



**ADDIS ABABA UNIVERSITY  
COLLEGE OF BUSINESS AND ECONOMICS  
SCHOOL OF COMMERCE  
GRADUATE PROGRAM OF PROJECT MANAGEMENT**

**Assessment of Project Performance:  
The Case of Debre Birhan City Cobblestone**

**BY**

**FASIKA BERHANU      ID GSD/4158/12**

**A Project Work Submitted to Addis Ababa University, School  
of Commerce in Partial Fulfillment of the Requirements for  
the Award of Master of Arts Degree in Project Management**

**ADVISOR: FISSEHA AFEWERK**

**June, 2022  
Addis Ababa, Ethiopia**

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## **Declaration**

Here by, I, Fasika Berhanu Gemechu, whose identification number GSD/4158/12 is here to declare that this research is original work of my own and it has not been submitted partially or fully to any university so far a partial fulfillment to master's degree award.

Fasika Berhanu Gemechu

\_\_\_\_\_

This thesis has been submitted for final examination with my approval as an advisor.

\_\_\_\_\_

# **Addis Ababa University**

## **College of commerce**

### **Department of Project Management Approval**

This is to certify that this project work prepared by Fasika Berhanu Assessment factors affecting project performance: A Case Study of Debre Birhan City Cobblestone Construction projects. Which is submitted in partial fulfillment of the requirements for the Degree of Masters in project management (MAPM), complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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1. Questionnaire

## **Abstract**

*The road building industry is a crucial and important part of Ethiopia's national economy. The success or failure of a project is determined by its project performance. However projects several problems challenge the project performance in terms of project performance parameters like time, cost and quality. Assessing the project performance of Debre Birhan City cobblestone is the main concern of the study. The performance of cobblestone road building in the city is examined, as well as the internal and external elements that influence the project's success. The study used research design method type called descriptive design method. Primary and secondary sources are used to collect information. Questionnaires were used extensively in this study as a major data collection approach, with document reviews serving as a supplementary data gathering instrument. 80 participants were used as a sample population but only 72 questionnaires were gathered back. The study was limited in year 2012 E.C and 2013 E.C. The purposive technique was used to review ten projects in this study. Contractors, clients, regulators, auditors, and infrastructure specialists were among the survey's participants. There were issues with project performance in the city, according to both primary and secondary data evaluations. A range of factors that influence performance are identified using RII. The top reported problems include poor use of computer software in all jobs, awarding contracts to the lowest bidders, land acquisition and compensation issues, material price hikes, delays in clearing payments for completed work, and clients prioritizing speed above quality. Those variables should be considered by management for project success. The conclusions of this study demonstrate that, while the city's cobblestone projects have performance issues across the board, the quality issue is more serious and significant than the others, and that the relevant agencies should pay more attention to it.*

*Key Words: cobblestone construction, project cost overrun, project quality, project delay, project management.*

## **ACRONYMS**

E.C- Ethiopian Calendar

ETB- Ethiopian Birr

GDP- Growth Domestic product

G.C- Gregorian Calendar

PMBOK-Project Management Body of Knowledge

RII- Relative Importance index

SPSS- Statistical package for social science

WBS- Work breakdown structure

### **Abbreviation**

ACWP- Actual cost for work performed

BCWP- Budgeted cost for work performed

BCWS- Budgeted cost for work scheduled

CPI- Cost performance Index

GNP- Growth national product

Km-Kilometer

SPI- schedule performance Index

ULGDP-Urban Local Government Development Project

IAMP- Infrastructure Asset Management Plan

# CHAPTER ONE

## Introduction

### 1.1 Study background

"Construction is one of the most important ways in which societies produce new values since it is responsible for constructing, defining, and maintaining the constructed environment in which most other social and economic activities take place," says (Morton, 2002; Cain, 2003; Winch, 2002). In developed countries, construction is one of the most important businesses, accounting for around ten percent of GDP. (Navon, 2005). Construction industry contains large number of parties as clients, contractors, consultants, stakeholders, and regulators so that it is a complex industry by its nature, so that it is one the industries that highly involve the concept of project management. Project management expertise has the greatest impact on project success, which is defined as satisfying project objectives (World Bank, 2009). Measuring performance is crucial in the control process since it allows for monitoring of performance in order to reach the ultimate goals in construction industries. (Haponava and Al-Jibouri, 2008). According to Jekale (2004), the success or failure of a construction project is decided by its performance, which is measured in terms of on-time completion, budget compliance, quality compliance, and customer satisfaction. Despite its considerable contribution to the economies of emerging countries and the vital role it plays in their development, the construction industry's performance is still largely poor.

From the many infrastructure sectors that Ethiopia is still trying to fulfill for the people one is the road construction sector. From different kind of road constructions, cobblestone construction is one that is being used vastly in the country due to its benefits for the urban poor. It has resulted in the creation of hundreds of thousands of employment, a significant increase in urban mobility, and the development of collaborative relationships between communities and local governments. It is also being the major job opportunity for the university graduates in construction industry.

Many cities in Europe, the United States of America, and other advanced parts of the world have firsthand experience with cobblestone roads. As a result, utilizing stones to pave streets is not a novel concept (Treskon, 2006).

Debre Birhan City is among one of the cities in Amhara National Regional states, which is under major development issues regarding the road infrastructure. Beside ULGDP projects the city is among the cities of Amhara national regional states which are selected to be benefited from World Bank fund for the city's infrastructure projects. Due to this multiple opportunities the city is under major infrastructure constructions including, cobblestone construction. But the performance and quality of the cobblestone is among the concerns related to this sector. The Government, contractors, consultants, project customers, and end-users/clients are all concerned about project performance, and it is also the key issue on the Debre Birhan City cobblestone building projects.

It is critical to identify the elements that influence project performance, particularly in the construction sector, in order to optimize project performance. In order to do so, the variables that contribute to project failure must first be recognized and defined in order to meet the study's goal. As a result, the purpose of this research is to determine the elements that influence the project performance of a cobblestone road construction project in Debre Birhan City.

## **1.2 Background of the organization**

This research is carried out in Debre Birhan City Administration, which is located in Amhara Regional State, North Shewa Zone, 130 kilometers northeast of Addis Ababa. Currently, the city serves as the capital of the north shewa. Debre Birhan's history began in 1454 G.C., during the reign of Emperor Zara Yacob. Debre Birhan was named after the Emperor's reaction to a brilliant light seen in the sky. Debre Eba was the city's previous name.

According to (Dagne 2016 ) the city's municipal government, the municipality in the city is created in 1984. Prior to 2012, the municipality's housing and infrastructure offices were combined, but after 2012, the infrastructure office was separated and re-established.

## **1.3 Statement of the problem.**

Cobblestone road development, according to Ofori (2006), makes a major contribution to local and national social, economic, and environmental benefits. Cobblestone road construction is definitely essential; the business provides a large number of job opportunities, second only to agriculture. It costs less than concrete or asphalt roads, and it improves the aesthetics of towns and cities while also helping people and increasing tourism. It's also cheaper to maintain than asphalt roads, and it lasts much longer. It is labor-intensive, producing jobs and opportunities for construction entrepreneurs; it uses natural and locally produced materials instead of imported machinery; it is not dependent on imported oil; and it has no impact on global warming temperatures. (UN-Habitat, 2013:2). The application and integration of modern management and project management skills, knowledge, tools, and techniques to the overall, directing, planning, coordinating, monitoring, and control of all dimensions of a project from conception to completion, as well as the motivation of all those engaged to create the project's product, service, or result on time, within approved cost, to the required quality and requirement, and to the satisfaction of participants[(Chartered Institute of Building, 2002), (Fewings, 2005), (Carmichael, 2004)]. Generally, the construction industry in developing countries failed to meet expectations of all clients (Ofori, 2006). All performance factors such as time, budget, and quality are problematic, and many aspects of the construction industry have

been plagued by concerns such as insufficient safety, bad working conditions, and poor quality.

Construction projects are considered successful when they are completed on schedule, on budget, according to specifications, and to the satisfaction of all stakeholders. It is critical that they be well managed if they are to be successful. In developing countries like Ethiopia, road construction costs account for a significant portion of the budget; it has a significant impact on the countries' economy. There are a vast scope for improving those performance parameters through project management skills in construction industry, where men, materials, machinery, money and management work together to build a facility.

In Debre Birhan City the municipality's sole purpose is to construct and provide work opportunities. The local government pays little attention to the overall performance of the cobble projects. To address the challenges it is essential to give priority to improving the performance. To improve performance knowing the factors that affect the performance and putting them in order is a way to handle the challenges. The main concern of this study is to assess the performance of cobble projects in the city, to identifying the factors that are internal and external and to place the factors in their respective order based on the RII value. Community continue to demand infrastructure but in parallel the issue that is prevalent in the city is the community's lack of trust in the quality, timeliness, and budget managements of the cobblestone projects. Every inhabitant of the city is dissatisfied with the deterioration of the erected cobblestones over a short period of time, and they are calling on the government to take action and to provide enough priority to the next projects as well. The issue raised by the community is not simply one of quality; it is also for projects to be completed on time. In all project cases, the projects were scheduled to be completed before the summer season, but it has been observed that the majority of the projects are not completed on time, and as the rainy season approaches, the projects are put under a great deal of stress, resulting in additional quality issues. So that in order to improve the status of the cobble projects, it is critical to address factors impacting project performance of cobblestone road construction projects in Debre Birhan City.

