



ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF BUSINESS ADMINISTRATION

**ASSESSMENT OF TIME AND COST OVERRUN IN CONSTRUCTION
PROJECTS (CASE OF MIDROC ETHIOPIA CONSTRUCTION PLC.)**

**ATHESIS SUBMITTED TO ST. MARY'S UNIVERSITY, SCHOOL OF
GRADUATE STUDIES IN PARTIAL FULFILMENT OF MASTERS OF
BUSINESS ADMINISTRATION**

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JUNE, 2022

ADDISS ABABA, ETHIOPIA

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DECLARATION

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of Dr. Tasew Tadesse. All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

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JUNE, 2022

LETTER OF CERTIFICATION

This thesis has been submitted to St. Mary's university, school of graduate studies for Examination with my approval as a university advisor

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JUNE, 2022

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ACRONYMS

MIDROC Mohammed International Development Research and Organization Companies.

PLC. Private Limited Company

COVID-19 Corona virus deseas -19

ETB Ethiopian birr

MOUDHD Minister of Urban Development, Housing And Construction

GDCF Gross Domestic Capital Formation

CPD construction project delays

ABSTRACT

The main objective of the research was to assess the cause of time and cost overrun in the case of MIDROC Ethiopia construction. Mixed method approach was used to collect quantitative and qualitative data. questionnaire, interview and focus group discussion used as primary data collection method. Total of 88 target population used in this study, 74 questionnaire is distributed to consultants, clients and contractor. 7 of them participated in focus group discussion held at red cross project and out of which 3 purposely selected participant are selected for interview. secondary data collected for eight project from monthly Report, payment, time extension letter and correspondence letters, from desk study rate of time overrun range from minimum 4.72% to maximum 270.42% of the contract amount. Relative importance index and descriptive statistics were used to analyze data in this research. The finding reveal that financial difficulties (shortage), delay of material delivery to site, poor economic conditions (currency exchanges, inflation rates, etc are top three cause of time overrun and fluctuations in the cost of building materials, cash flow and financial difficulties faced by contractors, delay in material delivery are top three cause of cost overrun. Finally, some recommendations have been delivered under this study on what actions should be taken to tackle the two major problems of schedule delay and cost overrun.

Key word: *Time overrun, cost overrun, contractor, consultant, client*

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Nowadays construction industry shows that it is a rare event most construction projects are completed on the scheduled time, budgeted cost, and desired quality. Unlike other industries, the construction industry has unique features that originate from various projects' individual structures (Cooper et al., 2005; Kenley, 2012). As a result, claims and disputes become common phenomena, especially on large civil engineering contracts.

The impact of construction delay does not just affect the construction industry alone but touches the whole economy of the concerned countries (Teo and Loosemore, 2001). Projects are expected to run recurrently without delays (Aibinu and Jagboro, 2002). Yet, construction delay is one of the major challenges faced by the global construction industry (Aibinu and Jagboro, 2002; Ika, 2012).

Ogunlana et al. (1996), Abd. Majid and McCaffer (1998) identified 57 major causes of delays and classified them into eight categories that include client-related delays; finance-related delays; consultant-related delays; contractor-related delays; equipment-related delays; material-related delays; manpower-related delays; and external-related delays. The authors pinpointed improper planning, poor site management, the inadequate experience of the contractor, inadequate finance of the client and payments for completed work, problems related to subcontractors, material shortage, labor supply, availability and failure of equipment, lack of communication between parties and mistakes during the construction stage are the most significant causes of project delay of the factors investigated.

Several studies have been carried out in an attempt to determine the factors influencing the cost variance between planned and actual construction cost Kasimu (2012), found out that the most important variables causing construction cost variance were fluctuation in money exchange, incomplete design at the time of tender, additional work at the owner's request, lack of cost planning during pre and post contract stages and poor soil conditions.

The Ethiopian construction industry is expected to expand by 4.7% in real terms in 2021 - up from a growth rate of 3.1% in 2020. Construction activities held up relatively well despite the outbreak of the Coronavirus (COVID-19) pandemic.

The construction industry in Ethiopia has been developing tremendously since 2001. Recent studies by (Zewdu & Aregaw 2015) indicated that the GDP contribution of the industry has been raised to 5.6% and approaches to the sub-Saharan average (6%). Meanwhile, the Gross Domestic Capital Formation (GDCF), which was about 60 percent in 1996/97, has reached nearly 75% in 2002/03. Beyond its contribution to the nation, the industry is also the 6th major contributor of the content infrastructure stock following South Africa, Egypt, Morocco, Algeria and Nigeria (S. Report, "Construction in Africa.").

In June 2020, the Ethiopian Council of Ministers approved a budget of over ETB476 billion (US\$13.7 billion) for the Financial Year (FY) 2020/2021 (which runs from July 8th, 2020 to July 7th, 2021). The government allocated ETB160.3 (US\$4.6 billion) towards capital expenditure, which marks an increase of 22.7% compared to the previous fiscal year's allocation of ETB130.7 billion (US\$4.5 billion).). Although the construction industry is forecast to grow this year, a downside risk could arise from the unstable political environment created due to the conflict between the federal government of Ethiopia and the armed rebel group of the Tigray region that erupted in November 2020. ("Construction in Ethiopia key trend and opportunity to 2025" report, 2021)

MIDROC Ethiopia Construction PLC. established by Sheik Mohammed Al-Amoudi with the objective of facilitating economic activity and expanding the use of modern construction services. The PLC. is the pioneer Construction Company established in the year June/July 1993 GC Show that the total asset of the company reached almost to 614million birr as of June 30, 2020. (The company's largest asset (63%) is prepayment and debtors, work in progress (10.4%), stock (9.8%), and fixed asset (9%)).

Time and cost overrun are found to be an extremely significant and serious problem in MIDROC Ethiopia Construction PLC. almost around 100% of the projects are facing the time and cost overrun for the last decade which makes the research more significant to solve the problems.

1.2 Statement of the Problem

The construction industry can be considered a major contributor to Ethiopian economic growth. According to a report by the Federal Democratic Republic of Ethiopia, Ministry of Urban Development, Housing and Construction (2014) on project performance status evaluation stated that among 14 public building projects under construction 8 projects, i.e. 57%, have failed to meet the planned percentage, (MOUDHD, 2014). In Ethiopia, 79% of projects had failed to meet their objectives (Getachew, 2015).

The contractor has obligation to complete and hand over a particular project to the client at least by the end of the due date, it likewise compels the owner to effect towards the contractor payment of a certain sum of money either in a lump sum or through several installments.

In order to all projects needed to be completed within the time frame, budgeted cost, and required quality when all employee take their responsibility well. Due to the unique feature of the project time and cost overrun vary from country to country, state from the state even project from the project.

Different study in different country including our country Ethiopia were conducted related to this topic a study by Tigist Tassew ,2018,with title of Cause and Effect of delay in construction of condominium House in Addis Ababa Project 17 Housing development Construction. The researcher used mixed method approach to capture qualitative and quantitative data. The result revealed that this project had poor performance but utilized above budget and has negative cost variance and combined cause and effects included in the model revealed that 99.6% of delay of project 17 was due to contractor related cause, client related cause, material related cause, labor related cause, corruption and effect of time overrun and mistrust on owner of project .the questionnaire took from only 37 team members. Another study by Yeshe Habte, on Factor Affecting time delay and cost overrun in construction of condominium in Addis Ababa, Project 6 Housing development .The researcher used mixed method .The major factor of delay were identified using questionnaire of 39 project member from client, contractor and consultant. Another research by Fisseha Gebre, on Assessment of the cause of schedule delay and cost overrun. (The case of Bamaco Engineering PLC.) Which face 143% schedule delay and 41% cost overrun. The first two research are done on government's projects, condominium projects which faced cost and time overrun due to consumer (people) saving trend and government

controlling technique but third one investigate on private company which can be highly control by the owner, stakeholder and their management bodies but all research focuses on project profit and loss, However, no previous literature consider corporate social responsibility of company. Basically the researcher select MIDROC Ethiopia Construction PLC. establish with startup cost 310 million capital, now a days company balance showed almost to 614million birr as of, by June 2020 G.C. The owner of company open then provide to people (employee) to do his corporate social responsibility as one of Ethiopian citizen, therefor every profit and loss directly affect the employee. Unlike other studies conducted on private organization or condominium projects my research work conducted on MIDROC Ethiopia construction PLC. Whom are neither private nor government organization.

However, from preliminary study for the last five years most of the project faced cost and time overrun (99% not completed according to schedule) and also current status of the company is they could not pay employee salary properly even though Construction industry is the most profitable industry worldwide and has more than 30 years' experience.

Finally, the research is conducted in order to assess time and cost overrun and to address the gap by take lesson for remaining work and for similar project aiming at limiting the root causes and improve project delivery timeline.

1.3 Research Question

The research attempt to assess cost and time overrun in MIDROC Ethiopia Construction PLC. by trying to address the following question

- What are the existing performances of MIDROC Ethiopia Construction PLC. Projects in terms of time and cost?
- What are the major factors contributing to time and cost overrun?
- How to find the options to mitigate time and cost overrun in future MIDROC Ethiopia construction PLC.

1.4 Objective of the Study

1.4.1 General objective

The general objective of this study is to assess the main factors explaining time delay and budget overrun in construction projects in the case of MIDROC Ethiopia Construction PLC.

1.4.2 Specific objective

The specific objectives of the study are:-

- ❖ To assess the current status of the MIDROC Ethiopia Construction PLC. in terms of time and cost overrun.
- ❖ To identify and asses the relative importance of the various causes of time and cost overrun in MIDROC Ethiopia Construction PLC. Projects.
- ❖ To identify the options to minimize time and cost overrun in future MIDROC Ethiopia Construction PLC. Projects.

1.5 Significance of the Study

The study is very important to the fill research gap by finding out the unseen root cause of construction time and cost overrun which affect the overall economies of the country.

In MIDROC Ethiopia Construction PLC. have no well-documented research on assessing construction cost and time overrun. As a result, this research is done as a bridge to fill the gap in the literature about assessing construction cost and time overrun.

The study will conduct to find out the main cause of time and cost overrun in relation to contractors, consultants, labor/material /equipment, and external factors.

The study felt significant for the following reason

- shows current progress of MIDROC Ethiopia construction PLC.
- It is important for the company because it helps to mitigate the weakness of the company.
- In order to show how proper time and cost management plan plays an important role in managing project schedule by comparing the current trends used in the projects.
- The finding of this research are expected to contribute for different literature.

1.6 Scope of the Project

The research was conducted in Ethiopia, with the focus on MIDROC Ethiopia Construction PLC. located in a different area.

The data for this study were gathered through detailed Interview, questionnaire survey, and Focus group discussion from key professionals and the RII is used for analyzing the data collected from the respondents. The study is limited to the identification of main cause of time and cost overrun of eight projects and stakeholders namely contractor,client and consultant.

Survey include nine major groups are project related factors, contractor related factors, consultant related factors, client related factors, design and documentation, material related factors, equipment related factor, and labor related factor and external factor and eight major group under cost overrun and then the collected data in this research were analyzed using relative importance index and descriptive statistics according to the collective group perspective.

