ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

SCHOOL OF COMMERCE

CAUSES & CONSEQUENCES OF ROAD PROJECT DELAY: (CASE STUDY OF WOITE-TURMI DESIGN AND BUILD ROAD PROJECT)

A project thesis work submitted to Addis Ababa University College of Business and Economics School of Commerce in Partial Fulfillment of the Requirements for the Degree of Master of Arts in Project Management (MAPM)

ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

SCHOOL OF COMMERCE

CAUSES & CONSEQUENCES OF ROAD PROJECT DELAY: (CASE STUDY OF WOITE-TURMI DESIGN AND BUILD ROAD PROJECT)

BY

Daniel Serbessa

A project thesis work submitted to Addis Ababa University College of Business and Economics School of Commerce in Partial Fulfillment of the Requirements for the Degree of Master of Arts in Project Management (MAPM)

ADVISOR; Dr. DEREJE ABI

June 2024

Addis Ababa, Ethiopia

ADDIS ABABA UNIVERSITY

STATEMENT OF DECLARATION

I hereby declare that the project work entitled "**CAUSES & *CONSEQUENCES OF ROAD PROJECT DELAY: (CASE STUDY OF WOITE-TURMI DESIGN AND BUILD ROAD PROJECT*** is my original work and all sources of material used for the work have been duly acknowledged.

The thesis is original and has not been submitted for the award of any degree or diploma to any university or institutions.

Researcher's Name	Signature	Date
Daniel Serbessa Negera		26/June/2024

STATEMENT OF CERTIFICATION

This is to certify that, this project work "***CAUSES & CONSEQUENCES OF ROAD PROJECT DELAY: (CASE STUDY OF WOITE-TURMI DESIGN AND BUILD ROAD PROJECT***", undertaken by **Daniel Serbessa Negera** in partial fulfillment of the requirements for Degree of Master of Arts in Project Management (MAPM) at Addis Ababa University, College of Business and Economics, School of Commerce, is an original work and not submitted earlier for any Degree either at this university or any other university.

Therefore, we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree or diploma.

Advisor's Name	Signature	Date
Dr DEREJE ABI		22/07/24

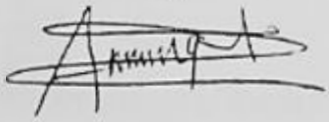
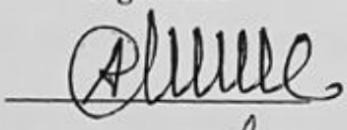
Addis Ababa University College of Business and Economics School of Commerce

Degree of Master of Arts in Project Management (MAPM)

CAUSES & CONSEQUENCES OF ROAD PROJECT DELAY: (CASE STUDY OF WOITE-TURMI DESIGN AND BUILD ROAD PROJECT

By - Daniel Serbessa Negera

Approved by Board of Examiners

Examiner (External)	**E.Signature**	**Date**
Dr. Afework G		**30/June/2024**
Examiner (Internal)	**Signature**	**Date**
Dr. Abraraw C.		30/06/2024
Advisor	**Signature**	**Date**
Dr. Dereje A.		22/07/14

Acknowledgement:

First and foremost, I would like to express my deepest gratitude to God for His guidance, strength, and blessings throughout this journey. Your firm love and support have been my constant source of inspiration and motivation.

I would also like to extend my heartfelt appreciation to my family for their unconditional love, encouragement, and understanding. Your belief in me and your solid support have been the foundation of my success. Thank you for always being there for me, providing me with the strength to overcome challenges, and celebrating my achievements with joy.

I am immensely grateful to my advisor **Dr. DEREJE ABI** for his invaluable guidance, expertise, and mentor-ship. His unwavering support, patience, and encouragement have been instrumental in shaping my research and pushing me to achieve my best. His insightful feedback and constructive criticism have immensely contributed to the refinement of my project work.

I would like to express my gratitude to all the individuals who directly or indirectly participated in my project work. Your contributions, whether through collaboration, discussions, or providing resources, have played a significant role in the success of this endeavor. Your expertise, dedication, and commitment have enriched my research and broadened my perspective.

Lastly, I would like to acknowledge the countless unnamed individuals who have contributed to my growth and development in ways I may never fully comprehend. Your support, encouragement, and belief in my abilities have not gone unnoticed and are deeply appreciated.