In this this study the total performance of the cobble projects is assessed by taking in account of the factors that are related to the project performance parameters that are time, quality and budget.

### **Identified Research Gap Observed by the Researcher**

Because we are in a developing country with limited infrastructure coverage from the federal government to local governments, most of the attention is focused on simply building infrastructures, and because cobblestone is a relatively new industry in our country, the focus on project performance is low. From many countries' perspectives, cobblestone is a road sector that provides service for a longer period of time while maintaining an elegant appearance; however there are limitations in our country, particularly in Debre Birhan. Even though there have been studies done on this subject, they are insufficient. Other studies in different cities have primarily focused on management issues, but this study covered external aspects such as the role of the customer, supply, and technology-related factors that are affecting the city's cobble project.

### **1.4 Research Questions**

This study aims to close the gap by addressing the following research questions about factors influencing cobblestone road construction project performance in Debre Birhan City.

1. What is the level of performance of Debre Birhan City cobblestone projects?
2. What internal project management related factors are affecting the project performance of cobblestone road construction projects in Debre Birhan City?
3. What external elements are influencing the project performance of Debre Birhan City's cobblestone road construction projects?

### **1.5 Research Objectives**

#### **1.5.1 General objective**

The overall goal of this research is to identify characteristics and factors that influence project performance in the context of Debre Birhan City cobblestone road construction projects.

### ***1.5.2 Specific Objectives:***

- A. To assess the performance of cobblestone construction projects in Debre Birhan City.
- B. To investigate project management related internal factors affecting project performance of cobblestone road construction projects in Debre Birhan City.
- C. To investigate external related factors like clients, supplies and technology related factors affecting project performance of cobble stone road construction projects in Debre Birhan City.

## **1.6 Significance of the study**

The findings of this study are expected to provide sufficient information to interested stakeholders who are interested in learning more about the elements that influence project performance on the cobblestone road construction in Debre Birhan City both in the internal and external aspects. Additionally this study's outcome would serve as a stepping stone for future studies on the project performance of the cobblestone road construction in Debre Birhan City and other comparable projects. The study also intends to create enough awareness on the cobble stone projects of Debre Birhan City.

## **1.7 Research Scope**

This study is limited to Debre Birhan City cobble stone road construction projects in past two years from 2020 to 2021 or from 2012 E.C to 2013 E.C year due to time and financial constraints. And the sample size is also limited to manageable size of the stakeholders that are having a role on the cobble construction of the city. This study is carried out using cross sectional along with descriptive design method. It focuses on identifying factors affecting project performance against three performance parameters of cost, time and quality.

## **1.8 Limitation of the study**

The major limitation of this study is the shortage of time. Since most of the contractors of this sector in the city are small micro enterprises which most of them goes under failure after their project is done so, some of the contractors that are involved in this sector may

not be available easily for the data collection process. Debre Birhan city is growing to metropolitan city in current situation and in this situation many of the top managements were on meetings and finding them was difficult.

## **1.9 Definition of key terms**

**Project:** - According to PMI (PMBOK, 2013) a project is defined as a temporary endeavor undertaken to create a unique product, service, or result.

A project is a collection of distinct, interconnected operations with a single aim or purpose that must be finished on time, on budget, and according to specifications. (Wysocki ,2014).

**Project Quality:** - The capacity of a service or product to accomplish its defined tasks is measured by its ability to conform to the specifications of the end-item, as well as procedures and processes of works. (Project Management Institute).

**Project Schedule Delay:** The interval between the original planned completion date and the actual completion date is referred to as schedule delay. (Nicholos, 2004).

**Cost Overrun:** Cost overrun is said to occur when the final cost of the project exceeds the original estimates (Avots, 1983).

**Project Management:** The application of knowledge, skills, tools and techniques to project activities to meet the project requirements (Wysocki ,2014)

## **CHAPTER TWO**

### **Literature Review**

#### **2.1 Introduction**

The aim of this study is to find out what elements influence the performance of a cobblestone construction project in Debre Birhan City. To fulfill the research goal, a detailed review of literatures relevant to this subject will be conducted. Certain of the research's important themes, as well as some theoretical contributions from the literature, are highlighted.

A literature review aids in the comprehension of earlier research relating to the study's aims and goals, as well as the concepts on which the study will be built. The Literature Review will be compiled using article reviews, secondary sources, relevant magazines and journals, institutional reports, text books, government publications and programs, and other sources.

#### **2.2 Theoretical Literature Review**

Project is defined by various writers in different ways. The first definition of project is according to the Project Management Institute (PMI) which defines project as a series of tasks that must be performed in order to achieve a specific result. The term "project" is defined as "any transitory endeavor with a known beginning and finish," according to the. It can be managed by a single person, depending on its complexity.

As [ (Stanleigh, 2007), (Cleland & Ireland, 2002), (Wheatley)] asserts “A project has a defined scope, is bound by limited resources, involves a large number of people with varying levels of expertise, and is often elaborated over time”( as cited in Abadir,2011, p.28)

Robert K. (2017)define project as a series of one-of-a-kind, complicated, and interconnected actions having a single aim or purpose that must be performed on time, on budget, and according to specifications. Just like project, project management also has different definitions by different authors.

Finally to gather and summarize those definitions, this study defines project management as follows: The modern management application and integration, and project

management knowledge, tools, techniques, and skills to the overall planning, directing, coordinating, monitoring, and control of all aspects of a project from conception to completion, and also the motivation of all those involved to produce the project's product, service, or result on time, within authorized cost, to the required quality and requirement, and to the satisfaction of participants. [(Chartered Institute of Building, 2002), (Fewings, 2005), (Carmichael, 2004)].

Scope, time, cost, risk, quality, human resources, procurement and communications, and integration management are the nine core knowledge area of project management that is identified in PMBOK.

Every project has three overarching dimension goals: complete work for the client or end-user within schedule, budget, and performance constraints.

- The timetable specifies the length of time that the task will be completed and the goal date for completion
- The budget is the specified or allowable cost for the project; it is the target cost of the work to be done
- The performance criteria indicate how to get to the end-item or final result.

Performance, scheduling, and cost are all interrelated, and in order to reach a package agreement, all three variables must be acceptable to all parties.

### ***2.2.1. Measurement of Construction Project Performance:***

#### ***Quality, Cost and Time Performance: -***

Two success concepts can explain Project performance according to (Baccarini, 1997): success of project management and product. The first notion focuses on the timely, cost-effective, and high-quality completion of the project, which can be measured in terms of project budget, schedule, and compliance to functional and technical specifications. The latter concept is concerned with the project's ultimate result's effects and consists of three primary components: project goal, purpose, and stakeholders. Another criterion for evaluating project performance (Pheng & Chuan, 2006) is to take into account users, stakeholders, owners, and the general public (who look at projects from the macro perspective of overall goals of functionality and benefits), as well as the developer and contractor (who look at projects from the micro perspective of completion time, cost,

quality, safety, and profitability). Project measurement can upgrade the capacity of information with the goal that it gives the improved construction execution at all levels.

Performance measurement, according to Navon(2005), is a "analysis of the predicted and tangible performance." He also stated that exhibition estimation is essential not only to monitor current actions but also to update the noteworthy database.

**Project quality:** -As of the Project Management Body of Knowledge (PMBOK), Project Quality contains the activities that define quality policies, processes, responsibilities and objectives. So that the needs for which it was undertaken is satisfied by the project.

Quality is defined as "the extent to which a set of intrinsic qualities fulfills requirements by the Project Management Institute. Quality is defined as the ability of an administration or item to meet the requirements of a standard, as well as work procedures and methods, and mines the capacity of an administration or item to do its specified task.

As per Abbas et.al (2015) Quality is one of the most important key presentation aspects of a building project, and it can lead to cost overruns and delays. A typical determinant used to evaluate the degree of execution in building projects is task quality execution. Furthermore, as Jha and Iyer explained, project execution can be acquired based on the satisfaction levels of the participants (2006). In building projects, a lack of value leads to delays, cost overruns, and a potentially dangerous structure. According to Abbas et al. (2015), one of the very necessary key exhibition markers of a project in construction industry is quality, which can lead to cost overruns and delays.

Project cost management is depicted in the PMBOK as it includes resource planning, cost estimating, cost planning, cash flow, and cost management, as well as the procedures required to ensure that the project is completed within the set budget.

The cost overrun and also the schedule delay are measured by performance indicators as (Issues & The, 2017).

whether the project was under or over budget is determined by the cost performance index (CPI). It is computed by dividing the budgeted cost for the work performed by the budgeted cost for the job completed, the project was completed by consuming more than that was allocated if the calculated amount from CPI is below one, the project was within budget and the land cost was spent as intended if the calculated CPI equals one, and if CPI is greater than one, the project progress used fewer budgets than forecasted budget.

In a nutshell, schedule variance, the schedule performance index, percentage of the schedule performance, cost variance, cost performance index, and percentage of the cost variance are calculated and summarized in the following way:

SPI is for schedule performance index,

CPI stands for cost performance index.

