation and Review Technique (PERT), and Critical Path Method (CPM), have been created over the previous few decades, according to Nicholas (2001) and Lester (2001). (2000).

Microsoft Project, Primavera, and other software packages have become available to facilitate the use of these project control methodologies. Even though these methodologies and software packages are widely used in practice, many construction projects still run late. Numerous research on the identification of contributing elements of project time overrun have been published in recent years all around the world.

Poor contract management, financing and payment of completed works, changes in site conditions, shortages of materials, imported materials and plant items, design changes,

subcontractors and nominated suppliers are the most important variables causing construction delays, according to Mansfield et al. (1994), who conducted a questionnaire survey among 50 contractor, consultant, and client organizations in Nigeria. Through a questionnaire study of 31 project managers, Kaming et al. (1997) identified factors influencing construction time overrun on high-rise building projects in Indonesia.

Time overruns were discovered as a result of design revisions, poor labor productivity, insufficient planning, material shortages, inaccuracy of material estimates, skilled labor shortages, and other factors.In Hong Kong, Kumaraswamy and Chan (1998) conducted a more extensive study with 400 surveys and follow-up interviews. The top reasons of construction delays, according to the report, are delays in design information, extended wait times for drawing approval, inadequate site management and monitoring, faults and discrepancies in design documentation, and so on.

Al-Momani (2000) looked about 130 public projects in Jordan and found that the primary causes of delays include designer modifications, client requirements, weather, site circumstances, late delivery, economic situations, and so on. In a study of 67 civil engineering projects in Hong Kong, Yogeswaran et al. (1998) found that inclement weather was responsible for at least 15-20% of time overruns. Walker (1995: PP269) questioned Australian project representatives and discovered that the ability of the organization to manage risk, planning capabilities, and effective resource coordination are the most critical elements that determine time delays.

Faridi & El-Sayegh (2006: PP1172) investigated project delays in the United Arab Emirates and discovered that the preparation and approval of drawings, insufficient early project planning, and the slowness of the owner's decision-making procedures were the three main reasons of project delays.

Cost overrun, according to Angelo and Reina (2002), is a serious issue in both industrialized and developing countries. Cost overruns are widespread, according to several studies of large projects. Cost overruns in construction projects have a variety of factors, some of which are not only difficult to foresee but also difficult to manage. In a study conducted in Turkey by Arditi, et al. (1985), inflationary pressures, increases in material prices and workers' wages, difficulties in obtaining construction materials, construction delays, deficiencies in cost estimation prepared by

public agencies, and unexpected sub soil conditions were identified as major sources of cost overrun.

The variables influencing construction cost overrun for high-rise projects in Indonesia were researched by Kaming et al. (1997), who found that material cost increases owing to inflation, erroneous material estimation, and the degree of project complexity were the key factors driving cost overrun.

Cost overruns are attributed to problems with finance and payment arrangements, poor contract management, materials shortages, changes in site conditions, design changes, mistakes and discrepancies in contract documents, mistakes during constructions, price fluctuations, inaccurate estimating, delays, additional work, contract period shortening, and fraudulent practices and kickbacks, according to Mansfield, Ugwuand, and Doran (1994).

Stewart (1982) attributes cost overrun to a number of issues that are either uncontrollable or unmanageable to varied degrees. They include things like the accuracy of the initial cost estimate, the level of government regulation and control, construction completion delays, the number of design revisions, and labor-related issues including availability, skills, and increases in fringe benefits. According to Robert F. Cox (2007), project owners identified five reasons for project cost overruns: incomplete designs, insufficient preplanning, rising material costs, a lack of timely choices, and excessive change orders.

Poor project management, design changes, unexpected ground conditions, inflation, material shortages, change in exchange rates, inappropriate contractors, funding problems, and force majeure are among the factors that affect the cost of construction projects over time, according to User's Guide (2005). The absence of adequate phasing of construction projects in emerging countries might contribute to the economy becoming 'overheated.' This causes a shortage of construction materials because demand exceeds supply, which causes a rise in the cost of construction materials, which inevitably leads to project cost overruns, with inflationary consequences and a decline in efficient construction activity, according to Mansfield, Ugwu, and Doran (1994).

Jahren, et al. (1990) found the following factors to influence cost overrun rates in their research on predictors of cost overrun rates: project size, difference between lowest bid and engineer's

cost estimate, type of delivery method, method of competition, quality of contract documents, and nature of interpersonal relations on the project.

Various studies have looked into the causes of building project cost overruns since the 1980s. Cost overruns were mostly caused by inaccuracy of material takeoff, increases in material costs, and cost increases owing to environmental limitations, according to Kaming, Olomolaiye, Holt, and Harris (1997), who analyzed 31 construction projects in Indonesia. High transportation costs, modification in material specifications, escalation of material price, frequent failure of construction plants and equipment, and rework were determined to be reasons for cost overruns by S. Shanmugapriya and Dr. K. Subramanian (2013). Slow decision making, poor schedule management, increases in material/machine/ prices, poor contract management, poor design/delay in providing design/, rework due to incorrect work, problems in land acquisition, incorrect estimation/estimation method/, and a long period between design and time of bidding/tendering/ were found to be the major causes of cost overrun by T. Subramani, P S Sruthi, and M. Kavitha (2014).

Dlakwa & Culpin (1990) observed that changes in material, labor, and plant costs, construction delays, and inadequate pre-planning are the three main reasons for cost overruns in public sector building projects in Nigeria. Another study on building projects in Nigeria, done by Okpala & Aniekwu (1988), revealed that architects, consultants, and clients concurred that the most common causes of cost overrun were a lack of materials, financing and payment of finished works, and inadequate contract management. Morris and Hough (1987), as well as Flyvbjerg, Bruzelius, and Rothengatter (2003), discovered that material cost variations and additional work contributed the most to cost overrun during large investigations on building project performance in European countries. Price fluctuation, inaccurate estimates, delays, additional work, materials cost raised by inflation, inaccurate quantity take off, lack of knowledge of project location, lack of experience of project kind, and so on were indicated as the top variables driving only cost overrun.

While all of the aforementioned studies have contributed to a better understanding of the issues of cost overruns in construction projects to varying degrees, past research has attempted to uncover the causes for the gap between the tender sum and the final account.