To all those mentioned above and to those who have stood by my side in any capacity, thank you from the bottom of my heart. Your steady support and contributions have been invaluable, and I am truly grateful for your presence in my life.

Abstract

The aim of this project work is investigate the factors contributing to delays in construction projects, specifically focusing on the Woito-Turmi road project. The study explores the causes of delays, their impacts on project outcomes, and the associated consequences for the Construction Company and stakeholders involved. The numerous causes of project delays and their subsequent effects on construction projects are examined in the thesis "Causes and Consequences of Road Project Delay: Case Study of Woito Turmi Design and Build Road Project." The goal of the study is to analyze the complex network of variables that have contributed to the region's most important construction project—the Woito Turmi road project—being delayed. A standardized questionnaire was used to gather information from 36 respondents, including clients, consultants, contractors, and locals, in order to guarantee uniformity and dependability in the responses. By using a ranking system to examine the responses, it was possible to gain a hierarchical understanding of the reasons behind delays, which in turn gave rise to a clear image of the main obstacles to timely project completion. The analysis revealed a spectrum of causes and consequences, highlighting the complexity of managing large-scale construction projects. The respondents' insights, drawn from their diverse perspectives and experiences, shed light on the interplay between various stakeholders and the challenges they face. The findings underscore the necessity for a robust framework to address and mitigate the causes of delays, emphasizing the importance of strategic planning, effective communication, and proactive management in overcoming obstacles. This study not only contributes to the existing body of knowledge on project management but also serves as a valuable reference for practitioners and policymakers striving to enhance the efficiency of road construction projects and minimize delays.

Key word: Causes and consequences of road project delay, focusing on the Woito-Turmi Design and Build Road Project, Client, Consultant, Contractor and major stakeholders.

Table of content

List of Tables

List of Figures

ACRONYMS

FDRE: Federal Democratic Republic of Ethiopia

OCE: Omega Consulting Engineers

ERA: Ethiopian Road Administration

ETCA: Ethiopian Transport Construction Authority

GTP: Growth and Transformation Plan

IPMA: International Project Management Association

ISO: International Organization for Standardization

PMBOK: Project Management Body of Knowledge

PMI: Project Management Institute

RII: Relative Importance Index

RSDP: Road Sector Development Program

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the Study

The most significant piece of infrastructure in Ethiopia that facilitates access to both rural and urb an regions is the road system.Roads are essential for lowering transportation costs and promoting national economic expansion.But by the late 1990s, only the larger cities and a few rural areas we re covered by the road network.The majority of the nation's areas were cut off from the market, ec onomic hubs, and essential social services.The majority of the current road network has deteriorated and is in poor shape. (ERA, 2008a).

Ninety to ninety-five percent of motorized interurban freight and passenger movements in Ethiopia are carried out by road. However, due to its sparse road network, Ethiopia has continued to face significant obstacles in its efforts to reduce poverty and achieve socioeconomic development when it comes to the provision of infrastructure (ERA, 2008a).

A significant amount of progress was made in the construction of roads between the years 1896 and 1936, which is before the second Italian occupation. It was reported that Emperor Menilik was an accomplished road constructor who took part in the project himself. In 1903, the roads connecting Addis to Addis Alem and Eritrea to Addis Ababa were built. Additionally, Addis saw the emergence of its first asphalt roads about this time.

The 6,400-kilometer road network that existed at the time of ERA's founding in 1951 was mostly constructed during the Italian invasion. International contractors controlled key highway construction projects in ERA history from 1960 to 1970. The local construction industry continued to flourish and became equally involved in the road construction sector between 1972 and 1976. Regrettably, the Derg regime's unfavorable policy climate hindered their development.

The quality of Ethiopia's road network has been improving annually. Over the past sixteen years, the GOE has actively participated in the construction of new roads and the expansion of Ethiopia's current road network through the Road Sector Development Programs (RSDP). According to a 2014 UNDP Human Development report, Ethiopia has invested 142 billion Birr ($7.1 billion) in

road development projects over the past 16 years, with $5.4 billion (77%) coming from domestic sources. The GOE anticipates that during the GTP II phase, which runs from 2015–16 to 2022–23, the nation's road network will be further developed to 220,000 kilometers (136,701 miles).