1.7 Limitation of the Study

The study is conducted on MIDROC Ethiopia Construction PLC. projects however short time given to the research limit the researcher to go to a large scope. Researcher delimited by both needed information and respondents (most employees have been leaving the company). However, due to the similarity of the nature of the project the findings can be applied to other similar projects. Therefore the researcher used both primary and secondary data collection method and also census sampling technique because of limited number of target population.

1.8 Definition of Terms

Time overrun: When the stipulated completion time is pushed forward, the project is said to have experienced schedule overrun (Sunjka, B.P. and Jacob, U., 2013).

Construction Time Overrun: According to Singh (2009), time overrun is defined as the difference of time between the actual and the initially planned dates of completion. A related term such as the implementation phase or implementation period is the duration in which a project is planned to be executed.

Cost overrun: When a project is completed at a cost higher than what was budgeted, it is said to experience a budget overrun (Sunjka, B.P. and Jacob, U., 2013).

Dispute and Claims: Disputes and claims arise because of the losses incurred through schedule overruns (Sunjka, B.P. and Jacob, U. (2013).

Contract administration: Involves making decisions and the timely flow of information to enable completion of the project as required by the Contract Documents including review and observation of the construction project (Surahyo, 2018).

1.9 Organization of the Study

The paper contains five chapters. The first chapter contains a brief description of the background of the study, statement of the problem, research questions, and objectives of the study, definition of terms, the significance of the study, scope, and limitation of the study, and organization of the Research report. The second chapter contains discussions of relevant related literature and prior

studies that support the study. Chapter three contains the research methodology, the subject/participant of the study, source of data, data collection tools/instrument employed, the procedure of data collection method of data analysis used. Chapter four is the analysis and result part which deals with the questionnaire response rate, questionnaire response analysis, and summary. The last chapter which is chapter five contains the conclusion and recommendation of the study plus recommendations for further studies.

CHAPTER TWO: LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Definition of Time and Cost Overrun

A „construction project“ is a high-value, time-bound, special construction mission of creating a construction facility or service, with predetermined performance objectives defined in terms of quality specification, completion time, budgeted cost, and other specified constraints (Chitkara, 2011). Cost is one of the five main parameters that can sufficiently define a construction project. Other parameters are scope, quality, resources and completion time.

Zidane, Y. J. T., & Andersen, B. (2018) identified the top 10 universal delay factors in construction projects from an intensive literature review that was complemented by delay factors in major Norwegian construction projects based on empirical data. These 10 leading universal delay factors are as follows: design changes during construction/change orders; delays in payment of contractor(s); poor planning and scheduling; poor site management and supervision; incomplete or improper design; inadequate contractor experience/building methods and approaches; contractor's financial difficulties; sponsor/owner/client's financial difficulties; resources shortage; and poor labor productivity and shortage of skills.

Construction cost overrun: Cost overrun, known also as a cost increase or budget overrun, is any unexpected incurred cost(s) that causes a project to exceed the overall budget (terms) you've agreed to with your client. Construction is one of the largest industries and contributes to about 10% of the gross national product (GNP) in industrialized countries (Navon, 2005).

The development of cost estimates that accurately reflect project scope, economic conditions, and are attuned to community interest and the macroeconomic conditions provide a baseline cost that management can use to impart discipline into the design process.

Chan and Kumaraswamy (2002) stated that construction time is increasingly important because it often serves as a crucial benchmarking for assessing the performance of a project and the efficiency of the project organization.

Ayalew (2009) also revealed a gap in practice of basic project management body of knowledge areas. Change in defined scope, lack of proper planning, lack of proper evaluation of tender

documents by contractors at tendering phase and contractor's financial problems were identified as major causes which affect the performance of the construction project.

Fetene (2008) examined factors that cause cost overrun during construction and their effects on public building construction projects in Ethiopia. Utilizing questionnaire survey of 70 completed public building construction projects in Ethiopia. The authors identified, and assessed the impact of cost overrun on the delivery of construction projects. From the results, it was found that 67 out of 70 public building construction projects suffered cost overruns. The rate of cost overrun ranges from a minimum of 0% to a maximum of 126% of the contract amount for individual projects.

2.1.2 Cause of Delay and Cost Overrun

First, it is important to identify the root causes of the problems, make assessments to the major factors, and then analyze the major variables towards recommending a workable solution. As part of this process, the assessment for the identification of factors that cause delays and cost Overruns has been conducted from the review of previous research done on the subject. In this research, delay refers to the time overrun beyond the completion date agreed between the parties during contract signature and specified on the contract. Similarly, cost overrun refers to the extra amount of money required to complete the project over and above what has been specified in the contract as the total cost of the project.

Surveys conducted by Le-Hoai et al. (2008) studied delay and cost overruns in Vietnam's large construction projects by comparison with some selected countries. In this survey, twenty one causes of cost and time overruns suitable with building and industrial construction projects are identified and ranked. Evaluation of causes of cost and time overruns are done with different model construction industries in Africa and Asia. The factor analysis method was applied to categorize the causes, as a result seven factors are determined, namely: lack of constraint and slowness, design, estimate and market, financial capability, incompetence worker and Government. These results might encourage practitioners to focus on time and cost overrun problems that might have been in their future or present projects.

A survey undertaken by Koushki et al. (2005) to assess delays and cost increases in the private residential construction projects in Kuwait concluded that cost increases are greater when the total cost of a residential building project is higher. The shortage of money and time assigned to

the design phase is the major factor contributing to the cost increase and time-delay. The study also points out three main causes of time-delays including change orders, clients' financial constraints and clients' lack of experience in the construction industry. Regarding cost overruns, the three major factors are identified as material-related problems, contractor-related problems, and clients' financial constraints.

Akinci and Fischer (1998) stated that risk factors include those associated with the project design, construction and project environment. It was found that the main causes for cost overruns were the complexity of the project, inflationary increases in material costs and inaccurate materials estimates.

The problem of delay and cost overrun in African countries' construction projects are no different. Causes of delay in building construction projects in Egypt are discussed by El- Razek et al. (2008). The main causes of delay in these construction projects are constraints in financing by the contractor during construction, design changes by client or his agent during construction, delays in contractor's payment by owner, partial payments during construction, and no utilization of qualified construction/contractual management. The results show that the consultant is found as having more intermediate views, whereas clients and contractors are seen having opposing views, usually blaming each other for delays.

2.1.2.1 Causes of cost overrun

Kaming et al. (1997) investigate the factors influencing construction building cost and time overruns on high-rising projects in Indonesia. A questionnaire survey of project managers working on high-rise building construction projects in Indonesian cities of Jakarta and Yogyakarta was undertaken. The variables identified are ranked according to their perceived frequencies of occurrence and severity of importance and it is observed that cost overruns are more severe and occur more frequently than time overruns. They point out that the most significant factors affecting cost overruns are material cost increases, inaccuracy of estimates, and degree of project complexity while the main factors influencing time overruns are design changes, poor labor productivity, inadequate planning and resource shortage.

In Malaysia, Memon et al. (2011) did a study on causative causes leading to construction cost overrun. To investigate the important factors causing cost overrun a questionnaire survey and interviews were conducted amongst selected experienced personnel for expert opinion, and

results showed that poor design and delays in design, unrealistic contract duration and requirements imposed, mistakes during construction, late delivery of materials and equipment, lack of experience, relationship between management and labor, delay preparation and approval of drawings, inadequate planning and scheduling, poor site management and supervision are most significant and common factors causing cost overrun in Malaysia.

In this section the author discussed the most frequently identified cost overrun causes.

- A. Frequent Design Change during Construction Phase:** Although it is very unlikely that a project can be delivered without any variation during the construction stage [J. Alsuliman, G. Bowles, and Z. Chen, 2012], a long process for processing design change orders negatively impacts on the duration and cost of a construction project. Change in a project's design could be part of a construction project nature because of its inherent complexity and uncertainty. Design change causes delay as its needs to be reviewed and approved by clients. However, this factor was found to cause cost overrun in different developing countries such as Vietnam, Indonesia, and Nigeria as well as developed countries such as Korea. The factor scored highly among other factors of cost overrun in developing countries. For example, in Zambia it scored second highest. Lack of clearly defined project objectives and scope was mainly the cause of frequent change orders in construction projects in these countries.
- B. Contractors' Financing:** It is usual that contractors face financing issue during the construction phase as they normally pay for works and receive payment after completing part of projects or the whole projects. Thus, contractors should make sure that they have sufficient funds available to enable them to undertake projects. Moreover, they should put all financing processes under control by adopting an effective project financing method. All the above points' emphasis that a reliable contractor's financial status plays a primary role in delivering projects on time. Moreover, poor controlling of cost and cash flow during the construction phase would directly increase the cost of implementing a project, or it might lead to project delay that leads to financial penalties. In other words, if contractors meet financial difficulties, project progression was affected. However, it is not unusual that contractors' face financial difficulties during the construction phase. For instance, a delay or inability to cover their direct and indirect costs. The contractor experiencing financial problems was found as a cause of projects' underachievement in different contexts and it

was ranked in the top five important causes for project underachievement in the following location contexts: Nigeria, Ghana, and Vietnam.

C. Payment Delay: Slow or delayed payment to contractors for completed works is a very common complaint of contractors about project's client. It was identified in five different contexts and appears to occur more often in government funded projects because of a typically slow payment procedure (the public sector around the world is more bureaucratic because the level of power and decision-making is centralized). Failure to provide payment on time to contractors for the completed work will make it difficult for the contractors to meet (typically due to relatively small cash reserves) project objectives. It is worth noting that late payment does not only consume contractor's time and money but more importantly it can affect the trust relationship between contractors and the owner. Moreover, payment delay by the owner might lead to an increase in the cost of projects as contractors increase their overhead cost to cover that risks (S. A. Assaf et al. (2001)).

D. Lack of Contractors' Experience: Construction projects are tending to become more complicated and therefore place pressure on time (project duration) and expertise. A lack of contractor experience (and expertise) of the projects' type and location might lead to a rework component for the project or delay which increases the cost of implementing a project.

It has been cited that lack of experience is one of the critical causes affecting the construction projects performance by different authors (R. H. Clough and G. A. Sears (1994)), (F. M. Arain, L. S. Pheng, and S. A. Assaf 2006)). A lack of contractor experience was one of the main causes of cost overrun in different developed countries such as Indonesia and Ghana.

E. Poor Cost Estimation: Cost estimating could be defined as the process where an estimator arrives at an expenditure of resources necessary to complete a project in accordance with plans and specifications. The preparation of a detailed cost estimate for a particular construction project requires collecting, retrieving, and manipulating large amounts of independent, but related, cost and non-cost data and information in a time-effective manner. Cost estimation for projects is a characteristically complex exercise. Although estimation techniques have improved over the years, they are still regarded as

imperfect. Because of the high uncertainty of construction projects, clients along with the contractor become better informed about the specific technological and material requirements of the project works after a project moves from the design phase to the implementation phase. E.g. poor ground conditions. There are several causes for an inaccurate cost estimate, and some of these causes may be similar to other causes of cost overrun. One of them is the psychology cause. Psychologists believe that most people tend to be more optimistic than realistic which is called optimism bias D. Kahneman and A. Tversky,(2006)), D. Lovallo and D. Kahneman(2003). In this situation, estimators and contractors make their decision based on delusional optimism (higher than actual rewards and lower than actual risks) rather than rational measuring of profits and losses. Other causes are:

- 1) The data used to estimate the bid may be unreliable.
- 2) The absence of national database for prices to rely on.
- 3) Lack of estimators' experience.
- 4) Honest mistakes.