Morris et al. (1990), Kaming et al. (1997), and Chimwaso et al. (1997) identified four criteria based on their previous research findings (2001). These include design revisions, poor planning, unpredictably bad weather, and price swings in construction materials.

Morris (1990) identified eleven elements that influence building project cost overruns. As the first source of cost overrun, these elements are inadequate project preparation, planning, and implementation, as well as construction delays. The second aspect was contractor supply of raw materials and equipment. The third factor was a shift in the project's scope. The fourth cause of cost overruns was a lack of resources, including finances, foreign exchange, power, and related auxiliaries.

The sixth element was government delays in making decisions and the failure of designated coordinating bodies. The sixth reason was a poor /inappropriate/ site selection. Technical incompetence and a bad organizational structure were the seventh and eighth reasons. This was the eighth strike in a row. Natural calamities were the ninth reason or cause of cost overruns, and the final was a lack of technical consultants' experience, insufficiency of overseas collaboration agreements, and technology monopoly.

2.1.2 Distinction between Delay and Time Overrun

Although there is a slight difference between the terms delay and time overruns, they are sometimes used interchangeably to denote a lack of progress in the construction industry. Delay refers to a lack of project progress in compared to the baseline construction timetable, whilst time overrun refers to any delay beyond the baseline construction schedule. Time overrun is the most major effect of construction delays, followed by cost overrun. Aibinu and Jagboro (2002) define a delay as a situation in which the contractor and project owner jointly or jointly contribute to the project not being finished within the initial or stated or agreed contract period. Most construction projects, no matter how simple or complex, face delays. A delay is defined in the construction business as an increase in the time it takes to finish a project. In a nutshell, a little delay indicates that the project will not be completed on time or within the contract's allocated cost. The occurrence of one delay may be followed by the occurrence of other delays, all of which could affect the project's completion schedule. The amount of time it takes to finish a project after its completion date is missed is referred to as the project's time overrun (Salunkhe and Patil, 2014).

2.2 Theoretical literature

Many researchers have defined time and cost overruns in their respective literatures. (Azhar and Faroouqi, 2008) define delay as the late completion of work in comparison to the expected or contract timeline. A delay occurs when a contract's progress falls behind its schedule. It can be caused by any contract party, and it can be the direct result of one or more factors. A contract delay has negative repercussions for both the owner and the contractor (in terms of lost revenue or increased expenses), and it frequently raises the sensitive issue of delay culpability, which can result in legal issues. When the project's ultimate cost exceeds the original estimates, it's called a cost overrun (Azhar and Faroouqi, 2008).

Morris (1990) looked into some of the factors that influence project schedule overruns, such as insufficient project planning, delays in process, changes in project scope, planning and implementation, contractor supply of raw materials and equipment, resource constraints: power, funds, associated auxiliaries, foreign trade not ready and delay in government decision-making, and failure of specific coordinating bodies.

According to (Ramanathan, 2012) Time overrun and cost overrun in projects can also be called is "slippage of project schedules". Time overrun is defined as the amount of time it takes to complete a project after its anticipated completion date, as a result of both internal and external factors (Najjar, 2008). Budget overrun, cost rise, or cost escalation are all terms used to describe cost overrun (Zhu, 2004). The difference between the initial estimated or projected cost and the ultimate cost at the project's completion is known as cost overrun (Amoa, 2014). Final costs are defined as the overall expenses incurred on a construction project as determined at the time of completion, whereas projected or initial costs are defined as the costs anticipated at the time of project approval (Lee, 2008).

A condition known as cost overrun occurs when a project is completed at a higher cost than anticipated. It occurs when a project deviates from its original schedule and is a common challenge. One of the critical turning points in a project's success is completing it within the contract's timeframe (Mulenga 2015). As a result, a cost overrun is defined as the difference between the projected initial project cost and the actual final cost. Cost overruns are unaffected by the type of project, procurement technique, or contract value (Peter 2013). In terms of

establishing and maintaining positive project team connections between contractor and design teams, the client's managerial effectiveness and sophistication, as well as their representatives', have a significant impact on project success (Peter 2013). In the project lifecycle, a shortage of experienced project managers emerges as the primary cause of schedule and cost overruns (Marian 2017). Cost overruns are caused by frequent design modifications and poor procurement planning, which can be minimized by sufficient project manager training and coaching (Marian 2017). As a result, cost uncertainty analysis is a key component of cost estimation that assists decision makers in understanding not just the potential financing exposure, but also the type of risks for a certain project or program (Van Truong 2009)

When the reasons of schedule overruns are not identified and properly addressed, the effects of schedule overruns will occur. The implications of construction project timetable overruns are identified and ranked as follows (Pourrostam and Ismail, 2011):

I. Time overrun: When a project's completion time is pushed forward, it is referred to as a schedule overrun (Sunjka and Jacob 2013). The term "schedule overrun" refers to a delay in the completion or delivery of a construction project beyond the time indicated or agreed upon by all parties involved. Financial issues, late payments for finished and ongoing work, modification orders, organizational changes, and other factors all contribute to timetable delays (Haseeb, 2011).

II. Cost overrun: A budget overrun occurs when a project is finished at a cost that exceeds the original estimate (Sunjka and Jacob 2013). Changes in scope of work on site, incomplete design at the time of tender, contractual claims (extension of time with cost), lack of cost planning and monitoring of funds, delays in costing variations, and additional works are all identified as critical factors that cause cost overruns in construction projects (Kikwasi 2012). The delay factors are the result of these essential elements. According to (Pourroustam and Ismail 2011) Cost overruns can be traced back to "root causes" that are often associated with the preliminary phases, project planning, or design, such as poor quantity estimation, design variations or errors, project schedule changes, scope changes, unexpected site conditions, rising materials and labor costs (largely due to inflation), and or unforeseen events. Cost overruns are caused by a variety of factors. These include increases in labor costs, labor force, materials and

equipment, and other factors. Change orders and contract errors are the primary causes of cost overruns.

2.2.1 Major determinants of time and cost overruns

Financial concerns, unrealistic contract durations imposed by customers, inadequately described project scope, client-initiated revisions, under-estimation of project cost by consultants, and inadequate inspection/supervision of projects by consultants, according to (Samuel and Charles, 2017). Contractors' underestimation of project complexity, poor site management, contractors' use of inappropriate building technology, and delays in government entities delivering licenses were among the other concerns. Cost overruns were caused by a variety of circumstances, including client financial issues, delays in payment of completed works, design changes, a lack of communication plans, insufficient feasibility and project analysis, poor financial management on site, and material price fluctuations.