Budgeted cost for scheduled work (BCWS),

Budgeted cost for completed work (BCWP),

And actual cost for completed work (ACWP). Cost Variance (CV), on the other hand, is a measure of the difference between the budgeted value (BCWP) and the actual cost of executing the activity (ACWP).

The CV 1 percent (cost performance percentage) is calculated as  $CV/BCWP$ . And schedule variance (SV) measures the time deviation between the planned progress (BCWS) and the earned value (BCWP);  $SV=BCWS-BCWP$ .

The percentage of schedule performance (SV 1 percent) is calculated using  $SV/BCWS$ .

Having the project costs that are lower than the initial estimate is showed by Positive cost variation. While having that the project costs are greater than the original estimate is showed by negative cost variances. Positive schedule variance implies that the project has been completed ahead of schedule, whilst negative schedule variance shows that the project is running late.

### ***2.2.2. Construction Projects Nature and Characteristics***

Construction project management differs from additional types of project management in a number of ways. The distinctions are due mostly to the qualities and essence of construction projects. For successful construction project management, these variances must be taken into account.

Generally construction projects:

- Are usually capital intensive, complex; and require significant management skills, involvement and coordination of a large number of experts in various field. (Chartered Institute of Building, 2002).
- Are usually undertaken outside; hence, they are susceptible to many variables such as weather and traffic (Gould & Joyce, 2003).

- Must address the geography and conditions of the project site and the relation of the project to the environment. (Project Management Institute (PMI), 2007).
- Are governed by a number of laws and regulations aimed at ensuring public safety and reducing environmental impact. (Bennett, 2003).
- Construction projects, in comparison to most other businesses, utilize a lot of labor and consume a lot of resources and physical instruments. (Jekale, 2004).

### ***2.2.3. Construction Project Management***

“Much of the content of PMBOK\_ Guide is also directly applicable to construction projects.” (Project Management Institute (PMI), 2007). Even though construction project management is comparable to different types of project management in many ways, it has several unique characteristics that set it apart from different types of project management, such as software development. According to (Chartered Institute of Building, 2002), the major task of project management in construction is primarily to coordinate professionals in the project team to enable them to make their best possible contribution to the project efficiently.

As(Chen, Partington, & Qiang, 2009) Managing construction projects necessitates an understanding of the design and construction process in addition to project management and general management skills (Hendrickson). Communication skills and the ability to lead a team are also essential for effective construction project management (as cited in Abadir, 2011).

project management functions in construction are summarized by Hendrickson as follows:

1. Defining the scope of the project, planning the budget and schedule, establishing performance requirements, and choosing project participants.
2. Obtaining labor, resources, and equipment according to a defined schedule and plan in order to improve resource efficiency.
3. The process, coordination and control of multiple processes, including planning, design, estimating, contracting, and construction.

4. Developing effective communication and conflict-resolution processes among the many stakeholders.

#### ***2.2.4. Cobblestone and its nature***

According to the Encyclopedia Britannica (cited in Tiwari, 2011:73), stones that are frequently used in the pavement of early streets are Cobblestones.

The word 'cobblestone' comes from a very old English word 'cob,' which had a variety of meanings, one of which was a spherical mass with big overtones. The diminutive suffix 'le' was introduced to the word cobble in the 15th century, and it indicated a little stone smoothed by the passage of water; essentially, a huge pebble. The original cobblestone roadways were built with these smooth 'cobblestones' obtained from stream beds. — (Treskon, 2006) defines cobblestone as a "masonry phrase." It refers to a rounded water-worn stone that is utilized for paving streets. However, the phrase is frequently used to refer to a variety of stone paving types.

Cobble Stone (Dressed Stone) is defined by ERA (2011:105) as "cubic fragments of stone larger than setts, commonly formed by hand and built into a road surface layer or surface protection." Cobbles, according to BASMAA (1999:53), are bigger granular materials that range in size from 6 to 24 inches in diameter and come in a variety of stones and hues.

Cobbles can be used as a permeable pavement in locations with minimal traffic, such as under huge trees, or in areas that are difficult to maintain, such as median islands. The size of each Cobblestone, as well as the status and position of laying the stones on the already built sub base, determines the nature of the Cobblestone roads. If a single Cobblestone is displaced (scattered) from its regular position, the entire Cobblestones could be affected as well. Because the stability of one Cobblestone in its position is dependent on the stability of the other, its nature allows it to decay or destroy if it is not formed properly. Unless firmly fixed with cement or concrete, the edge or end of a road with a connection or join with asphalt or earthen road can simply be demolished. In order for the Cobbles to be held, the curve stones must be properly built, glued, or attached with cement and other materials.

## **2.3 Empirical Literature Review**

The elements impacting cobblestone construction projects have not been adequately stated in the studies that have been studied. (Dessalegn Belay, 2017) Their research was limited to the success elements of building construction in Addis Ababa.

(Hameed Memon et al., 2014)(Iyer & Jha, 2006) focuses on Factors affecting quality performance in construction project where the findings concern on Project manager competence, top management support, monitoring and feedback by project participants. Most of the researches were on the building and road constructions.

### ***2.3.1. Factors Related to Projects***

Construction project performance does not meet optional expectations. The performance of the participants, who are interdependent and have a considerable impact on the overall project outcomes, is one facet of this. The client is generally the project owner, the architect or engineer is hired as the lead designer, and a contractor is hired to build the facilities. The project factors that cause project delays in Afghanistan, according to Carlson et al. (2012), are: the original contract period was too short, there were legal disagreements between several parties, there was an inadequate definition of significant completion, there were ineffective delay fines, and there was a type of construction contract. According to Tekalign (2014), "The Project Management Institute (PMI) describes the project as a series of tasks (with a defined start and the end moment) conducted following a structured loop of initiation, definition, planning, execution, and close to create a unique product, service, or result through novel organization and coordination of human, material, and financial support

### **2.3.2. Factors related to Contractors**

The contractor's performance is critical in the construction business for maintaining project performance. The effective completion of a building project depends on the selection of a qualified contractor. The project's owners must choose the contractor carefully in order for them to carry out their duties effectively. Many studies have been conducted on the contractor's performance. According to one of them, (Carlson et al., 2012), not enough client payments for finished and ongoing work, subcontractor issues, acquiring difficulty for work permit and permission, and availability and equipment

failure are the four main reasons of delays for contractors. According to (Al-Najjar, 2008), Contractors believe that materials insufficiency in the markets, lack of materials for construction on site, delays in material deliveries to site, a cash shortage during construction, site management that is unwise, lower economic conditions (currency, inflation), lack of equipment and tools on site, and a delay by the owner in releasing the project are the most major factors causing time overruns in building construction projects in Gaza.

### **2.3.3. Project performance and Client related factors**

The contractor's performance is critical in the construction business for maintaining project performance. A professional contractor must be chosen for a job in order for it to be completed successfully. Many studies have been done by the project owners in order to identify the contractor who will perform their duties in a satisfactory manner. Among them are: Insufficient client payments for completed and ongoing work, subcontractor issues, trouble acquiring work permits and approval, and availability and failure of equipment are the four main causes of delay, according to contractors (Assaf & Al-Hejji, 2006). According to Motaleb and Kishk(2010),the reason for project time overrun in UAE that are related to the contractor factors are materials being delivered late, slow mobilization of labor, strikes, construction methods that aren't appropriate, having low motivation, unreliable of sub contract, inadequate contractor experience, contractor' financial difficulties.

According to contractors, the most important factors causing time delay in building construction projects in the Gaza Strip are a shortages of building supplies on site, delays in material deliveries to site, scarcity of products in the markets, Construction financial constraints, inadequate site management, poor economic conditions, site equipment and tool shortages, and owner delays in paying contractors (Al-Najjar, 2008).

### **2.3.4. Performance and project Material**

Various criteria influence the quality and strength of each road project. It is recommended that a quality assurance component for important materials and works be established. According to (Sagade & Prakash, 2014)material management is one of the most important aspects of the construction industry. When essential resources,

apparatuses, or construction material are not available at the proper location and time, efficiency can be harmed. Lack of materials, material fabrication delays, sluggish conveyance of required materials, and material resistance to determination, unanticipated material damages, and material acquisition issues are all discussed in (Kifle, 2017)theory. Material-related factors that cause task delays in Afghanistan,(Carlson et al., 2012) include a lack of construction materials in the market, changes in material types and specifications during development, delays in material conveyance, late acquisition of materials, and late determination of completing materials due to a wide range of options in the market (n. d).

### ***2.3.5. External Factors***

External factors that influence businesses, particularly road initiatives, are divided into three categories: social, political, and economic. Financial situation, social condition, politics, physical condition, modern technical development, and amount of innovation progressed are all external elements that effect project execution, according to Dwindle (2015). Climate, trash on the site, and Babu are some of these variables (2015). Stormy/fervently climatic condition, common aggravation, unexpected site condition, government guideline, and moderate method of construction grant, value variance, transformation, conflict, revolt, exceptional climate, quake, landslip, fire, political and monetary unpredictability, according to (Sayad et al., 2002) According to Odeyinka and Yusif (1997), as cited by Haseeb et al., cataclysmic events, climate conditions, clashes, and work questions and strikes, unexpected site conditions, authoritative changes, administrative changes, issue with neighbors, and clashes are the primary outside reasons for delay in Nigerian ventures (2011).