F. Poor Tendering Documents Immature tendering documents were identified as causes of cost overrun in thirteen out of seventeen studies. Several factors have caused this issue including the involvement of the designer as a consultant; communication gaps occurring between the contractor and designer; insufficient details in the working drawings and a lack of coordination between the parties. Also included is a lack of human resources in the design firm, the designers' lack of knowledge of available materials and equipment and the use of incomplete shop drawings and specifications.

G. Poor Material Management Construction material is one of the most important elements in the execution of any construction projects. The importance of material management can be seen clearly from its definition. Patel and Vyas K. V. Patel and C. M. Vyas, 2011) define materials management as “the system for planning and controlling all of the efforts necessary to ensure that the correct quality and quantity of materials are properly specified in a timely manner, are obtained at a reasonable cost and most importantly are available at the point of use when required”.

The consequences of poor material management might result in late delivery of materials or risk of purchasing at higher prices, thus resulting in delay and cost overrun. With an increase in the number of construction projects in a single location, the local market cannot meet the high level of demand for building materials. Thus, a project's contractor might face a shortage of construction materials on the market or an increase of the material prices, which results in cost overrun. For large and complex construction projects where special materials are required, the risk of importing delay is raised as the construction industry depends on the international market to provide such materials. Material price fluctuation and poor material management have been recognized as one of the main causes of cost overrun in fifteen studies out of the seventeen, some of the countries that suffer from this cause are: Nigeria, Indonesia, Vietnam, Ghana, and Saudi Arabia. Different causes could lead to poor material management such as: unreliable material suppliers, shortages of materials, an absence of adequate statistics on materials availability; fluctuations in the availability of construction materials; very long average waiting times and uncertainty about the deliveries of ordered materials; shortages of funds to procure materials, and inadequacy in terms of transportation.

2.1.2.2 Causes of time overrun

A survey is also done by Sambasivan and Soon (2007) to establish the most important Causes and effects of delay in the Malaysian construction industry. A questionnaire Survey and relative importance index methods are used to identify the causes and effects of delay from clients, consultants, and contractors. The top ten most important causes identified from the survey include, among others, improper planning of contractors, poor site management of contractors, insufficient contractor experience, insufficient client's finance and payments for accomplished works, problems with subcontractors, shortage in labor and material supply, lack of equipment and failure, mistakes during the construction stage and poor communication between parties.

Kaming et al. (1997) stated that the main causes of time delay were related to inadequate planning, design changes, and poor labor productivity.

Despite the fact that for decades now, delay in construction projects has been a topic of research that many researchers have explored its impacts in public and private construction projects in other countries, particularly, the low-and middle-income countries Ogunlana et al., 1996; Endut et al., 2005; Moura et al., 2007; Le-Hoai et al., 2008; Haseeb et al., 2011; Doloi et al., 2012;

Kikwasi, 2013; Sepasgozar et al., 2019), none of such studies have been carried out in MIDROC Ethiopia Construction PLC. plc.

In a recent and more comprehensive study, Durdyev and Hosseini (2019) systematically reviewed prior studies published on construction project delays (CPD) between 1985 and 2018. The findings from their study revealed a total number of 149 factors that influence CPD were identified from 97 selected articles. The ten most common CPDs identified by the authors are weather/climate conditions, poor communication, lack of coordination and conflicts between stakeholders, ineffective or improper planning, material shortages, financial problems, payment delays, equipment/plant shortage, and lack of experience/qualification/competence among

Project stakeholders, labor shortages, and poor site management. The research was carried out by Chan and Kumaraswamy (1997) in Hong Kong construction projects to assess the relative importance of eighty-three possible delay factors. The main reasons for delay are analyzed, ranked, and classified on the basis of

- a) Responsibility of the parties in the construction industry, and
- b) The type of projects.

Data are collected from 167 local construction organizations and analyzed by using the relative impact index method in order to rank the determinant delay factors for different types of construction projects. As a result, five principal factors are identified. These are poor supervision and risk management, unpredicted site conditions, slow decision

Making, owner-initiated variations, and variation works.

A survey conducted to explore the likely causes of delays in high-rise building construction projects in Bangkok, Thailand (Ogunlana et al., 1996.). The findings compared with other surveys of cost overruns and delays around the world and their review finds out that the problems of the building construction industry in developing economies could be categorized in three levels:

- (i) inadequacies or shortage in industry infrastructure (particularly supply of resources);
- (ii) problems caused by consultants and owner and
- (iii) Problems caused by contractor inadequacies or incompetence.

Greenwood et al. (2001) did a comparative analysis of administrative delays in hospital building in order to examine whether the construction of large hospitals are susceptible to common delays or not. Two completed hospital building projects were chosen as case studies: the Tripoli Medical Centre in Libya and Guy's Hospital in London. One of the most influential causes of delay on large public projects such as these hospitals has been found to be administrative reasons. Despite the obvious differences between them, the problems encountered by the two projects exhibit some interesting similarities:

- Administrative failings associated with large public sector projects are similar regardless of factors such as geographical location and relative economic development.

- The preliminary findings show that, in most cases, hospital projects in any part of the world face similar difficulties, including slow decision-making, late approvals and changes to the make-up of administrative teams.

Furthermore, Aibinu and Jagboro (2002) reported construction delay to have reached an endemic level in Nigeria. They examined the effects of delays on the delivery of construction projects in the country. Utilizing a questionnaire survey of 61 construction projects, the authors identify and assess the impact of delays on the delivery of construction projects and finds out client-related delay is significant in Nigeria. The study recommend that acceleration of site activities coupled with improved clients' project management procedures and inclusion of appropriate contingency allowance in pre-contract estimate should assuage the adverse effect of construction delays.

2.1.3 Type of Construction Delay (According to Butterworth-Heinemann, 2018)

WHAT IS A DELAY?

There are a number of definitions for the delay: Are Something that happens later than expected, something that is performed later than planned and action that is not timely each of these definitions can describe a delay to an activity of work in a schedule. On construction projects, it is not uncommon for delays to occur. It is what is being delayed that determines if a project or some other deadline, such as a milestone, was completed late. Before any discussion of delay analysis can begin, a clear understanding of the general types of delays is necessary. There are four basic ways to categorize delays:

- Critical or noncritical
- Excusable or non-excusable
- Compensable or non-compensable
- Concurrent or non-concurrent

A. Critical Versus Noncritical Delays

Critical delays are those activity delays that affect the progress of the project in such a way that result in a predicted delay to the project completion date. However, many delays occur that do not delay the project completion date. Delays that affect the project completion are considered critical delays, and delays that do not affect the project completion are considered noncritical delays. The concept of “critical” delays emanates from Critical Path Method (CPM) scheduling. While the determination of the critical path and the identification of critical activities is a major feature of CPM scheduling, all projects, regardless of the type of schedule, have “critical” activities.

A key concept of CPM scheduling is that only delays to the critical path result in a delay to the scheduled project completion date. This is because the critical path is the longest path through the schedule network and, as such, is the path that determines the length of the project and the date upon which the project is predicted to be complete. Thus, the delay to the completion date is a predicted delay based on the then-current project plan. A change in that plan may either mitigate or exacerbate that delay.

B. Excusable Versus Non Excusable Delay

All delays are either excusable or non-excusable. These categories are typically defined by the contract. Generally, an excusable delay is a delay that is due to an unforeseeable event beyond the contractor’s control. Normally, based on common general provisions in public agency specifications, delays resulting from the following events would be considered excusable:

- General labor strikes
- Fires
- Floods
- Acts of God

- Owner-directed changes
- Errors and omissions in the plans and specifications
- Differing site conditions or concealed conditions
- Unusually severe weather
- Intervention by outside agencies (such as the EPA)
- Lack of action by government bodies, such as building inspection

Constructive changes

These conditions may be reasonably unforeseeable, not within the contractor's control, and not the contractor's fault or responsibility. When a delay is determined to be excusable, the contractor was entitled to an extension of the time to complete the project work.

The characterization of a delay as excusable must be made within the context of the specific contract. The contract should clearly define the factors that might justify entitlement to a time extension to the contract completion date.

Non excusable delays are events that are within the contractor's control, are the contractor's responsibility, or that are foreseeable. These are some examples of non-excusable delays:

- Late performance of subcontractors
- Untimely performance by suppliers
- Faulty workmanship by the contractor or subcontractors
- A project-specific labor strike caused by either the contractor's unwillingness to meet with labor representatives or by unfair labor practices

Again, the contract is the controlling document that determines if a delay would be considered non-excusable. Therefore, both owners and contractors should recognize the importance of clear and unambiguous contract documents when defining excusable and non-excusable delays.

C. Compensable Verses Non Compensable Delay

A compensable delay is a delay for which the contractor is entitled to both a time extension and additional delay-related compensation. Relating back to excusable and non-excusable delays, only excusable delays can be compensable. A non-compensable delay means that the contractor

is not entitled to additional delay-related compensation resulting from the delay. Some excusable delays may be compensable. All non-excusable delays are non-compensable.

Whether or not a delay is compensable depends primarily on the terms of the contract. In many cases, the contract specifically defines the kinds of delays that are excusable, non-compensable, for which the contractor does not receive any additional money but may be allowed a time extension. Contracts distinguish between compensable and non-compensable delays in many ways, some of which are described in the following paragraphs.

D. Concurrent Verses Non Concurrent Delay

Concurrency is relevant, not just to the determination of critical delays, but also to the assignment of responsibility for delay-related costs. Owners may cite concurrent delays by the contractor as a reason for issuing a time extension without additional compensation. Contractors may cite concurrent delays by the owner as a reason why liquidated damages should not be assessed for its delays. Unfortunately, few contract specifications include a definition of “concurrent delay” or define how concurrent delays affect a contractor’s entitlement to additional compensation for time extensions or responsibility for liquidated damages. To complicate matters further, there is a lack of consistent understanding in the industry concerning the concept of concurrent delay.

2.1.4 Effect of Cost and Time Overrun

Different scholar from different world investigate effect of construction cost and time overrun .in this section finding different literature from different scholar are reviewed.

A study made on project management maturity in the Ethiopian construction industry by Abadir, (2011) found out that 22%, 22%, 22% and 28% of the contractors cost management process maturity is incomplete, perform informally, perform formally and managed well, respectively. Whereas, the cost management practice maturity is 10%, 48%, 38% and 5% apply no practice, incomplete, basic and intermediate, respectively. His study pointed out that 90% of the contractors prepare detailed estimate of cost of labor, material and machinery. However, only 75% prepare detailed budget, about 70% track cost of labor, material and machinery separately, and 67% collect and use company’s historical data for preparation of cost estimate. His study further indicate that only 1/3 of the contractors use computer tools for cost estimate preparation

and about 2/3 update their budget regularly at least once in a month. The contractors perform formal financial management process.