Construction stakeholders' effective communication is widely regarded to play a critical role in transmitting every single instruction to site management at all phases of the project (Wang and Yuan, 2017). One of the top 10 characteristics that causes project COs is "poor communication," which has been blamed on the projects' fragmented structure (Durdyev et al., 2019). Lack of sufficient information flow, and thus conflicts and disputes among stakeholders, has been shown to affect project schedule performance (Hussain et al., 2018), which in turn affects project cost performance (Alinaitwe et al., 2013). The project life cycle is also known for its dynamic structure, which comprises several stakeholders at various levels, resources to be managed, and a dynamic information flow.

Several factors contribute to the overall project delay, some of which are the contractor's responsibility and others which are the owner's. Because of the overlapping nature of the events, determining who is to blame and what circumstances are causing the delay is challenging. Delays are frequently seen as a source of contention, negotiation, lawsuits, outright desertion, litigation, and abandonment. We can say that the contracting parties agree, through claims, on the additional cash and time involved with project delays. Delays affect different parties in different ways. The most prevalent outcomes are the loss of wealth, time, and capacity. A delay means lost money and the inability to use the amenities for the owner. Delays cost the contractor

money since they have to buy additional equipment and materials, as well as time because they have to hire more workers (Haseeb et. al., 2011).

According to (Henry Trammell, 2014) KPIs can be applied to any project management methodology you use. And remember: Your KPIs should be agreed upon by all involved parties before initiating a project, and then measured and monitored as a tool for decision-making during the project so then cost and time overrun won't exist.

Timeliness KPIs

Cycle Time: The time needed to complete a certain task or activity. This is helpful for repeated tasks in a project.

On-Time Completion Percentage: Whether or not an assignment or task is completed by a given deadline.

Time Spent: The amount of time that is spent on the project by all team members—or, if you like, by each team member individually.

Number Of Adjustments To The Schedule: How many times your team has made adjustments to the completion date of the project as a whole.

FTE Days Vs. Calendar Days: How much time your team is spending on a project by calendar days, hours, and/or full-time equivalent work days.

Planned Hours Vs. Time Spent: How much time you estimated a project would take versus actual hours. If the time spent differs from the amount of time anticipated, it's a flag that you underestimated the resource allocation or budget, and your timeline may be affected.

Resource Capacity: The number of individuals working on a project multiplied by the percent of time they have available to work on it. This project KPI helps to properly allocate resources (and determine any hiring needs) and set an accurate project completion timeline.

Resource Conflict YOY: Comparing the number of projects with resource conflicts year over year (YOY). Not having the resources to complete projects or having employees assigned to

several projects at a time can lower efficacy. KPIs that compare these conflicts will show whether the situation is a persistent problem or one-off situation that needs to be addressed.

Budget KPIs

Budget Variance: How much the actual budget varies from the projected budget. To track this KPI, measure how close the baseline amount of expenses or revenue is to the expected value.

Budget Creation (Or Revision) Cycle Time: The time needed to formulate an organization's budget. This includes the total duration of research, planning, and coming to a final agreement.

Line Items In Budget: Line items helps owners and managers keep track of individual expenditures—and provide a more detailed way to see how the budget was spent.

Number Of Budget Iterations: The number of budget versions produced before its final approval. A higher number of budget iterations means more time is being spent planning and finalizing a budget.

Planned Value: The value of what's left to complete in a project—in other words, the planned cost of what still needs to be done. For example, if you have a $20K budget and 30 percent of the project remaining, the planned value of the remaining work is $6K. Use this project KPI to compare against the actual cost and adjust the budget if needed.

Cost Performance Index: Compares the budgeted cost of the work you've accomplished so far to the actual amount spent. This is a ratio to measure the expense efficiency of a project—earned value divided by actual costs.

2.3 Empirical literature

Doloi (2012) studied Indian projects and found that the most significant cause of delays are

(1) lack of commitment.

(2) inefficient site management.

(3) inadequate site coordination.

(4) incorrect planning.

(5) lack of clarity in project scope.

(6) lack of communication; and

(7) substandard contracts were identified as the most crucial elements of Project delay based on the factor analysis. According to the regression model, the owner's tardy decision, poor labor productivity, architects' aversion to change, and rework due to construction errors are all factors that contribute to the project's overall delay.

Peter E. D. Love et.al (2013) explained the probability of project cost overrun in 276 Australian construction projects. The Kolmogorov-Smirnov, Anderson-Darling, and chi-squared nonparametric tests were used to determine the goodness of fit of the selected probability distributions. ANOVA test was used to determine differences between the cost overruns experienced in the construction and engineering projects. The study revealed a mean cost overrun of 12.22%. Abhishek Bhargava et.al (2010) proposed analysis based on Time and Cost Overruns in Indiana projects using three-stage least-squares technique to investigate the factors affecting time delay and cost overrun against the background of their simultaneous relationship. It was observed that, a number of factors that significantly affect cost overrun and time overrun are project type and results of the bidding process. Three-stage least-squares regression models was used to explain cost overrun and time delay as a function of variables that are available at planning phase. This study provided empirical evidence that a simultaneous relationship does exist between cost overruns and time delays.

2.4 Synthesis

An assessment is a method for identifying and addressing unmet needs, or "gaps" between present and desired conditions, or "wants." To properly define the demand, the difference between the present and desired conditions must be quantified. A desire to improve present performance or remedy a shortcoming can be the driving force behind the requirement.

Overruns in project schedules, according to the literature, have a range of implications. Time overrun (time extension), cost overrun, disagreements, arbitration, litigation, total abandonment, and claims are all consequences of timetable overruns, according to the literature.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Approach and Design

A mixed research technique was used to combine quantitative and qualitative data. A mixed methods approach employs strategies of inquiry that require obtaining data either simultaneously or sequentially to answer research issues (Creswell, 2003). The final data base contains both quantitative and qualitative data, as the study's purpose is to determine the consequences of time and cost overrun, as well as the relationship between time and cost overrun.