## **2.4. Conceptual Framework**

How the variables interact with one another is explained in conceptual framework. The independent and dependent variables are separated in this section. The study's independent variables are management-related, project-related, client-related, contractor-related, material-related, equipment-related, and external factors. The outcome of the project is a dependent variable (time, quality, and cost).

## Independent variables

1. Project -related factors
2. Management -related factors
3. Contractor-related factors
4. Client-related factors
5. Material-related factors
6. Equipment-related factors
7. External Factors



## Dependent variable

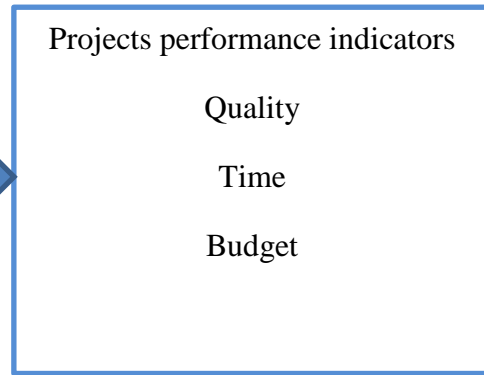


Fig 1: Conceptual Framework

Source: Akawak , 2020

## **CHAPTER THREE**

### **Research Methodology**

#### **3.1 Introduction**

This part covers the study's scope, research design, estimation of the study's results, sample size and sampling processes, data source, data collection technique, variable description, data coding method, and data analysis and interpretation.

#### **3.2 Description of the area**

Debre Birhan is roughly located between 90 36'30" – 90 42' 32' North Latitudes and 390 27'56"-390 34'26" East Longitudes, according to astronomical coordinates. On the main highway to Dessie, it is approximately 130 kilometers from Addis Ababa (the national capital) and 696 kilometers from Bahir Dar (the regional capital). The village is surrounded by ANRS weredas from the North Shewa Zone, indicating that it has a lot of potential. It is currently classed as a wereda level with nine kebeles under municipal status. It also serves as a hub for the North Shewa Zone and Basonna Wereda. The total area of Debre Berhan town is 5710ha. In this research, the town area is further classified as the inner part (1654ha) and the outer part (4055ha) based on the level of urban development. According to the projected baseline survey of Central Statistics Agency- CSA (2013), the total population of Debre Birhan is estimated to be 65,231. Of the total estimated population, 31.668 are male and the remaining 33.563 are female. The Amhara (90.12 percent), Oromo (3.94 percent), Tigrayan (1.81 percent), Gurage (1.6 percent), and Argobba (1.2 percent) were the five major ethnic groupings in the town; all other ethnic groups made up 1.33 percent of the population. 93.81 percent spoke Amharic as their first language, 3.04 percent spoke Oromiffa, and 1.5 percent spoke Tigrinya; the remaining 1.65 percent spoke all other primary languages reported. The bulk of the residents were Ethiopian Orthodox Christians, with 94.59 percent identifying as such, while 4.05 percent identified as Muslims and 1.02 percent as Protestants.

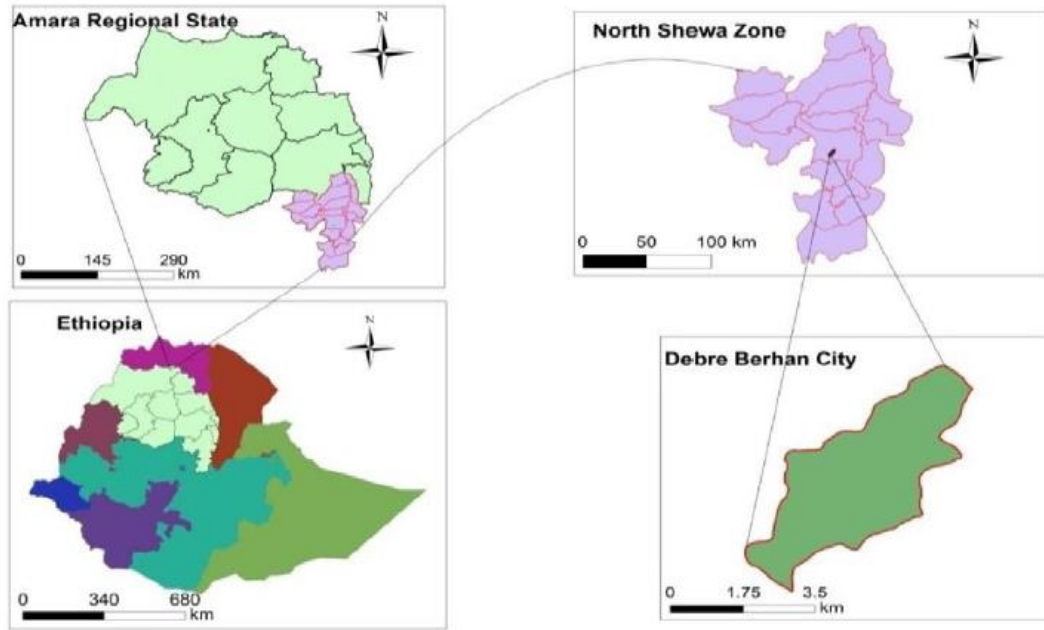


Fig 2: Location of Debre Birhan City

Source: Google website

### 3.3 Research Design

This study focuses on the elements impacting cobblestone construction project performance in Debre Birhan City from 2012 to 2013 E.C. or 2020 to 2021 throughout the last two years. The descriptive research design is adopted in this study. This aids in describing the current state of the city's cobblestone road. This strategy also aids in the collection of a wide range of data relevant to the research subject. In order to address the objectives, cross sectional research is used to collect or gather data at a certain point in time. As a result, the goal of this study is to find out what factors have influenced the performance of Debre Birhan City cobblestone construction projects in the last two years.

### 3.4 Population

This study was undertaken in Debre Birhan City cobblestone road construction projects. The data used for this study comprises the cobblestone projects that are undertaken in last two years starting from 2012 E.C. 10 cobblestone projects is studied under this research. The respondents for this study are contactors, clients and professionals in the infrastructure office that are involved in the 10 cobble projects. In Debre Birhan City

cobblestone stone projects the professionals in the infrastructure office are the ones who consult the project. So like other construction projects those project don't have external consultants.

### **3.5 Sample size and sampling procedures**

A sample design specifies how a sample is obtained from the sampling frame. It refers to the method or strategy used by the researcher to pick some sampling units from which population conclusions can be formed (Kothari, 2004). The participants in this study are: all the professionals in the study area who were clients, contractors and professionals in the infrastructure office that did participated in the past two year cobblestone road construction in the city. Since the number of participated professionals are manageable for the purpose of precision and quality of data all the professionals are included. And 10 cobblestone projects are identified. The sample size is 80; therefore census sample size determination approach is used. On the other hand, all cobblestone projects professionals and all cobble projects are selected.

### **3.6. Research Instruments**

The major instrument that is utilized in this investigation is questionnaires. In addition to primary data, existing documentation is reviewed as secondary data.

### **3.7. Procedure of Data Collection**

The major instruments employed were questionnaires. Clients, contracting firms, and specialists in the study area make up the study's population. The study's accessible document sources are analyzed and primary data is collected via questionnaires issued to a targeted population group and collected as needed.

### **3.8. Method of Data Analysis and Interpretation**

Sorting and classifying primary data from questionnaires according to their intended purposes is part of the analysis. The research yields both qualitative and quantitative results. Statistical Packages for Social Sciences (SPSS) was used to code, enter, and analyze the data, which was then examined using descriptive statistics.

Most important factors affecting the performance of Debre Birhan City cobblestone constructions projects are ranked using relative important index (RII). RII is used to

determine clients, contractors, infrastructure professionals and regulatory auditors' perceptions of the relative importance of the key performance indicator (independent variables) in Debre Birhan City Cobblestone construction projects.

As cited in Akawak Endale paper (2020) the relative importance index is computed by using the following formula (Cheung et al, 2004; Iyer and Jha, 2005;Ugwu and Haupt, 2007)

$$RII = \frac{\sum W}{A(N)}$$

Where RII= Relative Importance Index

W = Weight given to each factor by respondents ranging from 1 to 5

A = Highest weight.

N = Total number of respondents

### **3.9. Validity**

The validity and reliability of the research instrument must be met in one study. This is due to the fact that assessing the results without using a proper and reliable research instrument would result in ambiguity. According to Kothari (2004), content validity is one of the components of validity in which a measuring instrument gives enough coverage of the issue under research. He went on to say that the content validity of the instruments is good if they contain a representative sample of the universe. The content validity of the research instruments is thoroughly assessed from this perspective, and the respondents understand the substance of the questionnaires and replied accordingly.

### **3.10. Reliability**

Reliability is a necessary but not sufficient condition for validity; a reliable scale may not be valid (Babin et al 2009). Likewise, Kothari (2004) states dependability isn't as important as validity, yet it is simpler to scale unwavering quality in contrast with validity. Hence, in the event that the nature of the dependability is fulfilled by an instrument, at that point while utilizing it we can be sure that the transient and situational factors are not meddling.