2.2 Empirical Literature Review

Several studies have been conducted in relation to time and cost overrun. One of the studies conducted in Ethiopia in relation to the subject matter was done by Kirubel G/Silassie. The researcher assess Factor Affecting Timely Delivery of Government Construction Projects on Ethiopia Electric Power Projects. A construction industry survey was conducted through a semi-structured questionnaire .A total of 41 out of 50 responses (82%) were received data were analyzed using Statistic Package for Social Science (SPSS) and MS Excel.

The study indicate that the top major causes of delay were Delay in progress payments by the owner, Right of way problem ,Poor communication and coordination by contractor with other parties, Poor site management , Long waiting time for approval of tests and inspection, Shortage of construction material and Improper project feasibility study In addition, the top major effects of delay were; time overrun, cost overrun, dispute, arbitration, litigation and abandonment.

Study conducted by Yeshe Habte, on Factor Affecting time delay and cost overrun in construction of condominium in Addis Ababa, Project 6 Housing development.

Another conducted by Tigist Tassew (2018) with title of Cause and Effect of delay in construction of condominium House in Addis Ababa Project 17 Housing development Construction. The result revealed that this project had poor performance but utilized above budget and has negative cost variance and combined cause and effects included in the model revealed that 99.6% of delay of project 17 was due to contractor related cause, client related cause, material related cause, labor related cause, corruption and effect of time overrun and mistrust on owner of project .the questionnaire took from only 37 team members.

Aschalew Yohannes Anshebo (2017) analyzes the extent of cost and time performance of public building construction projects in Addis Ababa and tries to identify the critical factors that influence cost and time performance of public building projects in Addis Ababa. The researcher used Secondary data and questionnaire survey were used to collect relevant information. The outcome of secondary data indicates that 74.3% of public building construction projects in Addis

Ababa experienced cost under run and the remaining 25.7% projects were experienced cost overrun. Out of this 74.3% projects, 40% of the projects varies with more than negative 20%.The research finding points out 100% of the projects delayed and not completed within the time stated. The minimum and the maximum time overrun is found to be 10% and above 250% respectively.

Another study conducted by Emeka Onozulike (2016) determines delays, and the factors contributing to construction in Nigeria. Consequently, questionnaire surveys were conducted among 93 major project stakeholders in the Nigeria construction industry. The researcher used Kruskal Wallis test was carried out to determine the significant difference between the factors of delay on causes of construction delay.

The result of the survey revealed that financial predicament, lack of consultant site staffs, poor skills and inexperience of labor are the most important factors contributing to construction delay in the Nigeria construction industry. The result further revealed that labor input tracking model is the most important state of the art technology. Subsequently, the findings in this research will contribute in improving performance in the Nigeria construction industry in terms of time and cost.

2.3 Summary

In this chapter reviewed different literatures from different journal and book for the cause of time and cost overrun. Accordingly, from the related literatures review cause of time and cost overrun, type of delay, effect of time and cost overrun and empirical literature review are discussed in detail. In this chapter frequent design change during construction phase, contractors' financing, payment delay, lack of contractors' experience, poor cost estimation, poor tendering documents, poor material management construction material are cause of time overrun.

CHAPTER THREE: RESEARCH METHODOLOGY

According to Rajasekar et. al. (2006), research is a logical and systematic search for new and useful information on a particular topic. The methodology is the way the entire research is designed and conducted. (Scot & usher, 1996).It is an investigation of finding solutions to scientific and social problems through objective and systematic analysis. It is a search for knowledge, that is, a discovery of hidden truths.

According to the American sociologist Earl Robert Babbie, “research is a systematic inquiry to describe, explain, predict, and control the observed phenomenon. It involves inductive and deductive methods.”

This chapter explains Research design and approach, sample selection, source and type of data, data collection method, method of data analysis, data source and procedure of data collection, sample selection, Research population, and method of data analysis.

3.1 Research Design and Approach

In this research design, the researcher used both descriptive. Descriptive research is an appropriate choice when the research aim is used to describe characteristics, averages, trends, and categories. This research is descriptive because it tries to describe the causes of cost and time overrun in the MIDROC Ethiopia Construction PLC. projects.

Descriptive research describes the behavior of a sample population. Only one variable is required to conduct the study. The three primary purposes of descriptive studies are describing, explaining, and validating the findings.

There are two basic approaches to research: quantitative and qualitative (Leedy et al. 2005). The former involves the generation of data in quantitative form which could be subjected to accurate quantitative analysis in a proper and rigorous manner and in the form of a data base from which to realize characteristics or relationships. In quantitative research, samples of a population were studied (questioned) to establish its characteristics whereas qualitative approach is concerned with subjective evaluation of opinions, behavior and attitudes.

The questionnaire was designed based on factors that were identified as the causes of time and cost overrun.

The quantifiable data was gathered by closed ended questions of the questionnaire which were designed to keep the respondents in scope. There was an also open ended question, providing unquantifiable data, which was designed to provide respondents with the freedom of expressing what they believe important for the study. In addition to questioner the researcher used interview and focus group discussion as another method of data collection. . This leads for the study to use a mixed research approach which both qualitative and quantitative research methods were applied.

In order to evaluate and analyze the causes of delay and cost overruns in MIDROC Ethiopia Construction PLC. projects activities client, contractors and consultant were targeted.

3.2 Sampling Techniques and Sample Size

3.2.1 Sampling Techniques

The respondents were selected based on their experience from different MIDROC Ethiopia Construction PLC. projects by use of working experience and involvement. Method used by the researcher is censuses sampling technique, a complete enumeration of all items in the population, for contractor, clients and consultants because they are limited in number of target population.

3.2.2 Sample Size

Among the most important element of the research, the sample size is the one that addresses the characteristics of the whole file series with confidence. To stick with good statistical validity, the study made use of a representative sample size. For this study, maximum care is given to get the highest sample size (OSP, 2005).

According to Amin (2005), a target population is a population to which the researcher ultimately wants to generalize the results. The populations of MIDROC employees as a whole is 740 from data collected at the end of January 2021, around 140 are from production and plant. The target populations for the study were 74 professional staff who are currently working on projects of MIDROC Ethiopia Construction PLC., 7 from client side and 7 from consultant .Total target population for the study were 88.

3.3 Sampling Method

For quantitative studies the researcher develop questionnaire, it is pilot test and checked for content. For qualitative studies, Researcher outline the questions that will expect to ask in an interview and focus group discussion.

Project Name	Location	Skilled manpower (contractor)	consultant	Client	Total Manpower (skilled +unskilled) from contractor.
Sheger Bakery	Addis Ababa	10	1	1	64
Medina	Addis Ababa	20	1	1	52
Assosa Stadium	Assosa	3	1	1	33
Dami	Addis Ababa	-	1	-	11
Ethiopia Red Cross society (ERCS)	Addis Ababa	14	1	1	18
Akaki Leather Compound Asphalt Work	Addis Ababa	4	-	1	12
Huda(3B+G+12 Apartment Building, RC Shoring Pile & Excavation work)	Addis Ababa	4	1	1	26
Amdeyihun (2B+G+20 Apartment Building)	Addis Ababa	18	1	1	60
Total		74	7	7	

Table 1.2 projects selected in MIDROC Ethiopia construction PLC. for questioner and interview.

3.4 Method of Data Collection

The researcher used primary data collection through personal interview, questioner and focus group discussion. Secondary data is collected through published data textbook, journal, company manual, monthly Report, payment, time extension and Correspondence letters, publish and unpublished data are used in order to collect data that has been used to identify the causes of time and cost overrun in construction projects, assess the impacts, and forward solutions .

As stated above and with the help of a questionnaire that contains both close-ended and open-ended questions, the required information were distribute and collect from the target population client, contractors and consultants. The study participant were Project managers, office engineers, team leaders, site engineers, Forman, resident engineers and owner.

Different types of construction projects with their contract and actual completion time and cost are included to understand how the actual completion time and cost deviate from the contract executed by MIDROC Ethiopia Construction PLC.

3.5 Designing the Questionnaires

The questionnaire is divided in three main part which consist of Demographic Characteristics of Respondents, closed ended question and open-ended questions to assessing time and cost overrun in MIDROC construction projects. The questionnaire is adapted then modified from Nigussie Wendmu Zengu.

The severity was categorized on five point scale as follows: strongly disagree, disagree, neutral, agree and strongly agree. The questionnaire comprise a 5 –point Likert scale of 1 -5 where 1 shows a high level of disagreement and 5 shows a high level of agreement .During administration of question ,the instruction was given to the respondent by the researcher. Note that the questionnaire was adapted both in English then translated in to Amharic.

3.6 Data Analysis Techniques

Data analysis is in short a method of putting facts and figures to solve the research problem, research objective, and research questions and interpretation of the data.

Dependent variable are design change, decision delay, cost inflation, poor communication etc. independent variable are time and cost.

The researcher employed content analysis technique to analyze qualitative data to examine the effect of time and cost overrun and quantitative data was analyzed using descriptive statics. The Relative Importance Index (RII) was computed to determine the relative importance of the various causes of time and cost overrun using five-point Likert scale. It is used in this study in order to conduct analysis on the survey results for capabilities. It is a weighted average method in which the average rank for each question is calculated and then the rank for each capability is derived from the average of the ranks of the questions grouped under that capability by K Fernando (2014). The Relative Importance Index (RII) was calculated by using equation (2)

Analysis of data consists of calculating the RI

$$RII = \Sigma W / (A * N).....Equation 2$$

Where, RII= Relative Importance Index,

W: Weighting given to each factor by the respondent

A=the highest weight

N= Total number of respondents

3.7 Validity and Reliability

Reliability and validity was conducted to ensure the accuracy of the method and data collected.

3.7.1 Reliability

Reliability as the consistency of measurement defined by Roberta Heale and Twycross (2015) , Cronbach's Alpha coefficient was used to test the reliability of collected data values of Cronbach's Alpha range from 0 to 1,with minimum acceptable value is 0.7 to came to decision for utilizing the gathered data for further analysis. Generally reliability used to see if each respondent's answer has consistency or not.

Table 1.3 Analysis of Cronbach’s alpha value for reliability test

Category Of Time Overruns Factors	Cronbach’s alpha value
Project Related Factors	0.756
Contractor related factors	0.875
Consultant related factors	0.864
Client related factors	0.766
Design and Documentation	0.933
Material related factors	0.812
Equipment related factors	0.887
Labor related factors	0.838
External factors	0.809
Average Cronbach’s alpha Value	0.921
Category Of Cost Overruns Factors	Cronbach’s alpha value
Contractor’s site management related factors	0.834
Design and documentation related factors	0.799
Financial management-related factors	0.625
Human resource (workforce) related factors	0.7
Project management and contract administration related factors	0.823
Material & Equipment Related Factor	0.746
External Factor	0.928
Average Cronbach’s alpha Value	0.933

Source – Own survey, 2022

Reliability test is conducted to check the stability and consistency of data using Cronbach’s alpha method. In this report, it was conducted using the statically program SPSS Version 20. From both time and cost overrun ,almost all Cronbach’s alpha value are greater than 0.7, indicate that higher value of internal consistency.