The study was also descriptive and correlational because it was describing the actual rate of time and cost overruns and the variables of time and cost overruns and was tried to draw relationship between contract document and rate of time and cost overruns in the projects of the ministry of mining. Descriptive study is research that aims to give a glimpse of the existing situation. And Correlational research is a type of study that aims to uncover correlations between variables and anticipate future events using information already available. This design was chosen because it will allow to evaluate the scale and scope of problems as well as the proposal of solutions. The research process was generally defined by specifying the study challenges, objectives, and questions.

According to Singh (2006), research design is an investigator's decision about the components of a study and the development of specific design elements. A study design is not a set of steps that must be followed in a specific order. It is a step of research planning in which the feasibility of the research is usually visualized rationally. The research components were chosen in consideration of the research's aims. Research hypotheses also serve as the foundation for planning a study.

3.2 Sampling Techniques

Sampling is a method of picking individuals or a subset of the population in order to make statistical inferences and estimate population characteristics. Researchers utilize a variety of

sample strategies so that they don't have to study the complete population to get useful information.

Project professionals such as project managers, consultants, and contractors involved in the projects was targeted in order to examine and assess the effects of time and cost overruns in mining projects under the Ministry of Mines. The Ministry of Mines did provide a list of the project staff who was targeted. As there are six projects that are managed under the Ministry of Mines, the population of the research will include all six projects.

Both probability and non-probability sampling was used in this study. The latter is a sampling approach that provides no basis for calculating the likelihood of any item in the population being included in the sample because the study will include all six projects. Probability sampling, often known as random sampling or chance sampling, is the second type of sampling. According to this sampling strategy, every item in the universe has an equal probability of being included in the sample (Kothari, 2004). The sample population (50 employees of the projects) that was provided by the Ministry of Mines from a list of project employees who was targeted, and the study was done based on their work.

3.3 Data Source, Collection Tool and Procedures

In order to obtain the relevant data for the study both primary and secondary data was used to address the specific details under the study.

3.3.1 Primary Data

Primary data means original data that has been collected for different purposes. These types of data are generally collected for the first time. Such kinds of data are collected through questionnaires, observation. The primary data in the study was collected through questionnaires given to 50 project personnel like project managers, consultants and contractors involved in the projects as well as informal interview that were used in the conclusion and recommendation.

3.3.2 Secondary data

Secondary sources include all relevant available data that are prepared, Collected, and analyzed by others which include research publications, periodicals, essays, standard records, evaluation

reports and other relevant documentaries. Secondary data for the study referred includes books, journals, articles, annual report of ministry of mines, websites, and other published information within or outside of the ministry.

Semi-structured interview: the second instrument has used semi-structured interview. This was

Conducted mainly for the purpose of gaining enough information.

3.4 Description of study variables and measurement

Variables are commonly utilized in research to make accurate inferences. When the variables are changed, measured, and manipulated, this is achieved. As a result, variables are divided into two groups: dependent variables and independent variables (Cohen, Manion & Morrison, 2000).
Time and cost are the two main components in projects.

3.5 Data Analysis Techniques

To discover useful information by evaluating data through a process of inspecting, cleaning, transforming, and modeling data by using analytical and statistical tools, both descriptive and inferential statistics will be used in the data analysis. In the analysis the Mean Score Method will be adopted to establish the relative importance of the effects of time and cost overrun in mining projects that are run by the Ministry of Mines. Descriptive statistics were summarized to find out the characteristics of a data set. The major purpose of this type of research was to identify and analyze the causes of time and cost overrun on projects in Ethiopian Ministry of Mines.

Stakeholder experiences were analyzed through questionnaires, and the study were based on the comments of the participants, with special focus paid to the causes, impacts, and resolutions of overrun by making Shure that the comments and answers from the interviews given were reliable, valid, and ethically acceptable
The study focused on the analysis of the acquired data in order to draw conclusions and answer the question posed in the study's problem statement. The analysis conducted during the research were yield as a conclusion, as well as recommendations.

CHAPTER FOUR

Data Presentation, Analysis and Interpretation

4.1 Characteristics of the Study Respondents

This part mainly designed to provide general information about the respondents in terms of Gender, relevant work experience, job status, educational qualification and distribution and return of the questionnaire.