### **3.11. Ethical Consideration**

The researcher followed ethically acceptable processes throughout the research process. The participants were informed of the purpose of the study before the information is

collected from them thus conforming to the principle of voluntary and informed consent. In this regard, the names of the responders' did not released, and the information is not made available to anyone who was not a direct participant in the study. In addition, the researcher believes that all of the sources used in this research report have been correctly recognized and acknowledged in the form of in-text citations and references in the reference list. The research was conducted in accordance with the university's research guidelines, and data is collected once the interviewee's consent is secured through awareness-raising.

# **CHAPTER FOUR**

## **Results and Discussions**

### **4.1 Introduction**

In this chapter the analysis, interpretation, and presentation of findings is discussed. The analysis and interpretation were based on the research objectives and questions. The respondents' general background is also included on the analysis and interpretation. It depicts a data analysis of the parameters influencing project performance: a case study of Debre Birhan City cobble stone construction projects. This study used secondary data or an examination of documents from the years 2012 and 2013.

### **4.2 The response rate**

The response rate of the study lets in readers to measure what number of units have been distributed, what number of have been resumed, and what the general rate of reaction to the survey was. Eighty questioners were distributed to the respondents and from that seventy two is filled and returned. This means it is about 90% of sample data is successfully gathered from the total required sample. This sample is enough to proceed with the research and analyze the received data.

### **4.3. General background characteristics of the respondent**

The respondents' sex, age, level of education and experience are discussed as follows.

#### ***4.3.1 Gender Distribution***

The result of the findings shows that among the total respondents majority of the respondents are male which accounts 62.5 percent and the rest 37.5 percent are females as shown from the table 1 below. Even if the numbers of males are higher than that of females considering it is construction industry there is an appreciable number of female participants in the industry.

#### ***4.3.2 Age of respondents***

The age group of the respondents has been presented in the table 1 below. From the table it is clearly shown that most of the participants of this industry are youths that are found between the age range of 20-29. Between the age 20-29 the respondents are 54.2%, 30-39 29.2%, 40-49 12.5% and above 50 4.2%.

Table 1: Age and Gender of Respondents

	Gender of respondents		Age of respondents			
	Male	Female	20-29	30-39	40-49	Above 50
Frequency	45	27	39	21	9	3
Percent	62.5	37.5	54.2	29.2	12.5	4.2

Source: survey, 2022

#### ***4.2.3. Position of respondents***

Knowing where the respondents involve in the cobble road project helps this research to make it dependable. As the table below shows from the total 72 respondents 39 were from contractor, 14 were from client side, 12 was from infrastructure professionals and the rest 7 were from regulatory auditors.

Table 2: Position in the Industry

	Frequency	Percent
Client	14	19.4
Contractor	39	54.2
Infrastructure Professional	12	16.7
Regulatory auditors	7	9.7
Total	72	100.0

Source: survey, 2022

#### ***4.2.4. Experience of the respondents***

The respondents experience is directly related to their understanding of the industry. The respondents reply show that most of the respondents have an experience of 5-10 years, this experience is enough to give dependable responses for this research. From the respondents 40.3% of the respondents had an experience of 5-10 years. 31.9% of the respondent has an experience of less than 5 years. Experience year between 10-15 years consists of 11.1% of respondents; 15-20 year experience with respondent of 13.9% and respondents with above 20 years' experience consists of 2.8% respondents. Having respondents that have an experience of 5 to 10 years majorly implies that the respondents have enough experience and the data that is received from them is reliable.

Table 3: experience year of respondents

	Frequency	Percent
Less than 5 years	23	31.9
Between 5 to 10 years	29	40.3
Between 10-15 years	8	11.1
between 15-20 years	10	13.9
Above 20 years	2	2.8
Total	72	100.0

Source: survey, 2022

#### 4.3.5. Level of Education

It is vital to identify the educational level of respondents when doing research in order to evaluate and analyze the results. As a result, the respondents' educational levels are displayed below.

Table 4: level of education of respondents

	Level of education	
	Frequency	Percent
certificate	10	13.9
diploma	16	22.2
Bachelor degree	40	55.6
Masters	6	8.3
Total	72	100.0

Source: survey, 2022

From the above table, we can infer that majority of the respondent are Bachelor degree holders which accounts about 55.6 percent followed by diploma holder which represents about 22.2 percent and the least is indicated by Masters holders while 13.9 percent is a certificate holder.

As is generally recognized in project management, having relevant theoretical as well as practical abilities is a critical factor in project success. As a result, one of the major demography aspects that contribute to the improvement of project performance in the cobblestone building industries is the degree of education. Due to the vast expansion of universities in the county the number of youths graduating from university by having

theoretical skill is very appreciable. But to increase the quality and performance of the sector other than theoretical skill practical skill is also very important; working on improving the practical skill should be continued.

**4.3.6. Number of projects the respondents involved in**

As the table below shows 48.6 percent of respondents involved in projects less than, 26 percent of respondents involved in projects counted between 3 and 5 while the rest 11 percent involved in projects more than 5 in number.

Table 5: number of projects respondent involve with

	Frequency	Percent
less than 3	35	48.6
Between 3 to 5	26	36.1
above 5	11	15.3
Total	72	100.0

Source: survey, 2022

#### 4.4. The Respondents reaction on the three project performance parameters.

##### 4.4.1. The Project quality

Project quality is the major concern of any project, so this research also raised the quality issue of Debre Birhan City cobble stone road project and asked the respondents. From the figure below it is clearly visible that most of the respondents replied a yes to a question that asks if there is a quality problem in the cobble projects. 80.56 percent of respondent agreed that there is a quality problem. Only 19.44 percent replied no.

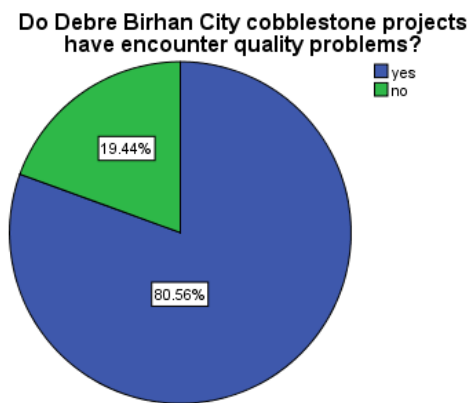


Fig 3: the project quality problem

Source: survey, 2022

##### 4.4.2. The Project cost overrun

Figure below shows how the respondents replied to the problem of the project cost overrun in Debre Birhan City cobblestone construction projects.

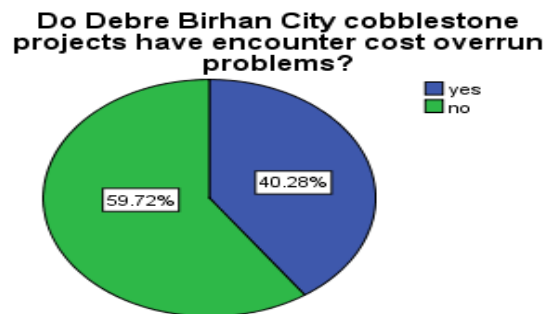


Figure 4: project cost overrun

Source: survey, 2022

As the figure above shows the respondents reply to cost overrun shows that 59.72 percent agree with the problem existing while the rest 40.25 percent refused to agree. This finding tells that cost overrun is still a problem in cobble projects in the city.

**4.4.3. The Project schedule delay**

The figure below shows that the delay problem is one of the problems in the cobble projects that are undergone in the city. 63.89 percent of the respondents agree on the problem of delay in the cobble projects while the rest 36.11 percent didn't agree if there is a delay problem in the projects.

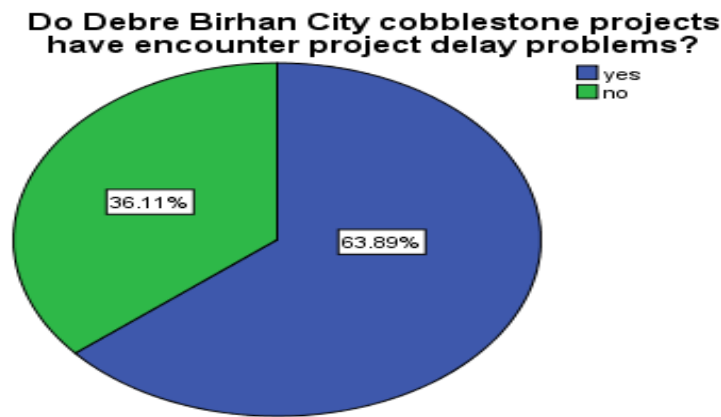


Figure 5: project delay

Source: survey, 2022

**4.5. Analysis of Cobblestone Project Performance from Secondary Sources**

In this section ten cobblestone road construction projects that were undertaken by the Debre Birhan City municipality in 2012 E.C and in 2013 E.C are assessed using the yearly reports as secondary sources. The discussion is presented as of below.

**Project 1:**

**Kebele 09 Cobble stone road from Ameshi house to Main asphalt high Cobble stone paving**

This project take place in kebele 09 from specific place called Ameshi house to main asphalt road, it is 213.22m in length, done by Aragie, Zenebech and their friends micro

enterprises. The project started on April 23, 2020 and completed in July 4, 2020 which is three days after the contract end date. The time elapse is 104%. The given contract date was 70 days but it took 73 days, which means a three days delay. This is an insignificant delay. The contract amount of this project was 1,750,648.34 (ETB) and completed by 1,580,784.89 (ETB). Which is less than the planned estimate by 169,863.45 (ETB), and this is 9.7% of the contract cost. The status of the project is completed. The project has positive cost variance and an appreciable time usage.