3.7.2 Validity: define the range to which a concept is precisely measured .different type of validity; construct validity, Face validity ,content validity and criterion validity, providing

accurate and honest information by the participant contribute to achieve research validity this can be achieved by providing clear and understanding questionnaire .by avoiding any bias data collection and by avoiding pre-assumed beliefs. The researcher was used both semi structured interview and questionnaire to increase the validity of the research.

3.8 Ethical Considerations

Ethical considerations must be considered while doing research. The first thing that we have to do is Respect & protect the rights & dignity of participants.

Respondents will clearly communicate the objective of the research before they are asked to give their answers. Full consent should be obtained from the participants prior to the study. Any type of communication in relation to the research was done with honesty and transparency.

An adequate level of confidentiality of the research data should be ensured. Respondents were not asked about their name, race, religion, etc.

CHAPTER FOUR: RESULTS AND DISCUSSION

The objective of this study was assessing time and cost overrun in the case of MIDROC Ethiopia Construction PLC. This chapter deals with presentation, analysis and interpretation of data collected using survey, interview and focus group discussion with consultants, contractor and clients concerning assessment of time and cost overrun in MIDROC Ethiopia Construction PLC. Moreover, document analysis is used to assess current status of MIDROC Ethiopia construction PLC regarding the time and cost overrun.

4.2 Results of Desk Study

Document Analysis is conducted to assess current status of eight projects time overrun in Ethiopia in terms of commencement date, project completion date, project period, actual completion time, current physical progress, and rate of time overrun. Out of the eight projects, except for the AGT project, the other seven projects are on progress. Accordingly, time overrun is calculated until March 31/22.

The researcher also assessed the current status of project cost overrun in terms of project contract amount, supplementary agreement, execute amount to date (as of march 31/2022 for seven uncompleted projects) ,actual completion cost, current physical progress ,rate of cost overrun(as march 31/22 for uncompleted project).

4.2.1 Time Overruns

Table 4.1 shows the time overrun project should be completed, though only AGT Project are completed in the last five years. Therefore, the researcher used project progress and time overrun data from each projects from starting date to March 31/2022.

Equation 3

$$\text{Time Overrun (\%)} = \frac{\text{Actual time Spent} - \text{Estimated planed time}}{\text{Estimated planed time}} * 10$$

Table 4.1: Summary of project time overrun

S/N	Name of Project	Commencement Date	Project Completion Date	Project Period (Days)	Completion Time	Current Physical Progress (%)	Rate of Time Overrun (or as march 31/22) (%)	Reason for extension of time
1	AGT multipurpose building project - 3B+G+20							<input type="checkbox"/> Contracture’s capital constraint <input type="checkbox"/> Sub-contractor productivity problem <input type="checkbox"/> Frequent design revision <input type="checkbox"/> Construction material inflation <input type="checkbox"/> Unskilled labor shortage <input type="checkbox"/> coordination between project and head office. <input type="checkbox"/> Material supply shortage
1.1	Main contract -Skeleton work	28-Jan-19	29-Jan-21	763	6-Apr-21	58	4.72	
1.2	Supplementary contract–Block& plastering	2-Jan-21	31-Aug-21	241	on progress	56.67	87.97	
2	Medina Project	19-Mar-21	18-Mar-22	365	on progress	71.48	3.29	<input type="checkbox"/> Material supply problem <input type="checkbox"/> Design revision by consultant <input type="checkbox"/> Contractor capital Constraint <input type="checkbox"/> Material price inflation <input type="checkbox"/> Delay of subcontract payment

3	Ethiopia Red Cross society(ERCS)	16-Nov-17	10-May-19	540	on progress	63.99	195.56	<input type="checkbox"/> Client budget constraint <input type="checkbox"/> Site overhead cost <input type="checkbox"/> Strength concrete quality problem encountered
4	Huda kera(3B+G+12)	23-Jul-21	20-Nov-21	120	on progress	51.1	109.17	<input type="checkbox"/> Delay in clearing right way issue <input type="checkbox"/> Budget constraint of contractor <input type="checkbox"/> Working capital constraint
5	Akaki Leather Compound Ashalt Work	14-Feb-22	15-May-22	90	on progress	10.8	0.00	<input type="checkbox"/> Machinery breakdown due to age <input type="checkbox"/> Change in scope of the work <input type="checkbox"/> Material shortage to the site <input type="checkbox"/> Absent of client/consultant to prepare design
6	Sheger Bakery different contract Package construction	Jul-19	Apr-20	275	on progress	98.0	265.09	<input type="checkbox"/> Cash flow problem <input type="checkbox"/> Delay in subletting some works. <input type="checkbox"/> Coordination problem between head office and project <input type="checkbox"/> Low productivity of subcontractor <input type="checkbox"/> Inflation <input type="checkbox"/> Delay of consultant in price adjustment, review & approval <input type="checkbox"/> Material delay supply by client.
7	Dami Store G+M+4	24-Oct-19	20-Jun-20	240	on progress	86.51	270.42	<input type="checkbox"/> Material supply problem <input type="checkbox"/> Delay of interim payment by client <input type="checkbox"/> Absent of consulting engineer
8	Assosa Stadium	11-Apr-17	25-Apr-20	1110	on progress	51.76	63.51	<input type="checkbox"/> Client budget constraint <input type="checkbox"/> High site overhead

Source: own computation based on Monthly Report, Payment, time extension letter and Correspondence letters

Table 4.1 shows that time overrun range from minimum 4.72 % at AGT Project (Main skeleton work) to Maximum 270.42% of contract time at Dami store. At Dami, project due to absent of consultant and Payment delay are most prominent reason for delay. Generally, if a contractor provide enough reason to the client and the consultant, extension of original contract time would be approved.

4.2.2 Cost Overrun

The cost overrun of projects is calculated using the mathematical formula, by Endut et al., (2005)

$$\text{Cost Overrun (\%)} = \frac{\text{Actual Expense}-\text{Budget Amount}}{\text{Budgeted Amount}} * 100 \dots\dots\dots\text{Equation 4}$$

Table 4:2 Summary of Desk study to cost overrun

S/N	Name of Project	Project Contract Amount (before vat)	Supplementary Agreement	Execute Amount to date As March 31/2022 (before vat)	Actual completion Cost	Current Physical Progress (%)	Rate of Cost Overrun (as of march 31/22) (%)
1	AGT multipurpose building project - 3B+G+20						
1.1	Main contract -Skeleton work	124,185,498.20			2,905,760.54	58%	15.07
1.2	Supplementary contract - Block & plastering	12,752,153.36		7,361,614.56	not determined	56.67%	-42.27
2	Medina Project	19,361,529.31		15,114,295.61	not determined	71.48%	-21.78
3	Ethiopia Red Cross society(ERCS)	211,739,313.57		135,497,512.88	not determined	63.99%	-36.01
4	Huda kera(3B+G+12)	12,515,101.70		6,398,875.87	not determined	51.1%	-48.87
5	Akaki Leather Compound Asphalt Work	15,314,825.29		1,651,327.63	not determined	10.8%	-89.22
6	Sheger Bakery different contract Package construction	139,788,239.66		136,992,639.82	not determined	98.0%	-2
7	Dami Store G+M+4	23,584,592.90	2,438,110.30	20,402,450.40	not determined	86.51%	-21.59
8	Assosa Stadium	193,912,807	88,119,202	94,973,356	not determined	51.76%	-66.33

Source: own computation based on Monthly Report, Payment, time extension letter and Correspondence letters

The data in Table 4.2 show that the only completed project over the last 5 years is the AGT multipurpose building project with 15.07% of cost overrun. Since the other projects are on progress, the researcher could not determine the actual completed cost. Rather the cost overrun for each project is attempted to be calculated. The remaining projects show negative cost overrun. The researcher also considered the physical progress for the seven projects and the data show that the progress ranges from a minimum of 10.8% to maximum of 86.51%. Though there might be several reasons for project delays, the delay was accompanied by an increase in the project cost.

4.3 Analysis of Survey Data

4.3.1 Questionnaire Response Rate

The questionnaire was distributed to three contracting parties, namely contractor, clients, and consultants, who are currently working in the MIDROC Construction projects through both in person and internet based survey tool.

By considering the role of the each stakeholder in projects, 77 participants were selected for questionnaire, interview and focus group discussion. The questionnaire was distributed to 78 study participants, out of which 82.06 % of them are contractors. Focus group discussion was made with 7 participants at Red Cross project and interview is made with the remaining 3 participants.

Table 4: 4 Summary of Questionnaire distributed and response rate

Group	Questionnaire Distributed		Questionnaire Returned		Response Rate
	No.	%	No.	%	
Contractor	64	82.06%	53	81.3%	98.11 %
Client	7	8.97%	5	7.8%	71%
Consultant	7	8.97%	7	10.9%	100 %
Total	78	100%	65	100%	96 %

4.3.2 Demographic Characteristics of Respondents

This part provides general information about the respondents' personal characteristics and organizational information in terms of gender, organizational type, and experience, the level of education and area of proficiency in the field of construction.

I. Gender

	Frequency	Percent	Cumulative Percent
Female	12	18.5	18.5
Male	53	81.5	100.0
Total	65	100.0	

Table 4: 5 Summary of Respondents' Gender from the Questionnaire Survey

Source – Own survey-2022

In this study 53(81.5%) of the respondents were Male and 12(18.5) of them were Female.

II. TYPE OF ORGANIZATION

	Frequency	Percent	Cumulative Percent
Consultant	8	12.3	12.3
Contractor	52	80.0	92.3
Client	5	7.7	100.0
Total	65	100.0	

. Table 4: 6 Summary of Respondents' organization from the Questionnaire Survey

-Source – Own survey-2022

Table 4.6 indicate that 8(12.3%) of the respondents were Consultant, 52(80%) were Contractor and the remaining 5(7.7%) of them were client.

III. Level of experience: you need to present experience in their respective profession

	Frequency	Percent	Cumulative Percent
< 5	15	23.1	23.8
5-10	14	21.5	46.0
10-20	17	26.2	73.0
>20	17	26.2	100.0
Total	63	96.9	
Missing	2	3.1	
Total	65	100.0	

Table 4: 7 Summary of Respondents' Level of Experience from the Questionnaire

Source – Own survey-2022

When we look at in terms of working experience, 15 (23.1%) of the team members have an experience of less than 5 years, 14(21.5%) have an experience of 5-10 years, and 17(26.2%) have an experience of 10-20 years and lastly 17 (26.2%) have experience for over 20 years, Aside these 2 (3.1%) respondents returned the questionnaire leaving empty. According to percentage of distribution of questionnaire, the majority of questionnaire were filled by highly working experienced staff, it helps the researcher to collect qualitative and satisfactory response.