Table 4.1 Summary of respondents' gender from the questionnaire survey

Gender	Occurrence	Rate of occurrence (%)
Male	38	76%
Female	12	24%
Total	50	100%

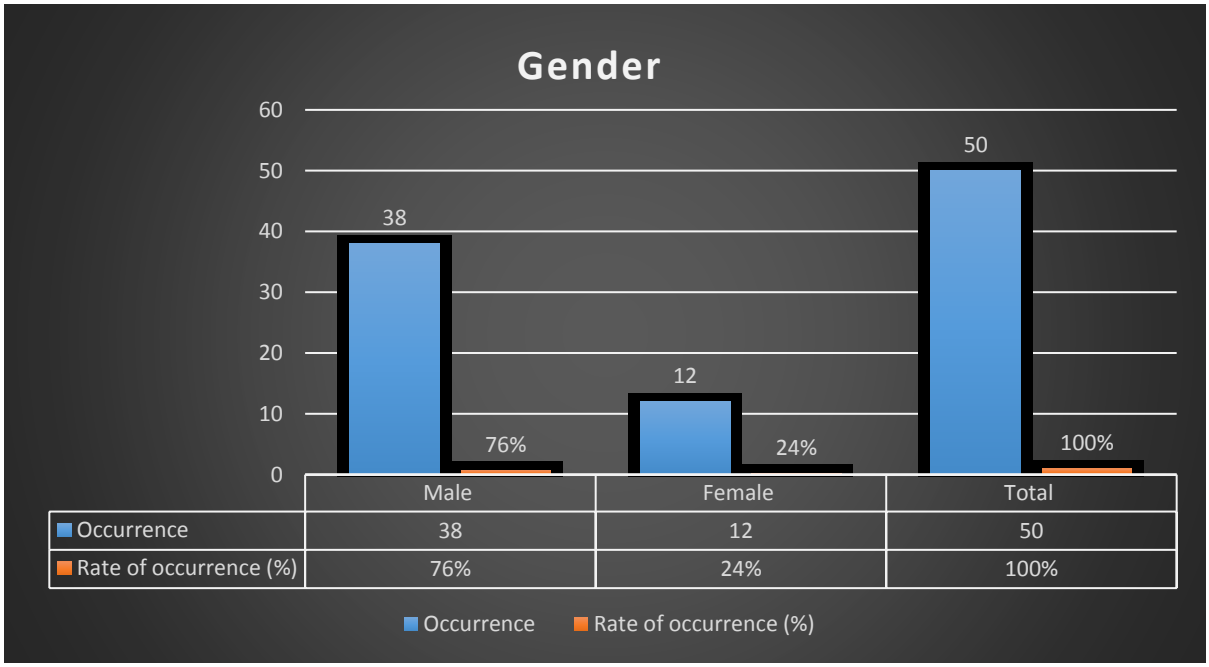

Figure 4.1 Summary of respondents' gender from the questionnaire survey

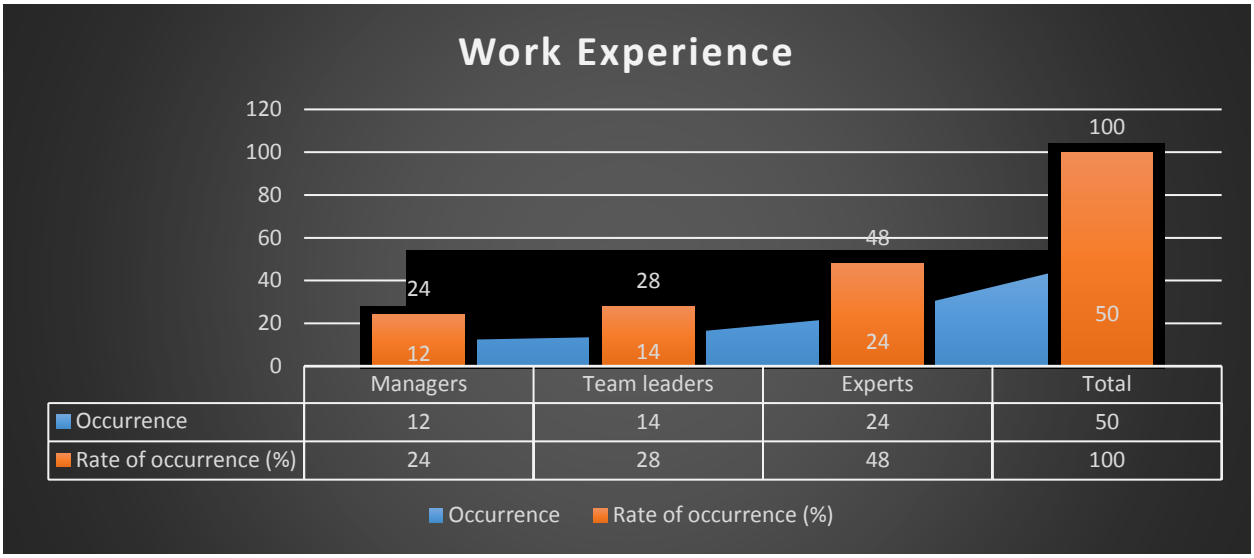

Figure 4.2 Summary of respondents' job status from the questionnaire survey

Figure 4.2 shows that 24 % (12) of respondents were managers, 28 % (14) were team leaders and 48 % (24) were experts.

Table 4.2 Summary of respondents' work experience from the questionnaire survey

Experience	Occurrence	Rate of occurrence (%)
Up to 5	18	36%
5-10	14	28%
10-15	10	20%
Above 15	8	16%
Total	50	100%

Table 4.2 shows that 36 % (18) of the respondents have experience up to 5 years, 28% (14) of the respondents experience is between 5 to 10 years, 20 % (10) of respondents have experience from 10 to 15 years and 16 % (8) are with service year of above 15 years .

Table 4.3 Summary of respondents' educational qualification from the questionnaire survey

Experience	Occurrence	Rate of occurrence (%)
Diploma	24	48%
1st Degree	14	28%
2nd Degree	12	24%
Total	50	100%

Table 4.3 shows that 6.25 % (3) of the respondents have diploma, 54.17 % (26) of the respondents' qualification is 1st degree and 39.58 % (19) of respondents have educational background of 2nd degree.

Table 4.4 Summary of questionnaire responses from the questionnaire survey

	Distributed in number	Returned in number	Rate of return (%)
Manager	**12**	**12**	**100%**
Leader team	**14**	**14**	**100%**
Experts	**24**	**24**	**100%**
Total	**50**	**50**	**100%**

Figure 4.3 Summary of questionnaire responses from the questionnaire survey

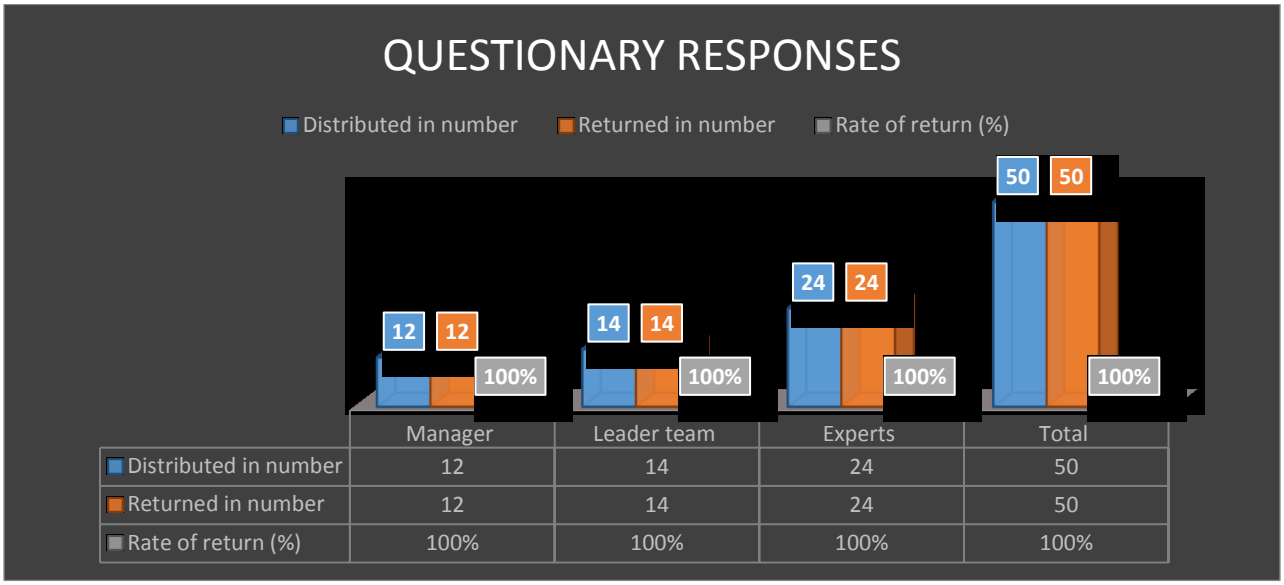

Figure 4.3 shows the general response rate for respondents is 100 % and the total number of respondents for the four categories was 50 out of 50 respondents. The response rate of managers is 100 % (12 out of 12 respondents), team leaders 100 % (14 out of 14 respondents, 100 % (24 out of 24 respondents) for experts.