## **Project 2**

### **Kebele 07 Cobble stone road from 07 youth center to the 24m road**

This project is started on March 31, 2020 and completed in July 28, 2020 in kebele 07 in specific area from 07 youth center to the 24m road cobble stone which is 680m in length, done by Habtamu, Milion and their friends. The project took more than the contract time, it has a delay of 30 days, and the contract time was on June 29, 2020. This projects contract amount was 8,274,809.67 (ETB) and completed in 8,526,008.53 (ETB). It consumed additional 251,198.85 (ETB). There is negative variance both in cost and time. Status of the project is completed.

## **Project 3**

### **Kebele 02 Cobble stone road from Biruh Tesfa School to 02 youth center**

This project did take place in kebele 02 by contractors named Kebede, Minalu and their friends micro enterprises. This project has a length of 509m. The start point was from specific place of biruh tesfa school and finished at 02 youth center. The project report showed that there is no variance both in cost and time. The contract budget was 6,910,655.04 (ETB) and completed within this budget. The time planned for this was 70 days from April 29, 2020 to July, 2020. Status of the project is completed.

## **Project 4**

### **Kebele 04 cobble stone road from Bimru Beshah house to Atsezereyakob Minch**

This is a cobble stone road construction that took place in kebele 04 it is measured to be 242.10m in length. The contractor that held this project is named as Tekliye, Mitkie and their friends RC. The project was started on March 13, 2020 and completed on July 10, 2020. The contract end date was on June 30, 2020, so the project got delayed by ten days from the contract date. The contractor win the procurement by 2,318,926.70 (ETB) and finished by 2,078,278.87 (ETB). The project consumed less amount of money than the contract. This project had a negative variance in time and positive variance in cost. Status of the project is completed.

## **Project 5**

### **Kebele 04 cobble stone road from Atse zereyakob Minch to Aberash House**

This project was started in kebele 04 from specific place called Atse zereyaob minch and finished at Aberash house, the contractor to this project is Lemlem, Besha and their friends RC. The project has a length of 435.17m. Starting time of the project was on March 13, 2020 and completed on July 10, 2020, which is 10 days earlier than the deadline of the contract. The contract amount of the project was 4,276,792.50 (ETB) and completed within the contact amount. The status of the project is completed.

## **Project 6**

### **kebele 03 Cobble stone road From Berhane house to Fitsume Tekie house**

This project took place from November 30, 2020 to March 29, 2021 in kebele 03 starting from specific place of Ato Berhane house to Ato Fitsume. The length of the project was 426m and constructed under Kidist, Ermias and their friends Cobble paving micro

enterprises. The contract amount of this road project is 1,820,259.72(ETB) and completed in 1,916,074.25 (ETB). The project showed a negative variance in time because it is finished 25 days after the contract day. The deadline on the contract showed the project to be completed on March 3, 2021. The variance in cost is also negative because it consumed an additional cost of 95,814.53ETB. The status is completed for this project.

### **Project 7**

#### **kebele 06 cobble stone road from Sosina mill house to Teacher college fence**

The construction of this project is undergone in kebele 06 from Sosina mill house to teacher college sefer by Elsabeth, Yared and their friends Cobble micro enterprises. The length of this road is 633m and took just the amount of money that was under contract which is 2,684,924.15(ETB) but have gone under time delay of 15 days from the contract deadline. The start and end date of the project was on February 2, 2021 and June 1, 2021 respectively. But the project is completed 15 days after the contract on June 16, 2021. The status of the project is completed.

### **Project 8**

#### **kebele 05 cobble stone road from Yemane Birhan house to Belyu Bekele house**

This project was started in kebele 05 from Ato Yemane house to W/ro Belyu with the length of 168m. the contractors were Kalkidan, keyyalew and their friends Cobble road micro enterprises. The contractor agreed to construct project within 120 days starting from December 2, 2020. But the project was completed 145 days. The contract amount of the project was 748,286.26 (ETB) and completed in 770,345. 34(ETB) which means the project took more money than the contract amount. Additional 22,059.08 (ETB) is invested on the project. The status of the project is completed.

## **Project 9**

### **Kebele 05 cobble stone road from Fistum Mekonen house to Awraris Tasew house**

This 203m long cobble road project is constructed in kebele 05 starting from Ato Fitsum house to Ato Awraris house by Asegedech, Lakew and their friends Cobble road micro enterprises. The agreed contract shows the amount of project as 900,945.63 (ETB) but the exact money that is invested on the road is 982,233.45 (ETB), there was an increase in cost of the project by 81,287.82 (ETB). The project start time was on November 30, 2020 and completed on March 29, 2021 which is 20 days delay from the contract end date March 9, 2021. The status of the project is completed.

## **Project 10**

### **kebele 05 cobble stone road from Debebe house to Tewodede house**

This is a cobble stone road construction that took place in kebele 05 it is measured to be 199m in length. The contractor that held this project is named as Etsegenet, Joni and their friends cobble road micro enterprises. The project was started on November 30, 2020 and completed on March 27, 2021. The contract end date was on March 3, 2021, so the project got delayed by 24 days from the contract date. The contractor win the procurement by 851,253.00 (ETB) and finished by 873,600.23 (ETB). The project consumed more amount of money than the contract. This project had a negative variance in time and negative variance in cost. Status of the project is completed. From the results of secondary data for 10 projects above, we see that out of ten projects four of them showed both cost overrun and delayed time. While four of the projects show only a delay in project time, two projects showed a performance that is according to the contract document. Accordingly, results from primary data showed that there is a major quality problem in the projects. Even if the results from both secondary and primary data on cost and time variance shows a less significant problem comparing to quality problems, but still there is a need in modifying those measurements too. In line with closed ended questions there were open ended questions that ask the respondent to verify what reasons

are behind quality, cost overrun and schedule delay problems. According to the respondents quality problems of the cobblestone road major comes from the type of stone the contractors use. Most of the stones are below standard and with low quality; those products came from different cities in the country. Having no manufacturing sites of those stones in the city made the quality problem control problem even worse. The other quality problem source is the late schedule and fast construction process according to the respondents. The municipality always faced last time rushes when it comes to the cobblestone construction. This last minute work is affected mostly by the rainy seasons entering and on this season the construction process faces different challenges that affected the quality of construction. Gap of communication between clients and contractors are also another challenge in this sector as stated by most of the respondents. The splitting of cobblestones and the roads not having enough drainage that leads to the road more vulnerable to rain water are the main quality problems noticed in the construction of cobblestones in the city.

According to the respondents the major reasons behind cost overrun of cobblestone projects in the city is the poorly prepared WBS and unfit design that are prepared. The wrong routes being selected is also another source of cost overrun problem. The sources of schedule delay are majorly associated with the project being started late and having low supervision before the due date according to respondents.

## **4.6. Analysis and Presentation of the results from primary data by using Relative importance Index**

### **4.6.1 Project management related factors**

The respondent's reaction on project management related factors is placed in order using relative importance index (RII). As table below shows, the RII of awarding contractor to the least bidder is higher than the rest of the factors making it ordered in first place as of the factors that influence cobblestone projects in Debre Birhan City. Giving more emphasis on keeping the team busy than on results is the second ordered factor with RII of 0.78. Both, poorly prepared proposal, WBS, responsibility matrix, or work role definitions and estimation made without regard to the experience of the workers placed in

the third order from the factors that are listed under the project management related factors. Placing emphasis on individual activities than on project objectives lack of project management experience and lack of top management support for the project are ordered in the fourth, fifth and sixth place from the factors that influence the cobblestone project in the city with 0.69, 0.67 and 0.64 RII value respectively. Top management not participating in reviewing project plans and progress, management waiting until near the completion date to see if the project is on time and responsibility of the project manager is being unclear or undefined are the factors that are ordered in the last place with RII value of 0.62, 0.6 and 0.59 respectively.

Table 6: Project Management Related Factors

Order of Factors	Degree of Rank					RII
	5	4	3	2	1	
project management-related factors	5	4	3	2	1	RII
1. Contractors are chosen based on their lowest bid.	36	22	4	6	4	0.82
2. The focus is more on keeping the crew active than on achieving achievements.	35	20	3	4	10	0.78
3. A proposal, job breakdown structure, responsibility matrix, or work role definitions that aren't well-prepared.	25	22	3	12	10	0.71
4. The workers' experience is not taken into account while estimating.	28	14	6	16	8	0.71
5. Individual actions are prioritized over project objectives.	28	12	10	8	14	0.69
6. There is a lack of top-level support for the initiative.	22	13	15	12	10	0.67
7. Lack of project management experience	18	23	7	2	22	0.64
8. Top management is not involved in the evaluation of project plans and progress.	12	15	25	8	12	0.62
9. Management waits until near the completion date to see if the project is on time	21	6	1	12	18	0.6
10. The project manager's responsibilities are vague or undefined.	15	12	15	13	17	0.59

Source: survey, 2022

#### **4.6.2 .Project-Related Factors**

The results from table below shows that both poor usage of computer software in project planning and schedule, and lack of developing project standard procedures are the first two factors that influence the project performance in Debre Birhan City cobblestone

projects with RII value of 0.79. Similar to Saraf finding (2013) lack of proper drainage construction become the second ordered factor with RII value 0.73. Following that poor estimation of duration for activities in the project, unclear scope definition lack of sufficient fund to finance project ordered from third to fifth with RII value 0.7, 0.66 and 0.61 respectively. According to the respondents, site condition problems and lack of user involvement in defining project scope, task and land requirements are placed in the next order with both having 0.58 RII value. The other two, i.e. change in project design (RII 0.56) and complexity of project (RII 0.55) are also positioned in the last orders.