IV. Level of Education

	Frequency	Percent	Cumulative Percent
High School	24	36.9	36.9
Diploma	3	4.6	41.5
First Degree	22	33.8	75.4
Master's Degree	16	24.6	100.0
Total	65	100.0	

Table 4: 8 Summary of Respondents' Level of Education from the Questionnaire

Source – Own survey-2022

Table 4: 8 shows the level of education of the respondents. It was observed that respondents completing High School were 24(36.9%).Diploma 3(4.6), First Degree holders were 22(33.8) respondents, Master’s degree were 16(24.6) none of them have Ph.D.

V. Area of proficiency(Respondent Title in the company)

	Frequency	Percent	Cumulative Percent
Project Manager	8	12.3	12.5
Project Coordinator	7	10.8	23.4
Office Engineer	17	26.2	50.0
Site Engineer	5	7.7	57.8
Forman	3	4.6	62.5
Resident Engineer	5	7.7	70.3
Other	19	29.2	100.0
Total	64	98.5	
Missing	1	1.5	
Total	65	100.0	

Table 4: 9 Summary of Respondents' Area of Proficiency from the Questionnaire

Source – Own survey-2022

In terms of respondents title, 8(12.3%) are project manager, 7(10.8%) are project coordinator, 17(26.2%) are office engineer, 5(7.7%) are site engineer, 3(4.6%) are foreman, 5(7.7%) are resident engineer, 19(29.2%) are other (include mason, carpenter, bar bender), aside these 1 (1.5%) respondents returned the questionnaire leaving empty.

4.4 Relative Important Index (RII)

The results and discussion of assessments of time and cost overruns are presented in this section. The questionnaires were obtained from experienced targeted project member and analyzed using RII. The ranking of causal factors for time and cost overrun was determined using the Relative Importance Index (RII).

4.4.1 Ranking of causes of time overrun (RII)

In the analysis, the most influential factors for time overrun are classified in to nine major groups. RII and rank were calculated to each major group. The nine major groups are project related factors, contractor related factors, consultant related factors, client related factors, design and documentation, material related factors, equipment related factor, and labor related factor and external factor. The findings reveal that many factors contribute to time overrun Table 4: 10(Annex 1) Factors causing time overruns in the case of MIDROC Ethiopia construction projects: RII, Rank of Related factors identified by construction parties. (Refer Annex 1).

Consultants' perspective

As it was perceived by the consultant, the first ranked cause of time overrun in which contractor related factors were “Ineffective planning and scheduling” of project with RII of 0.857. Rough estimation of project cost or time and unavailability of experienced staff are a clear indication for the cause of ineffective planning and scheduling. Odeh and Battaineh (2000) found in their research work that ineffective planning and scheduling by contractors is the significant causes of delay in construction project. It is also critical problem mentioned in focus group discussion. The second important factors ranked by consultant were “inaccurate site investigation” with RII of 0.77, which grouped in consultant related factors. This address the main reason that contribute to project delay, lack of responsibility of consultant to follow site progress e.g. investigation if there is misplace of rebar, quality of material used in the site. The third major factor which bring time overrun was project related factors linked to “Lack of follow-up for the project schedule and absence of continuous tracking” and “contractor facing a new problem related with financial difficulties (shortage)” Which had RII of 0.74. The fifth major factor related by consultant with Project related factors, contractor related factors and client related factors were” Highly bureaucratic organization “;” Poor coordination/ communication” and “Delay in progress payments” respectively, with RII of 0.714. Good transparent and cooperation among head office and projects, stakeholders commitment to corporate and communication are very necessary to complete the project on time. Most commonly wrong trend happened every year in every project is payment delay. Moreover, from Interview result of code 01, 02 and 03 Payment delay,

improper inspection, High overhead cost and frequent design change have been mentioned as cause delay in MIDROC Ethiopia construction project .

Contractors' Perspective

Table 4.10 reveal that, “financial difficulties (shortage) of contractor” ranked first by both contractors and clients, with RII of 0.808. “Delay of material delivery to the site” ranked second, with RII of 0.777. Third major cause of delay related with external factor is “Poor economic conditions” the main reason for this cause of delay is currency exchanges, inflation rates, etc., with RII of 0.755.” Delay in progress payments by owner”, with RII of 0.745 was ranked the fourth major cause of delay in Project related factor. The fifth ranked cause of delay is “Low speed of decision making within each project team” with RII of 0.737. This finding is consistent with the results of many studies, Subramani et al. (2014) found that slow decision making is highly ranked factor for the cause of time and cost overrun. From the interviewee session a relatively result was found that Slow decision making are among the prominent factor that attribute to time and cost overrun.

Clients' Perspective:

With RII of 0.8, the first ranked cause of delay financial difficulty of contractor”. Memon et al. (2010) found similar study that cash flow and financial difficulties are the first cause of delay. Due to financial shortage, contractor could not pay labor salary, proper material Procurement which might induce Project termination. The second major cause of delay with RII of 0.72, was” highly bureaucratic organization”,” Shortage of labor”,” Poor economic conditions (currency exchanges, inflation rates, etc.)”. Tejale et al. 2015 also found that shortage of labor was the ranked cause of delay in India construction industry.

With RII of 0.68,the third major cause of time overrun was” Low speed of decision making within each project team”,” Lack of follow-up for the project schedule and absence of continuous tracking”,” Delay of material delivery to site” and “Lack of maintenance for the equipment.”

4.4.2 Ranking of top ten factors that causing time overrun

Tables 4.11 illustrate that according to perception of stakeholders (consultant, contractor and client) ten important factors affecting time overrun in the case of MIDROC Ethiopia

construction. Stakeholders ranked the first cause of delay were “financial difficulties (shortage) of contractor”, with RII of 0.797.

The second major cause of delay were ” material delivery to site” (RII of 0.757). The main reason behind this is lack of resource occurred in the market and most construction material(specially finishing material) supplied from outside so inflation and bureaucracy of government bodies during importing process trigger delay of material delivery to the site.

The third causes of delay were “Poor economic conditions (currency exchanges, inflation rates, etc.)”(RII of 0.732).during current Ethiopia’s situation, construction industry is suppresses by high economic inflation and unbalanced economic condition which occurred time overrun. Fourth major reason for the cause of delay is “Low speed of decision making within each project team “(RII of 0.725).In order to see a project moving toward to the final delivery phase, each responsible stakeholders have to work in collaboration to make useful choice faster, it put projects in a position to achieve the highest value from decision timing.

With RII at 0.72, “Highly bureaucratic organization” are ranked the fifth cause of delay. There are little studies on bureaucracy, specifically on infrastructure projects but it is the most influential cause for project delay.

“Delay in progress payments by owner” (RII of 0.716) is ranked the sixth cause of delay. progress payment is a partial payment to contractor after completion of predefined works in order to recover a portion of their costs along a project way ,otherwise contractor may decide to stop working on projects which induced time overrun. This result aligned with all professionals interview, major cause of delay in MIDROC Construction is delay in progress payment.

“Ineffective planning and scheduling of project” (RII of 0.706), “Shortage of construction materials”(RII of 0.692), “Lack of a strong organizational culture” (RII of 0.683)and “Lack of a strong organizational culture”(RII of 0.679) are the seventh , eighth , ninth and ten cause of project delay respectively.

4.4.3 Ranking of causes of cost overrun (RII)

Table 4: 12 Factors causing cost overruns in the case of MIDROC Ethiopia construction projects in RII, Rank of Related factors and overall factor decide by construction parties.

Consultants' perspective:

With RII of 0.8, “Poor project management” &” fraudulent practices and kickbacks (Corruption)” were ranked the first cause of cost overrun. Proper project Planning means that the schedule that the team member are supposed to follow is not set out, All project members might have no clear picture of what is expected of them.it results of failure poor project planning, budget and to produce satisfactory results. Due to uniqueness, complex transaction chain and scale of infrastructure investment transaction are very exposed to corruption as compare to other industries. According to the result from focus group discussion poor project management and corruption are the most prominent factor that cause cost overrun in the projects.

Table4:12(Annex 2)revel that “inadequate project preparation ,planning & implementation”,” Cash flow and financial difficulties faced by contractors”,” Fluctuations in the cost of building materials(RII of 0.714) are rated Second by consultant that trigger cost overrun. Jamaludin et al. (2014) found out that the first ranked factors causing cost overrun during construction stage of construction projects are poor planning.

Contractors' Perspective:

Table 4. 12 (Annex 2)reveal that “Fluctuations in the cost of building materials” (RII of 0.843) are rated first by the contractor. In the current situation of Ethiopia, where highest inflation occurred in a century, and fluctuation of material price is expected. Enshassi et al (2009) found a similar study that fluctuations in the cost of building materials are one of the important factors causing the cost overrun in the construction industry in Palestine.

With RII of 0.812,”Delay in material delivery” ranked second by the contractor. Contractor rated “Cash flow and financial difficulties faced by contractors” as third cause of delay with RII of 0.788.similar study by, Belachew et al. (2017), found causes of the cost overrun in construction projects in Ethiopia is delay in supply of raw materials and equipment .

With RII of 0.724, “Fluctuations in the cost of labor” were ranked fourth by contractor, which grouped under human related factor. Similar study found by Tang examined the effect of labor wages and inflation on productivity in Malaysia. The study period lasted from the year 1970 to 2007, where it was reported that there is a relationship between real labor wages, inflation and productivity in Malaysia. Furthermore, the analysis revealed the negative impact of inflation and

productivity and thus demonstrated the value of real labor wages and inflation for productivity in Malaysia. In contrary to focus Group discussion, fluctuation in the cost of labor were not a problem, instead all participant agreed that most employee lose their moral because their salary don't cover their cost of living. Another study by Nega (2008) found that fluctuations in the cost of labor are the main causes of the cost overrun in construction projects in Ethiopia.

“Construction equipment shortage or failure” (RII of 0.702) were ranked fifth cause of cost overrun. During construction process, priority should give to equipment because equipment consider as the most significant factor in all construction progress. Patil and Pankaj (2016) found a similar study, frequent breakdown of construction plants and equipment's, and rework are Causes of the cost overrun in Indian.

Clients' Perspective

With (RII of 0.720) ,“delay in material delivery” ,”fluctuations in the cost of building materials”,” cash flow and financial difficulties faced by contractors” were the first ranked factor rated by client. Common cause of project cost and time overrun share by most researchers is fluctuation in cost of building material, similarly in this survey all client, consultant and contractor ranked highest.

Material delay is most severity factor shared by both client and consultant even if consultant rated as a second factor. “Construction equipment shortage or failure” (RII of 0.640) is second ranked factor by client .construction Equipment are highly needed factor during construction. According to the result from the interviewer construction equipment shortage is argue to be one of the most important factors that lead to delay. Construction progress without equipment is too difficult because it is affect quality, time and cost. With RII of 0.56, “Degree of government regulations and control” is the third factor that trigger cost overrun.

4.4.4 Ranking of top ten factors causing Cost overrun

In this section ranking of the major factors that influence cost overruns from the collective group perspective on the relative significance of factors are presented.