4.2 Existing Time and Cost Management Performance of the Ethiopian ministry of mines.

Three Ethiopian Ministry of Mines projects were chosen for the study, and their contract and actual completion time were examined. In the same way, this is done for cost overruns.

The information was gathered through looking over project materials. The rate of time overrun varies from a minimum of 23% to a maximum of 61%of the contract time, while the rate of cost overrun varies from a minimum of 5% to a maximum of 15% of the contract value.

Names of selected projects, contract and actual completion time and cost, rate of time overrun, and cost overrun are described as demonstrated in the desk research data.

Table 4.5 Summary of Mines projects data from the desk study

s/n.	**Name of projects**	Contract compl. time (days)	Actual completion time (days)	Contract compl. cost in million (Birr)	Actual completion cost in million (Birr)	Rate of time overrun (%)	Rate of cost overrun (%)
1	Petroleum and Atomic Minerals Company	1090	1683	82.55	94.70	54	15
2	Strip Mining	1040	1279	93.63	98.1	23	5
3	Underground mining	1095	1761	176.83	195.81	61	11

4.3 Time and Cost Overruns

Time and cost overruns are the first major question of the statement of problem, i.e. 'what are the time and cost overruns?' In order to get answer in detail from the respondents this question has been further subdivided into two questions. The first question indicates identification of significance rate of different types of causes and the second question is empathy of the significance rate of overruns related to responsible parties.

The time and cost overruns that are included in the literature review are tested with the questionnaire. And hence, after calculation the mean score result of each cause is found out as indicated in the table below. Accordingly, Table 4.6 below indicates the mean score and rank of the top 10 time and cost overruns in PEMM Mines projects.

Table 4.6 Mean score and rank for time and cost overruns from the questionnaire survey

S/ no.	Causes	MS	Rank
1	Less emphasis to planning	2.94	1
2	Poor contract management	2.86	2
3	Poor pre planning process	2.86	3
4	Lack of timely decisions	2.84	4
5	Failure to update schedules on time	2.79	5
6	Frequent breakdown of working machinery and equipment	2.75	6
7	Excessive change orders	2.56	7
8	Inadequate early planning of the project	2.56	8
9	Setting unrealistic time schedule	2.54	9
10	Contractual claims, such as extension of time with cost claims	2.54	10

4.3.2 Responsible Parties for Time Overruns

This part consists of discussion and results of responsible parties for the time and cost overruns. These factors include: contractors' responsibility, consultants' responsibility, and external factors.

After calculation the mean score of each causes from the questionnaire responses, the result is as indicated in the table below. Accordingly, Table 4.7 below indicates the mean score and rank of the main or top time overruns for each responsible party.

Table 4.7 Mean score and rank for causes of time overruns of responsible Parties from the questionnaire survey

S/ no.	Causes	MS	Rank
I	**CONTRACTOR**		
1	Frequent breakdown of working machine and equipment	2.88	1
2	Contractual claims	2.83	2
3	Poor schedule management	2.83	3
4	Poor project management	2.83	4
II	**CONSULTANT**		
1	Fraudulent practices and kickbacks	2.96	1
2	Excessive change orders	2.71	2
4	Lack of timely decisions	2.71	3
III	**EXTERNAL**		
1	Escalation of material price	2.33	1
2	Inclement weather	2.25	2
3	Unexpected sub soil conditions	2.21	3
4	Unexpected problem	2.13	4
5	Poor economic conditions (currency, inflation rate and LC.)	2.13	5
6	Fraudulent practices and kickbacks	2.13	6
7	Increase in workmen's wage	2.13	7

4.3.2 Responsible parties for causes of cost overruns

This part consists of discussion and results of responsible parties for the causes of cost overruns. These factors include: contractors' responsibility, consultants' responsibility, and external factors.

After calculation the mean score of each causes from the questionnaire responses, the result is as indicated in the table below. Accordingly, Table 4.8 below indicates the mean score and rank of the main or top causes of cost overruns for each responsible party

Table 4.8 Mean score and rank for causes of cost overruns of responsible Parties from the questionnaire survey

S/ no.	Causes	MS	Rank
I	**CONTRACTOR**		
1	Frequent breakdown of working machine and equipment	2.88	1
2	Poor schedule management	2.83	2
3	Poor project management	2.83	3
II	**CONSULTANT**		
1	Long waiting time for approval of working machine and materials samples	3.00	1
2	Fraudulent practices and kickbacks	2.96	2
4	Excessive change orders	2.71	3
6	Lack of timely decisions	2.71	4
III	**EXTERNAL**		
1	Escalation of material price	2.33	1
2	Inclement weather	2.25	2
3	Unexpected sub soil conditions	2.21	3
4	Unexpected problem	2.13	4

5	Poor economic conditions (currency, inflation rate and LC.)	2.13	5
6	Fraudulent practices and kickbacks	2.13	6
7	Increase in workmen's wage	2.13	7

4.4 Resolution methods to minimize of time and cost overruns

The second major question of the statement of the problem is, 'how could the time and cost overruns can be avoided or minimized?' and hence this part consists of discussion and Results to get to resolution of time and cost overruns.

After calculation the mean score of each resolution methods, the result is found out as indicated in the table below. Accordingly, Table 4.10 below indicates the mean score and rank of the main or top 15 resolution methods of time and cost overruns in PEMM Mines projects.