Table 7: Project-Related Factors

Order of factors	Degree of ranks					
	5	4	3	2	1	RII
Project related factors						
1. There is a lack of conventional project procedures that have been developed.	32	19	9	12	0	0.79
2. Inadequate use of computer tools in project scheduling and planning	29	21	12	8	2	0.79
2. Inadequate drainage construction	24	21	13	7	7	0.73
8. The duration of project operations was underestimated.	20	18	14	8	12	0.67
3. Unclear project scope definition	22	11	17	12	10	0.66
4. Inadequate funds to fund the project	16	16	12	12	16	0.61
5. Site condition problems	12	18	19	8	7	0.58
6. Involvement of users in defining project scope, duties, and land requirements is lacking.	15	11	11	25	10	0.58
7. Change in project design	12	8	17	23	12	0.56
9. Complexity of project	13	14	5	22	18	0.55

Source: survey, 2022

#### 4.6.3. Contractor Related Factors

Among the most compelling contractor related variables that influence the venture execution in the Debre Birhan City cobblestone projects site preparation time and delay in approving payment of completed works are positioned in the first place both with RII

of 0.82. Lack of communication between the project participants with RII of 0.75 is the second placed factors according to the respondents in the Debre Birhan City cobble stone development project. Variation in scope with RII of 0.57 took the 4<sup>th</sup> place according to the respondents, while Poor performance of project cash flow analysis and poorly approval of start and end date are ranked as the 5<sup>th</sup> factors with RII of 0.54, shortage of labor force is listed as the lastly placed factors affecting project performance with RII of 0.48.

Table 8: Contractor Related Factors

Order of Factors	Degree of ranks					
	5	4	3	2	1	RII
<b>Contractor-related Factors</b>						
1. Delay in approving payments of completed works	35	23	5	5	4	0.82
2. Site preparation time	31	29	3	7	2	0.82
3. Lack of communication between the project participants	28	22	5	10	7	0.75
4. Problem of Cost overrun	19	22	4	7	20	0.64
5. Variation in scope	19	8	10	15	18	0.57
6. Poor performance of project cash flow analysis	16	8	7	19	22	0.54
7. Start and finish date are poorly approved and fixed	15	9	4	28	16	0.54
8. Shortage of labor force	13	4	8	22	25	0.48

Source: survey, 2022

#### **4.6.4. Clients/Employees-Related Factors**

As shown in the table below according to the respondent and calculate RII value different factors that are related to client/employee-related factors are listed below and placed in order. Clients giving emphasis on quick construction instead of quality is pointed out as the first placed factors that affect the performance of cobble projects with RII of 0.77. Delays in progress payment to contractor and client interference during construction are the second and third factors that affect the cobble project performance in the city with RII of 0.76 and 0.71 respectively.

Table 9: Clients/Employees-Related Factors

Order of Factors	Degree of ranks					
	5	4	3	2	1	RII
<b>Client related factors</b>						
1. During construction, the client interferes; the client prioritizes speed above quality.	31	18	6	11	6	0.77
2. Payment to the contractor in progress has been delayed.	29	21	7	9	6	0.76
3. Client interference during construction	23	21	9	12	7	0.71
4. In project management, there is a lack of project software.	25	18	8	11	10	0.70
5. A lack of regular meetings	19	22	7	15	9	0.68
6. Inadequate monitoring and control	26	16	2	18	10	0.68
7. Coordination of information is poor.	23	9	8	15	17	0.62
8. The client seeks minimal building costs.	22	8	10	17	15	0.61
9. Ineffective planning and scheduling	9	14	8	16	25	0.51
10. Estimating the length and cost of operations based on historical data from the company	18	4	0	22	28	0.49

Source: survey, 2022

#### ***4.6.5. Factors Related to Material***

Materials are one of the major inputs that greatly affect the performance of the projects. According to the respondents escalation of material prices is recorded with RII value of 0.78 which made this factor the most recognized factor that played the major role in influencing the performance of cobble projects in Debre Birhan City. Next to this Poor mechanism uses of material in projects and Poor documented process for approval, checking and testing material took the second and third place. Project delay due to shortage of material, unavailability of material as planned and lack of wareness about importance of material are the least recognized factors with RII of 0.7, 0.68 and 0.67 respectively.

Table 10: Material-Related Factors

Order of factors	Degree of Ranks					
	5	4	3	2	1	RII
Factors related to Material	5	4	3	2	1	RII
1. Material prices are rising.	33	17	8	11	3	0.78
2. In the project, there are poor mechanism uses of material.	28	18	4	15	7	0.73
3. There is a lack of documentation for the approval, inspection, and testing of materials.	28	16	9	10	9	0.72
4. Project delay due to shortage of material	25	19	4	17	7	0.7
5. Material availability as Planned throughout Project duration	29	11	6	13	13	0.68
6. lack of understanding about the value of material	27	11	7	15	12	0.67

*Source: survey, 2022*

#### **4.6.6. Factors Related to Equipments**

Factors related to equipment's are also under the factors that influence performance of cobble roads. Among the lists below in the table: delay of project due to shortage of equipment, Poor use of computer software in equipment planning and assigning and Poor planning for acquiring and using of project equipment are the factors that are top rated according to the RII of 0.78, 0.75 and 0.74 respectively. Poor equipment sharing among projects of the company, lack of awareness about importance of project equipment management and equipment replacement decision based on actual performance and economic analysis are among the least rated factors.

Table 11: Equipment-Related Factors

Order of Factors	Degree of Rank					
	5	4	3	2	1	RII
<b>Equipment-related factors</b>	5	4	3	2	1	RII
1. Delay of project due to shortage of equipment	33	20	6	6	7	0.78
2. Inadequate use of computer software in the planning and assignment of equipment.	32	18	5	9	8	0.75
3. Poor project equipment acquisition and use planning.	28	18	4	17	9	0.74
4. Long-term, medium-term, and short-term equipment requirements were not effectively prepared.	28	22	3	7	12	0.73
5. Lack of equipment policy/guidelines that guide acquisition, use and replace decision	28	18	4	13	9	0.72
6. Low efficiency of equipment	29	19	2	6	16	0.71
7. Quality of equipment is not assured	28	12	13	10	9	0.71
8. The decision to replace equipment is based on the actual performance and a land economic analysis.	18	22	12	11	9	0.68
9. Lack of understanding of the significance of project equipment management	16	18	9	15	14	0.62
10. Poor equipment sharing among projects of the company	14	9	3	24	22	0.53

Source: survey, 2022

#### ***4.6.7. External-Related Factors***

The external factors are listed in the following table. All factors are placed in order based on the RII value. From the listed factors: Problem of land acquisition and compensation, corruption and changes in laws and regulations are identified as the factors that are listed in first three order in the Debre Birhan City cobble stone projects are facing with RII of 0.76, 0.71 and 0.66 respectively.

Table 12: External Factors

Order of factors	Degree of Rank					
	5	4	3	2	1	RII
External related factor						
1. Problem of land acquisition and compensation	28	22	6	12	4	0.76
2. Corruption	27	13	12	13	7	0.71
3. Changes in laws and regulations	13	29	9	9	12	0.66
4. Unforeseen site condition	21	12	7	19	13	0.63
5. Excessive bureaucratic condition	18	15	7	24	8	0.63
6. Wastes in construction site	15	13	9	18	17	0.58
7. Low participation of local community	19	16	12	13	12	0.58
8. Difficult in weather condition	17	9	18	15	13	0.55
9. Political concern rather than social and economic concern	12	18	10	19	13	0.54
10. Environmental concerns and restrictions	12	9	10	16	15	0.48

Source: survey, 2022

## **CHAPTER FIVE**

### **Conclusion and Recommendation**

#### **5.1 Introduction**

This study mainly centers is on identify characteristics and factors that influence project performance in Debre Birhan City cobblestone road construction projects. The performance assessment of the cobble projects and identification of internal and external factors that affect the project performance is examined specifically in this study. Recommendations and suggestions for further studies are forwarded based on the findings of the research.

#### **5.2 Conclusions**

The main study of the research is to identify characteristics and factors that influence project performance in Debre Birhan City cobblestone road construction projects. The research included three specific objectives:

- To assess the performance of cobblestone construction projects in Debre Birhan City.
- To investigate project management-related (internal) elements affecting project performance in Debre Birhan City's cobblestone road construction projects.
- To investigate external related (clients, supplies, technology related) factors affecting project performance of cobble stone road construction projects in Debre Birhan City.