Table 4: 13 reveal that “Fluctuations in the cost of building materials” were rated first by all stakeholders, with RII of 0.813 as the major cause of construction cost overrun ,a similar study

conducted by Nega (2008) for the causes of the cost overrun in construction projects in Ethiopia was inflation or increase in the cost of construction material.

With RII of 0.772, the second most influential factor ranked by all respondents were “Cash flow and financial difficulties faced by contractors”. Memon et al. 2010 found similar study Cash flow and financial difficulties faced by contractors is important cause of cost overrun in construction projects of Malaysia.

The third major rated factor ranked by all parties were “delay in material delivery” with RII of 0.771. “Inadequate project preparation, planning and implementation” ranked in the fourth factor causing cost overrun, with RII of 0.685. “Fluctuations in the cost of labor”, “Construction equipment shortage or failure”, “Deficiencies in cost estimate”, “Delays in decision making”, “Poor project management”, “Fraudulent practices and kickbacks./corruption” are also top influential factor that cause cost overrun. The most critical factor mentioned by the interviewers’ are construction equipment shortage and failure. This study align with focus group discussion, most critical problem for cost overrun in MIDROC Ethiopia construction project are corruption and poor project .

4.5 Analysis of interview

The researcher used semi-structured interview ,interview conducted with three purposely selected project managers to collection in depth information about current status ,challenge and mitigation measure of MIDROC Ethiopia construction in terms time and cost overrun.

The first question was directed toward if time and cost overrun are seen as a problem and all interviewees agreed time and cost overrun in the construction projects are major problem.

Table 4.3 Summary of interviewees’ duration and year of experience

Code	Experience(yrs.)	Date	Interview Duration(min.)
001	10	May 3/22	50
002	18	May 26,22	30
003	22	April26/22	20

Table 4.3 indicates that interviewees had experience in handling project ranging from minimum 10years to maximum 22 years. Interviewees highlighted that the following are the main Internal and external challenge of construction PLC.

The researcher discusses with interviewees, Mitigation measure were analyzed and presented as follows in order to improve time and cost performance, so different opinions rose from code 01, 02, 03 such as

4.3.2 Opinion on mitigating time and cost overruns

Different opinion gathered from open ended questions on how to avoid or minimize time and cost overrun are Proper scheduling and planning, Good coordination between head office and projects ,Prepare a series of training, Reduce incomplete work on time, Share working methodology and trend from well-organized construction company e.g. china, Have daily work plan, Use efficient material, Implement better project management practice, Have consistent and daily follow up and schedule from project initiation to completion and also Deliver material, machinery and resource as per schedule.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

This study assessed the current status of MIDROC Ethiopia construction in terms of time and cost overrun. Specifically, it examines the relative importance of the various causes of time and cost overrun in MIDROC Ethiopia construction projects.

To address the objectives, the researcher used primary data collected through survey, interview, and focus group discussion with clients, consultants and contractors. The questionnaire were distributed both through in person and internet based survey tool. Respondents were invited to rate the level of importance of time and cost overrun factors on a five-point Likert Scale. Data were collected on 46 major causes of time overrun and 25 major causes of cost overrun. The secondary data were collected from report, payment, time extension, and correspondence letters. The secondary data were used to identify and investigate past and current situation.

To determine the relative importance of the various causes of time and cost overrun, the RII was employed. The analysis identified ten most significant factors causing time and cost overruns in MIDROC Ethiopia construction PLC. Financial difficulties (shortage), delay of material delivery to site, poor economic conditions (currency exchanges, inflation rates, etc.), low speed of decision making within each project team, highly bureaucratic organization, delay in progress payments by owner, ineffective planning and scheduling of project, shortage of construction materials, lack of a strong organizational culture, poor coordination/ communication are the major factors explaining time overrun.

Fluctuations in the cost of building materials, cash flow and financial difficulties faced by contractors, delay in material delivery, inadequate project preparation, planning and implementation, fluctuations in the cost of labor, construction equipment shortage or failure, deficiencies in cost estimate, delays in decision making, poor project management, fraudulent practices and kickbacks./corruption are the major factors explaining cost overrun.

5.2 Conclusion

The nine major groups under time overrun are project related factors, contractor related factors, consultant related factors, client related factors, design and documentation, material related factors, equipment related factor, and labor related factor and external factor and eight major group under cost overrun are financial difficulties (shortage), delay of material delivery to site, poor economic conditions (currency exchanges, inflation rates, etc.), low speed of decision making within each project team, highly bureaucratic organization, delay in progress payments by owner, ineffective planning and scheduling of project, shortage of construction materials, lack of a strong organizational culture, poor coordination/ communication.

The finding of this study reveal that fluctuations in the cost of building materials and financial difficulties (shortage) of contractor are first ranked cause of cost and time overrun respectively. As a result, serious attention must be paid to time and cost overrun. Practically, this phenomenon is expected to continue unless different mitigation measures are taken to control the cause.

5.3 Recommendations

The followings recommendation were forwarded based on research finding.

5.3.1 Recommendations for Clients

In order to reduce Time and cost overrun the client should take the following recommendations

- It's advisable to pay payments as soon as payments are approved inorder to avoid time and cost overrun.
- It's recommended to improve good communication with both consultant and contractor it help to resolve problem on time.
- During construction building process due to lack of materials, the worker will be idle and it will create cost and time overrun so the client should ensure sufficient time and resource at all stage of projects.
- Clients are provide necessary information regarding the projects.
- Client should ensure co-ordination between stakeholders.
- Clients are recommended to provide information regarding the project and other relevant issues to the designers and contractors.

5.3.2 Recommendations for Contractor

- ❖ As conclude and indicated above proper scheduling and planning of projects is the first important value recommended by researcher. It is important to know the work that will be done during the planning process then to prepare the required material in advance and also to compare plan and result.
- ❖ Contractor is recommended to outsource some works to subcontractors in order to avoid delay. In order to reduce risk, time and cost overrun then to become cost effective, we must share certain tasks to sub-contractor.
- ❖ It's important to contractor to give priority to delivery of construction material, resource and equipment on time as per schedule.
- ❖ It's recommended to contractor to change work methodology or terminate the project before additional cost is induced (not profitable).
- ❖ Contractor are recommended to empower project managers by giving full responsibility (allow overtime to employee, give reward and punishment if required without head office permission) and accountability to hand the projects by their own.
- ❖ Contractor should apply effective project management system, take day to day plan and schedule in to consideration and then evaluate plan as per agreement.
- ❖ Contractor is recommended to practice strong resource management.
- ❖ It's recommended to provide training that would increase the employee capacity, competence and performance.
- ❖ The contractor should continue to use a variety of revenue –generating method.
- ❖ Contractor should replace the outdated material with new one or repair it.
- ❖ When contractor deal with Sub- contractor, contractor should not only focus on current profit but also experience, Performance and commitment should take in to consideration.
- ❖ Contractor should imitate better working methodology and trend from well-organized construction company e.g. china
- ❖ In order to facilitate better communication between stakeholders and also to complete the project successfully the contractor should prepare progress meeting with consultant and client about major issue.

- ❖ It's advisable to have good coordination between head office and projects. In order for the work to go well successfully, head office and the projects should support each other.

5.3.3 Recommendations for Consultant

In order to reduce Time and cost overrun the consultant should take the following recommendations.

- ❖ Because frequent design changes are one of the top Ten reasons for the project time and cost overrun, Consultants are recommended to provide drawing and other necessary document before project beginning.
- ❖ Often the consultant will only listen to the wishes of the owner and make a short schedule and budget in a way that will please the owner, but it will be difficult to put it into practice, therefore Consultants should attach practicable project schedule and budget.
- ❖ Consultants should provide professional opinion or advice instead of only taking client side.
- ❖ Consultant should approved payment as soon as contractor submit in order to successful completion of the project

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APPENDIX

ANNEX 1

Cause of construction project time overrun	CONSULTANT		CONTRACTOR		CLIENT	
	RII	Rank from Overall factor	RII	Rank from Overall factor	RII	Rank from Overall factor
1. Project Related Factor						
Project location	0.514	38	0.551	44	0.520	19
Lack of a strong organizational culture	0.686	9	0.696	11	0.480	27
Highly bureaucratic organization	0.714	6	0.715	7	0.720	2
Low speed of decision making within each project team	0.686	9	0.737	5	0.680	5
Lack of follow-up for the project schedule and absence of continuous tracking	0.743	3	0.725	6	0.680	5
2. Contractor Related Factors						
Financial difficulties (shortage)	0.743	3	0.808	1	0.800	1
Mistakes during construction and rework	0.514	38	0.560	43	0.400	39
Shortage of project staff	0.514	38	0.550	45	0.600	14
Poor coordination/communication	0.714	6	0.692	13	0.520	19
Ineffective planning and scheduling of project	0.857	1	0.688	14	0.650	9
Improper construction methods	0.657	16	0.596	35	0.240	46
Obsolete technology	0.657	16	0.576	41	0.360	43
Poor site management & supervision	0.686	9	0.692	12	0.320	45
Delays in sub contractors' work	0.629	24	0.675	16	0.400	39

3.Consultant related factors						
Inadequate experience in Construction projects	0.629	24	0.678	15	0.480	27
Conflicts with in consultant team	0.486	43	0.565	42	0.520	19
Inadequate Contract duration	0.657	16	0.596	35	0.480	27
Inaccurate site investigation	0.771	2	0.576	40	0.500	25
Late in reviewing and approving design documents	0.633	23	0.660	20	0.650	9
Poor communication and coordination with other parties	0.600	31	0.655	22	0.480	27
Delay in inspection, testing of work ,approval of shop drawings and samples	0.629	24	0.656	21	0.600	14
4. Client related factors						
Delay in progress payments by owner	0.714	6	0.745	4	0.480	27
Delay in handing over the site to the contractor	0.486	43	0.613	32	0.440	33
Too many change orders	0.686	9	0.714	8	0.360	43
5. Design and Documentation						
Unclear specifications	0.571	33	0.604	34	0.400	39
Poor design	0.686	9	0.638	25	0.400	39
Lack of designer's experience	0.657	16	0.617	31	0.440	33
Incomplete drawings	0.629	24	0.702	10	0.520	19
Poor documentation and no detailed written procedures	0.629	24	0.621	30	0.480	27
Obsolete technology	0.514	38	0.579	39	0.560	17
6. Material						
Delay of material delivery to site	0.657	16	0.777	2	0.680	5
Inappropriate/ misuse of material	0.543	36	0.632	26	0.600	14
Poor quality of materials	0.600	31	0.581	37	0.440	33

Shortage of construction materials	0.686	9	0.704	9	0.520	19
7.Equipment						
Low productivity of equipment	0.629	24	0.608	33	0.440	33
Lack of equipment	0.743	3	0.624	29	0.440	33
Lack of maintenance for the equipment	0.657	16	0.647	23	0.680	5
8.Labor						
Shortage of labor	0.657	16	0.662	17	0.720	2
Absenteeism	0.514	38	0.627	27	0.520	19
Low motivation and morale of labor	0.571	33	0.662	17	0.640	11
Labor union actions	0.543	36	0.520	46	0.500	25
9.External Factors						
Poor economic conditions (currency exchanges, inflation rates, etc.)	0.629	24	0.755	3	0.720	2
Changes in laws and regulations	0.457	46	0.640	24	0.560	17
Bureaucracy in government agencies	0.667	15	0.624	28	0.640	11
Bad weather conditions	0.571	33	0.581	37	0.440	33
Strikes, political unrest, etc.	0.486	43	0.662	17	0.640	11