Table 4.10 Mean score and rank for resolution methods of time and cost overruns from the questionnaire survey

S/ no.	Resolutions	MS	Rank
1	Timely progress control, schedule control, cost control, resource control by comparing with the completion date and cost	3.33	1
2	Assign competent personnel	3.13	2
3	Effective strategic planning	3.00	3
4	Provide knowledge/training/ to unskilled workers based on their scope of work	3.00	4
5	Committed leadership and management	2.96	5
6	Increase the Production productivity	2.96	6
7	Systematic control mechanism	2.92	7
8	Proper project planning and scheduling	2.88	8
9	Focus on quality, cost and delivery of the project	2.88	9
10	Increase the expertise and skill of human resources	2.83	10
11	Use of appropriate project method	2.83	11
12	Use of experience of subcontractors and suppliers	2.83	12

13	Prepare a cash flow diagram and monitor progress during the contract period	2.83	13
14	Avoid poor quality of work, more rectification and double handling	2.79	14

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Summary of the Findings

The questionnaire was analyzed from the work force, who worked for the project of Ethiopian ministry of mines. In order to find the most important factors which influence the time and cost overruns in Ethiopian ministry of mines., factors were ranked based on responses. The analysis shows that, there are many important factors which influence the causes of schedule delay and cost overruns in Ethiopian ministry of mines. Project. During the survey, five most important factors which causes were the delay and cost overruns are shown in table 4.9.

These factors are poor material management (PMM), site conditions (SC), unskilled labours/labour strikes (USL), contractor financial difficulties (CFD), machines and equipment difficulties (M&ED) Poor Information and Communication Technology (PICT), External Factors (EF). Table 4.8 explains about the main factors of cost and time overruns in ground anchoring project and their highest mean values.

Other reasons contributed to the schedule delays and cost overruns, including contractor changes, rework costs, insufficient early planning, a lack of safety awareness, owner factors, labor shortages, unskilled operators for machines, and the workload of the contractors. Weather conditions, material delivery, mistakes during the project, poor inspections, estimate errors, conflicts, delays in work approvals, unexpected conditions, slow decision making, shortage of site workers, lack of communication, ineffective scheduling, contract modification, project location, change of material specification, equipment availability, quality equipment, increase in material cost, in accurate mating are all factors that must be considered.

5.2 Conclusion

Based on a survey of those who worked on the Ethiopian Ministry of Mines project for ground anchoring, this study investigates the primary causes of time and cost overruns in construction projects, with an emphasis on discovering the important elements of project schedule delay and cost overruns. Material management, site conditions, unskilled labor/labor strikes, contractor

financial challenges, and machine and equipment difficulties are the survey's primary findings. The above-mentioned five factors have the highest precision of all 81 factors. Other factors played a role in the project's schedule delays and cost overruns, but not to the same extent as the five factors mentioned above. The findings show that many of the issues in ground anchoring projects stem from the project's execution; project execution necessitates the control of these types of factors to avoid overruns, and project management techniques such as planning, directing, controlling, monitoring, and procedures must be implemented. The following conclusions are derived based on the findings of the desk study and the responses of the respondents to the questionnaire.

- Three out of three (100%), projects investigated in the research suffered with time and cost overruns in their execution and completion. For these construction projects, the actual time overruns range from 23% to 61% of the contract completion time and the cost overrun ranges from 5% to 15% of the contract completion cost.
- The first major question of the statement problem was to identify causes of time and cost overruns in Mines projects of PEMM.
- After analysis, less emphasis to planning (MS: 2.94), poor contract management (MS: 2.88) and Poor pre planning process (MS: 2.86) has been ranked in the first, second and third position as the causes of time and cost overruns.
- MS analysis and result indicated that, frequent breakdown of construction plants and equipment (MS: 2.86), the method of competition in procurement (MS: 2.86) and contractual claims (MS: 2.83) has been ranked in the first, second and third position as contractors responsibility; and in the same manner long waiting time for approval of drawings and materials samples (MS: 3.00), fraudulent practices and kickbacks (MS: 2.96). And escalation of material price (MS: 2.33), inclement weather (MS: 2.25) and unexpected subsoil conditions (MS: 2.13) are external causes of time and cost overruns.

- One of the specific objectives was to identify the effect of time and cost overruns in construction projects of PEMM. There are many effects of time and cost overruns to stakeholders in the construction industry. But, during analysis MS results indicated that the contribution of the construction industry to the growth of national economy of the country will be less (MS: 2.75), delayed payments to contractor (MS: 2.75) and inability to deliver value for money (MS: 2.67) has been ranked in the first, second and third position as effects of time and cost overruns.
- The second major question of the problem statement was to forward the resolution methods to minimize or avoid time and cost overruns in PEMM Mines projects. And hence, during analysis MS results indicated that timely progress control, schedule control, cost control, resource control by comparing with the completion date and cost

(MS: 3.33), assign competent personnel (MS: 3.13) and effective strategic planning (MS: 3.00) has been ranked in the first, second and third position as resolution methods of time and cost overruns.

5.3 Recommendation

The researcher recommended some points that are suggested to PEMM in order to control, minimize and avoid time and cost overruns in Mines projects.

1. PEMM ought to assign competent and complete administrative and technical staff as soon as project is awarded to make arrangements to achieve completion within contract time, cost and with the required quality.

2. PEMM had better to use advance payment properly to avoid the financial problems; and it is advised to conduct breakeven analysis from time to time.

3. PEMM is guided to use planning and scheduling**,** which are continuing processes during construction and match with the resources and time to develop the work and to avoid time and cost overruns.

4. PEMM has to be aware about best Mines materials procurement competition, so it is advised to purchase the Mines materials at the beginning of work. It is also better to have time schedule for material delivery process to the site in order to avoid shortage or lack of materials.

5. PEMM is advised to setup realistic time schedule and preventive and periodic maintenance of machine and equipment.

6. PEMM had better monitor the quality of activities continuously and to set the required quality system in the different activities of the project so as to avoid any mistakes that may lead to rework of activities, and finally time and cost overruns.

7. PEMM must have committed leadership and management, timely decision process, advanced contract and project management, systematic control mechanism and effective and efficient strategic planning and management.

8. PEMM would set up a computerized system to perform documentation process for all the activities in the site, so they would be able to detect performance in the work and to follow the time schedule continuously.

9. PEMM need to have appropriate construction method and increase productivity to control or to avoid the greatest rate of time overrun of construction projects.