The performance assessment of the cobble projects was made using both the primary and secondary data, and both results show that there is a problem on the performance of the projects. According to the secondary data some of the projects have a visible quality problem, cost overrun and project delay problem. While some of the project show only cost overrun problems and some show only project time delay problem. From the ten projects that were under study only two projects are completed within the planned cost and time. Results from the primary data also strengthen these findings. So as of the results from the study cobble stone projects that is constructed in Debre Birhan City in 2012/2020 and 2013/2021 have a project performance problem. The quality problem of

projects can be seen as major problem than delay and cost overrun problems. The major cause for this according to the findings is the lack of cobblestones in the city, buying the stones used for the cobble project from another place made the quality supervision more complex and difficult.

All internal factors that affect project performance are listed in different category of internal factor and from the listed factors the first three factors that are listed according to their RII value. From project management related factors awarding of contractors to the lowest bidder, giving more emphasis on keeping the team busy than focusing on the results and estimation made without regard to the experience of the workers are the three top factors that are ordered in the first three places. From factors that are directly related to projects: Poor use of computer software in project planning and schedule, lack of developing project standard procedures and lack of proper drainage construction are the main three factors that affected the performance of the project. From contractor related factors affecting the performance of the cobble project in Debre Birhan City delay in approving payments of completed works, delay in site preparation time and lack of communication between the project participants are the top rated factors that affect the performance of Debre Birhan City cobble stone projects.

External factors affecting the project performance can be seen by dividing into different categories too. From client related factors: client giving more emphasis on quick construction instead of quality, client delay in progress payment to contractor and Client interference during construction are the top ordered factors influencing the performance of the cobble stone road project in Debre Birhan City. From the category of material related factors: escalation of material prices, poor mechanism of material uses in project and poor documented process for approval, checking and testing material are the top factors. From equipment related factors: delay of project due to shortage of equipment, poor use of computer software in equipment planning and assigning and poor planning for acquiring and using of project equipment are the factors affecting the projects. And other external factors such as Problem of land acquisition and compensation, corruption and changes in laws and regulations are also the major factors that are identified in this

study as factors that affect project performance of Debre Birhan City cobble stone road projects.

### **5.3 Recommendations**

Based on the findings from secondary data and primary data general recommendations are drawn out. The recommendations include:

- Rather than buying the stone used for cobble stone from other places manufacturing it in the city helps in controlling the quality and standards of stones.
- Well compaction and study the ground before the construction starts
- Increasing the use of software in every office task
- Solving land acquisition problems earlier before the construction starts
- Pre-evaluation of contractors before awarding contracts to low-priced bids, as this has a detrimental impact on project completion, resulting in cost overruns and inadequate project quality.
- Effective scheduling and planning in accordance with successful monitoring and control among project partners, including extending cobblestone construction in locations ideal for their endurance in order to maintain their quality.
- Introducing parallel construction of drainages for the roads
- Clients should involve in time and guarantee on time payment for the contractors
- All stakeholders should fight against corruption

### **5.4. Suggestion for Future Research**

Further research into the factors affecting project performance in the construction industries in Debre Birhan City, particularly project cost overruns, schedule delays, and project quality in both the public and private construction sectors, should be conducted using inferential statistics to improve generalizability of factors affecting projects across the sector.

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## **Annex –questionnaires**

**ADDIS ABABA UNIVERSITY SCHOOL OF GRADUATE STUDIES  
COLLEGE COMMERCE MASTERS OF PROJECT  
MANAGEMENT**

**QUESTIONNAIRE  
ON  
Assessment of Performance : A CASE COBBLE STONE ROAD  
CONSTRUCTION PROJECTS IN DEBRE BIRHAN CITY**

**BY: Fasika Berhanu  
ADVISOR: Dr.Fisseha**

**FOR THE FULFILLMENT OF MA DEGREE IN PROJECT  
MANAGEMENT**

May, 2022

Addis ababa

## **QUESTIONNAIRE**

### **Dear Respondent**

The researcher is a graduate student at Addis Ababa University pursuing an MA in Project Management. Graduate students are required to perform research in their field of study as part of the program. The goal of this investigation is to look at the factors that influence project performance in Debre Birhan City's cobblestone road construction projects. This questionnaire must be filled out as completely as possible with correct and relevant information. All information provided in this questionnaire will be kept totally confidential and used solely for academic research. In this aspect, your input is extremely valuable and helpful to the research's outcome.

Thank you for your valuable time and effort

With regards

Fasika Berhanu



3. Do Debre Birhan City cobblestone projects have encountered cost overrun problems?

1. Yes                       2. No

4. If your answer is yes for the question number 3, what are the reasons for the cost overrun?

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5. Do Debre Birhan City cobblestone projects have encounter project delay problems?

1. Yes                       2. No

6. If your answer is yes for the above question, what are the reasons for the delay problems?

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Here are lists of factors affecting performance of construction projects which are categorized into seven subcategories. Please put a tick mark in the appropriate column according to their degree of rank.

Where 5=very high, 4=high, 3=neutral, 2=low, 1=very low

4. How much do you think the following project management-related issues influence the performance of Cobblestone building projects?

SN	Lists of Factors	Degree of rank				
		5	4	3	2	1
	project management-related factors					
1	Contractors are chosen based on their lowest bid.					

2	There is a lack of top-level support for the initiative.						
3	The focus is more on keeping the crew active than on achieving achievements.						
4	The project manager's responsibilities are vague or undefined.						
5	Top management is not involved in the evaluation of project plans and progress.						
6	Individual actions are prioritized over project objectives.						
7	Lack of project management experience						
8	A proposal, job breakdown structure, responsibility matrix, or work role definitions that aren't well-prepared.						
9	The workers' experience is not taken into account while estimating.						
10	Management waits until near the completion date to see if the project is on time						

5. To what extent do you rate the following factors affects project performance of Cobblestone construction projects of project-related factors?

SN	Lists of factors	Degree of rank						
		5	4	3	2	1	RII	Rank
	Project related factors							
1	Complexity of project							
2	Inadequate funds to fund the project							
3	Inadequate drainage construction							
4	Site condition problems							

5	Involvement of users in defining project scope, duties, and land requirements is lacking.							
6	There is a lack of conventional project procedures that have been developed.							
7	Unclear project scope definition							
8	Change in project design							
9	The duration of project operations was underestimated.							
10	Inadequate use of computer tools in project scheduling and planning							

6. From project performance of cobble construction projects, to what rate do put the following factors contractor related factors?

SN	Lists of Factors	Degree of rank				
		5	4	3	2	1
	Contractor-related Factors					
1	Poor performance of project cash flow analysis					
2	Shortage of labor force					
3	Problem of Cost overrun					
4	Delay in approving payments of completed works					
5	Site preparation time					
6	Lack of communication between the project participants					
7	Variation in scope					
8	Start land finish date are poorly approved land fixed					

7. Rank client related factors?

SN	Lists of Factors	Degree of rank				
		5	4	3	2	1
	Client related factors					
1	Ineffective planning and scheduling					
2	a lack of regular meetings					
3	Coordination of information is poor.					
4	Inadequate monitoring and control					
5	Payment to the contractor in progress has been delayed.					
6	In project management, there is a lack of project software.					
7	During construction, the client interferes; the client prioritizes speed above quality.					
8	The client seeks minimal building costs.					
9	Client interference during construction					
10	Estimating the length and cost of operations based on historical data from the company					

8. Rank material related factors

SN	List of factors	Degree of rank				
		5	4	3	2	1
	Material-related factors					
1	Poor documented process for approval, checking and testing material					
2	Lack of understanding of the significance of the material					
3	Project delay due to shortage of material					
4	All costs are less considered in material planning (purchase costs, loading and unloading costs, inflation costs)					

5	Unavailability of material as planned through project duration						
6	Risk associated with unavailability and cost increase considered in material planning is poor.						
7	Poor mechanism use of material in project						
8	Lack of project material management system						
9	Low quality of material selection						
10	Escalation of material prices						

9. How much do you think the following elements influence Cobblestone Construction projects in terms of equipment-related factors?

SN	Lists of Factors						
	<b>Equipment-related factors</b>	5	4	3	2	1	RII
1	Lack of understanding of the significance of project equipment management						
2	Lack of equipment policy/guidelines that guide acquisition, use and replace decision						
3	Delay of project due to shortage of equipment						
4	Quality of equipment is not assured						
5	Poor project equipment acquisition and use planning.						
6	Inadequate use of computer software in the planning and assignment of equipment.						
7	Long-term, medium-term, and short-term equipment requirements were not effectively prepared.						
8	Poor equipment sharing among projects of the company						

9	The decision to replace equipment is based on the actual performance and a land economic analysis.							
10	Low efficiency of equipment							

10. How much do you think the following external-related elements influence project performance of Cobblestone building projects?

SN	List of factors	Degree of rank						
		5	4	3	2	1	RII	Rank
	External related factor							
1	Difficult in weather condition							
2	Problem of land acquisition and compensation							
3	Wastes in construction site							
4	Unforeseen site condition							
5	Corruption							
6	Environmental concerns and restrictions							
7	Excessive bureaucratic condition							
8	Low participation of local community							
9	Changes in laws and regulations							
10	Political concern rather than social and economic concern							