Table 4: 10 Factors causing time overruns in MIDROC Ethiopia construction projects

Factors of time overruns	Consultant		Contractor		Client		Overall	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank
financial difficulties (shortage)	0.743	3	0.808	1	0.8	1	0.797	1
Delay of material delivery to site	0.657	16	0.777	2	0.68	5	0.757	2
Poor economic conditions (currency exchanges, inflation rates, etc.)	0.629	24	0.755	3	0.72	2	0.732	3
Low speed of decision making within each project team	0.686	9	0.737	5	0.683	5	0.725	4
Highly bureaucratic organization	0.714	6	0.715	7	0.72	2	0.72	5
Delay in progress payments by owner	0.714	6	0.745	4	0.48	27	0.716	6
Ineffective planning and scheduling of project	0.857	1	0.688	14	0.65	9	0.706	7
Shortage of construction materials	0.686	9	0.704	9	0.52	19	0.692	8
Lack of a strong organizational culture	0.686	9	0.696	11	0.48	9	0.683	9
Poor coordination/communication	0.714	6	0.692	13	0.52	19	0.679	10

Table 4: 11 Top ten factors causing time overruns in MIDROC Ethiopia construction projects

ANNEX 2

Cause of construction project Cost overrun	Consultant		Contractor		Client	
	RII	Rank from Overall factor	RII	Rank from Overall factor	RII	Rank from Overall factor
1. Contractor's site management related factors						
Poor site management and supervision	0.543	20	0.663	13	0.560	5
Lack of experience of the project type	0.629	10	0.573	22	0.360	24
Deficiencies in cost estimate	0.686	7	0.698	6	0.440	17
2. Design and documentation related factors						
Design changes	0.657	9	0.620	18	0.560	5
Omissions and errors in the bills of quantity	0.629	10	0.664	12	0.560	5
Inadequate project preparation, planning and implementation	0.714	3	0.696	7	0.560	5
Mistakes and discrepancies in contract documents	0.600	15	0.632	16	0.440	17
3. Financial management - related factors						
Cash flow and financial difficulties faced by contractors	0.714	3	0.788	3	0.720	1
Financial difficulties of owner	0.686	7	0.672	10	0.400	22
4. Human resource (workforce) related factors						
Fluctuations in the cost of labor	0.571	16	0.724	4	0.520	12
Labor unrest (labor related matters such as the availability, skills, Productivity...)	0.629	10	0.620	17	0.560	5
Bad allocation of workers inside the site	0.457	24	0.596	21	0.560	5
5. Project management and contract administration related factors						
Change in scope of the project	0.700	6	0.565	23	0.480	14

Delays in decision making	0.629	10	0.686	8	0.520	12
Poor project management	0.800	1	0.664	11	0.480	14
size or complexity of the project	0.629	10	0.536	24	0.450	16
6.Material Related						
Fluctuations in the cost of building materials	0.714	3	0.843	1	0.720	1
Low quality of materials	0.543	20	0.641	15	0.440	17
Delay in material delivery	0.514	22	0.812	2	0.720	1
7.Equipment Related						
Construction equipment shortage or failure	0.571	16	0.702	5	0.640	4
8. External						
Degree of government regulations and control	0.571	16	0.604	20	0.560	5
Fraudulent practices and kickbacks./corruption	0.800	1	0.658	14	0.440	17
Unpredictable weather conditions	0.486	23	0.612	19	0.400	22
Conflict, war, and public enemy	0.571	16	0.673	9	0.440	17

Table 4: 12 Factors causing cost overruns in the case of MIDROC Ethiopia construction

Factors of cost overruns	Consultant		Contractor		Client		Overall	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Fluctuations in the cost of building materials	0.714	3	0.843	1	0.72	1	0.813	1
Cash flow and financial difficulties faced by contractors	0.714	3	0.788	3	0.72	1	0.772	2
Delay in material delivery	0.514	22	0.812	2	0.72	1	0.771	3
Inadequate project preparation, planning and implementation	0.714	3	0.696	7	0.56	5	0.685	4
Fluctuations in the cost of labor	0.571	16	0.724	4	0.52	12	0.681	5
Construction equipment shortage or failure	0.571	16	0.702	5	0.64	4	0.681	6
Deficiencies in cost estimate	0.686	7	0.698	6	0.44	17	0.675	7
Delays in decision making	0.629	10	0.686	8	0.52	12	0.666	8
Poor project management	0.8	1	0.664	11	0.48	14	0.663	9
Fraudulent practices and kickbacks./corruption	0.8	1	0.658	14	0.44	17	0.662	10

Table 4: 13 Factors causing cost overruns in the case of MIDROC Ethiopia construction

QUESTIONNAIRE

ST.MARY'S UNIVERSITY

**SCHOOL OF GRADUATE STUDIES MASTER OF BUSINESS ADMINISTRATION
PROGRAM**

Dear Respondents,

My name is Hananya Solomon, I am conducting research titled “Assessment of time and cost overrun in the case of MIDROC Construction” for the completion of an MBA at Saint Mary’s University.

I kindly request you to participate in this research study by completing this questionnaire. To ensure that all information will remain confidential .please don’t include your name anywhere in the questionnaire. I also sincerely request you to respond to the questions as honestly as possible and return the completed questionnaire. Knowing that your time is valuable, please take a few minutes of your time to complete the questionnaire.

With best regards,

Hananya Solomon

Thank you very much for your cooperation!

General Information

- There is no need of writing your name.
- Please select the right answer you think and put the “√” mark in the boxes.
- For questions that require your further opinion, please respond clearly and faithfully.

Telephone: 0920672302

Email: lpealyeadmassu12@gmail.com

Part one: personal data

1.1 Please specify your gender: Male Female

1.2) Which organization do you represent?

Consultant Contractor Client Other

1.2 Work experience in the construction Project (in years)

0-5 5-10 10-20 >20

1.3 The level of education:

High School Diploma First Degree Master Degree PhD

1.4 Your area of proficiency

Project manager Project Coordinator Office Engineer
 Site Engineer Forman Resident Engineer Other

Part two: ASSESSING TIME AND COST OVERRUN IN MIDROC CONSTRUCTION PROJECTS.

NOTE: Extremely Sig. = EXTREMELY SIGNIFICANT (5); Very Sig. = VERY SIGNIFICANT (4); Moderately Sig. = MODERATELY SIGNIFICANT (3); Slightly Sig. = SLIGHTLY SIGNIFICANT (2); NOT Sig. = NOT SIGNIFICANT (1)

1. Major causes of project delay in the construction industry

	Causes of Construction Project Time overrun in the case of MIDROC Ethiopia construction	NOT Sig.	Slightly Sig.	Moderately Sig.	Very Sig.	Extremely Sig.
1	Project Related Factors					
1.1	Project location					
1.2	Lack of a strong organizational culture					

1.3	Highly bureaucratic organization					
1.4	Low speed of decision making within each project team					
1.6	Lack of follow-up for the project schedule and absence of continuous tracking					
2	Contractor related factors					
2.1	financial difficulties (shortage)					
2.2	Mistakes during construction and rework					
2.3	Shortage of project staff					
2.4	Poor coordination/ communication					
2.5	Ineffective planning and scheduling of project					
2.6	Improper construction methods					
2.7	Obsolete technology					
2.8	Poor site management & supervision					
2.9	Delays in sub contractors' work					
3	Consultant related factors					
3.1	Inadequate experience in Construction projects					
3.2	Conflicts with in consultant team.					
3.3	Inadequate Contract duration					
3.4	Inaccurate site investigation					
3.5	Late in reviewing and approving design documents					
3.6	Poor communication and coordination with other parties					
3.7	Delay in inspection, testing of work ,approval of shop drawings and samples					
4	Client related factors					
4.1	Delay in progress payments by owner					
4.2	Delay in handing over the site to the contractor					
4.3	Too many change orders					
5	Design and Documentation					
5.1	Unclear specifications					
5.2	Poor design					
5.3	Lack of designer's experience					
5.4	Incomplete drawings					
5.5	Poor documentation and no detailed					

	written procedures					
5.6	Obsolete technology					
6	Material					
6.1	Delay of material delivery to site					
6.2	Inappropriate/ misuse of material					
6.3	Poor quality of materials					
6.4	Shortage of construction materials					
7	Equipment					
7.1	Low productivity of equipment					
7.2	Lack of equipment					
7.3	Lack of maintenance for the equipment					
8	Labor					
8.1	Shortage of labor					
8.2	Absenteeism					
8.3	Low motivation and morale of labor					
8.4	Labor union actions					
9	External factors					
9.1	Poor economic conditions (currency exchanges, inflation rates, etc.)					
9.2	Changes in laws and regulations					
9.3	Bureaucracy in government agencies					
9.4	Bad weather conditions					
9.5	Strikes, political unrest, etc.					

2. Major causes of project cost overrun in the construction industry

Table 4: 12 Factors causing time overruns in MIDROC Ethiopia construction projects

	Causes of construction projects cost overrun in the case of MIDROC Ethiopia construction	NOT Sig.	Slightly Sig.	Moderately Sig.	Very Sig.	Extremely Sig.
1	Contractor's site management related factors					
1.1	Poor site management and supervision					
1.2	Lack of experience of the project type					
1.3	Deficiencies in cost estimate					
2.	Design and documentation related factors					
2.1	Design changes					
2.2	Omissions and errors in the bills of					

	quantity					
2.3	Inadequate project preparation, planning and implementation					
2.4	Mistakes and discrepancies in contract documents					
3.	Financial management-related factors					
3.1	Cash flow and financial difficulties faced by contractors					
3.2	Financial difficulties of owner					
4.	Human resource (workforce) related factors					
4.1	Fluctuations in the cost of labor					
4.2	Labor unrest (labor related matters such as the availability, skills, Productivity...)					
4.3	Bad allocation of workers inside the site					
5.	Project management and contract administration related factors					
5.1	Change in scope of the project					
5.2	Delays in decision making					
5.3	Poor project management					
5.4	size or complexity of the project					
6	Material Related					
6.1	Fluctuations in the cost of building materials					
6.2	Low quality of materials					
6.3	Delay in material delivery					
7	Equipment Related					
7.1	Construction equipment shortage or failure					
8	External					
8.1	Degree of government regulations and control					
8.3	Fraudulent practices and kickbacks./corruption/					
8.4	Unpredictable weather conditions					
8.5	Conflict, war, and public enemy					

Part Three: open-ended questions

1. What other factors might have contributed to time and cost overruns in the project/s you were involved in? Please you are kindly requested to write here in the order of their importance.

Causes of Time overrun

Causes of Cost overrun

2. In your opinion how could the time and cost overruns be avoided or minimized?

2.1. Time overrun (Project Delay).

2.2. Cost overrun.

Thank you for your cooperation