5.4 Directions for further research

For PEMM and other construction companies, this study looked into the causes, impacts, and remedies of time and cost overruns on Mines projects. According to the findings, there is a lot of need for more research in the following areas:

- ✓ The skills level of PEMM Mines labour and subsequent levels of productivity.
- ✓ The impact of architectural novelty on the design phase duration of projects. These
- ✓ The impact of geographical positioning on Mines performance.
- ✓ The impact of interrelationships/causalities/ between two or more factors. Although levels' could impact on 'site supervision'.

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SCHOOL OF POST GRADUATE STUDIES

ST. MARY'S UNIVERISITY

Department of Project Management

Projects at Ethiopian Ministry of Mines' Workers Questionnaire

Dear respondents,

This research is entitled " Assessment of Project Time and Cost Performance: The Case of Projects at Ethiopian Ministry of Mines'. The researcher is Melaku who is currently Project Management student at ST. MARY'S UNIVERISITY.

This survey is intended to collect information on the Assessment of Project Time and Cost Performance: The Case of Projects at the Ethiopian Ministry of Mines. Your sincere responses will be more valuable to the study's success. As a result, I'd like to ensure you that all of the information you supply will be kept private and used just for the goal of receiving a partial master's degree in project management from St. Mary's University.

It is completely voluntary to take part in this study. Your information was kept private and was only used for research purposes. In the researcher's thesis, personal responses were not recognized.

Thank you very much for your cooperation in advance!!

SECTION – A (General Information)

Q.1 Gender

☐ Male ☒ Female

Q.2 Job status

☐ Manager ☐ Team leader ☐ Expert

Others,_____

Q.3 Relevant work experience (Years)

☐ Up to 5 ☐ 5 - 10 ☐ 10 – 15 ☒ Above 15

Q.4 Educational qualification

☐ Diploma ☐ 1st Degree ☐ 2nd Degree

Please indicate the significance rate of each factor by ticking the appropriate box. Add any Remark relating to each factor on the last column.

E.S. = extremely significant (4)

V.S. = very significant (3)

M.S. = moderately significant (2)

S.S. = slightly significant (1)

N.S. = not significant (0)

SECTION B:

Q.5 causes of time and cost overruns of Projects at Ethiopian Ministry of Mines'

What are the causes of time and cost overruns on your Projects?

CAUSES	N.S	S.S	M.S	V.S	E.S	Remark
Delayed disbursing of payments to the contractor by client						
Less emphasis to planning						
Setting unrealistic time schedule						
Failure to update schedules on time						
Poor contract management						
Inadequate early planning of the project						
Deficiencies in cost estimate and preparation						
The degree of project complexity						
Finance and payment arrangements						
Changes in laws, regulations and taxes						
Fraudulent practices and kickbacks						
Poor pre planning process						
Lack of timely decisions						
Poor project management						
Changes in exchange rate						
Inappropriate sub-contractors						

CAUSES	N.S	S.S	M.S	V.S	E.S	Remark
Cost increase due to environmental restrictions						
High transportation cost						
Changes in material specification						
Escalation of material price						
Poor schedule management						
Incomplete design at the time of tender						
Poor qualification of technical staffs						
Lack of experience						
Poor economic conditions (currency, inflation rate, LC and etc.)						

Q.6 Responsible parties for causes of time and cost overruns

Who are responsible for causes of time and cost overruns?

I) Contractor

CAUSES	N.S	S.S	M.S	V.S	E.S	Remark
Less emphasis to planning						
Setting unrealistic time schedule						
Failure to update schedules on time						
Inaccuracy of material estimate						
Poor site management and supervision						
Ineffective resource coordination						
Deficiencies in cost estimation and preparation						
Finance and payment arrangements						
Poor contract management						
Constructions mistakes and defective works						
Fraudulent practices and kickbacks						
Lack of timely decisions						
Poor project management						
Inappropriate sub-contractors						
Poor schedule management						

II) Consultant

CAUSES	N.S	S.S	M.S	V.S	E.S	Remark
Delayed approval of payments						
Mistakes and discrepancies in design documents						
Lack of timely decisions						
The ability of the organization to manage risk						
Poor contract management						
Mistakes and discrepancies in contract documents						
Fraudulent practices and kickbacks						
Excessive change orders						
The method of competition in tendering						
Changes in material specification						
Incomplete design at the time of tender						
Absence of staff in site						
Change in the scope of the project						
Wrong /inappropriate/ choice of site						

III) External Factors

CAUSES	N.S	S.S	M.S	V.S	E.S	Remark
Unexpected problems						
Inclement weather						
Increases in workmen's wage						
Unexpected sub soil conditions						
Changes in exchange rate						
Escalation of material price						
Fraudulent practices and kickbacks						
Inadequacy of foreign collaboration agreements and monopoly of technology						
Delay in obtaining permits from municipality						
Force majeure						
Lack of labour, materials, equipment, and tools in the market						
Poor economic conditions (currency, inflation rate, LC and etc.)						
Changes in laws, regulations, and taxes.						
High transport cost.						
Delay in providing services from utilities (such as water, electricity etc.)						

SECTION D: Q.7 RESOLUTION METHODS OF TIME AND COST OVERRUNS

IN YOUR PROJECTS

What are the resolution methods to overcome time and cost overruns on your Projects?

RESOLUTIONS	N.S	S.S	M.S	V.S	E.S	Remark
Provide knowledge/training/ to unskilled workers based on their scope of work						
Focus on client's need						
Compare the budget prepared at weekly or monthly intervals with the actual performance achieved						
Systematic control mechanism						
Increase supply of materials						
Appropriate contractual framework						
Use of appropriate project method						
Effective strategic planning						
Efficient management						
Fully utilization of the construction team						
Proper project planning and scheduling						

RESOLUTIONS	N.S	S.S	M.S	V.S	E.S	Remark
Increase the expertise and skill of human resources						
Risk management during project execution						
Focus on the quality, cost and delivery of the project						
Hire skilled workers to achieve good progress						
Avoid poor quality of work, more rectification and double handling						
Timely progress control, schedule control, cost control, resource control by comparing with the completion date and cost						
Send clear and complete message to workers to ensure effective communication						
Committed leadership and management						
Increase the construction productivity						

Q.8 Factors Influencing Time and Cost Overrun

Factors	N.S	S.S	M.S	V.S	E.S	Remark
poor material management						
site conditions						
unskilled labours/labour strikes						
contractor financial difficulties						
Time extension						
Poor Information and Communication Technology						
External Factors						