A substantial budget has been allotted to the Federal Democratic Republic of Ethiopia, represented by the Ethiopian Roads Administration, in order to finance the building of a road project along the Woito-Turmi in 48 months. On May 27, 2021, Rama Construction Plc. and the Ethiopian Road Administration inked a contract for the project. Twenty-one percent of the project's entire work has been completed thus far, which is far behind schedule.

Construction project delays might have unfavorable consequences. Delays can have a variety of negative effects, such as disagreements, delayed completion, damage to the construction company's reputation, missed chances for upcoming projects, reduced or eliminated profit margins, firm insolvency, contract termination, etc. Construction project delays can cause schedule extensions, cost increases, and compromises on quality and safety (González et al., 2023). Delays impede economic growth by causing massive cost overruns. Despite the fact that numerous scholars have examined and recorded the literature's explanations for construction project delays, delays of varied degrees persist in construction projects worldwide. There has to be a thorough investigation into the reasons and the out puts behind the delays, along with mitigation measures.

According to (Marzouk and El-Rasas 2014), a construction delay is any period of time that exceeds the agreed-upon deadline for project delivery or the contracted date. Within the road construction sector, delays in projects can arise from incidents that cause disruptions to the construction process, hence extending the construction period (Shebob et al., 2022). Furthermore, These delays hurt both the contractors and the people who get the completed projects. The objective of this paper is to investigate the main causes and consequences of the delays in the Woito-Turmi Design and Build Road Project.

1.2 Statement of the Problem

According to ERA's 2016 estimate, there were 28,032 km of federal roads total, of which 14,632 km were paved with asphalt and 13,400 km were unpaved. Even though performance has improved compared to prior RSDP years, there is still more space for improvement. Even though performance has improved compared to prior RSDP years, there is still more space for improvement. An inadequate local construction industry, a lack of foreign contractors, a weak internal force with fewer qualified staffing resources, and the need to address massive network expansion and improvement under tight budgetary constraints are just a few of the many difficulties facing Ethiopia's road sector.The local construction industry's poor implementation capability, the slow rate of institutional change, the high turnover of professional and administrative staff, and the protracted contract procurement procedures are major hurdles (ERA 2016).

In almost all situations, poor communication amongst builders, subcontractors, property owners, or any other source raises the risk of construction project delays. Delays are a common occurrence in road construction projects, and they can seriously hinder economic growth. It is among the many problems that frequently impede construction enterprises' capacity to compete and survive in the global marketplace. Sweis and associates (2018) Construction projects may be delayed for a variety of reasons. The problem of project delays is still unresolved even in this day of sophisticated technology and widely used project management techniques (Yang et al., 2013).

Several investigations were carried out to investigate the causes of delays in construction projects. Al-Momani (2000) investigated the causes of 130 public project delays in Jordan. The following issues were identified by him as key delays based on his investigation: (1) designing; (2) client adjustments; (3) weather; (4) site conditions; (5) late supply; (6) financial circumstances; and (7) growing workload. Al-Ghafly (1995), on the contrary, claims that financial concerns, delays in owner agreement and decision-making, modifications to the project's scope and design, challenges in securing a building permit, and problems with coordination and communication are the main causes of delays.

In terms of timeliness, the Woito-Turmi Design and Build Road Project has been regarded as a low-performing project. The road development project along the Woito-Turmi has been given

enough funding by the Federal Democratic Republic of Ethiopia, with a 48-month completion timeframe set. However, just approximately 29% of the overall work is finished today, including personnel mobilization, small machinery mobilization, and minor labor activities, even though the project should be expected to progress by more than 68%.

The failure to gather sufficient resources, both in quantity and kind; The contractor has mobilized insufficient rental equipment on site to finish the assigned task load. The development of a quarry source, the deployment and setting up of a crusher, and the groundwork required before starting long-term construction The contractor should have begun producing crushed aggregate for concrete, base course, DBST, and asphalt concrete, as well as pre-casting concrete components for drainage and structural works, like concrete pipes, kerb stones, ditch covers, posts, and so on, in accordance with the scope of work that was available. However in this aspect, nothing has been done. The precast concrete yard, aggregate stockpile area, asphalt and crusher facilities, etc., are still under development. Provision of Facilities for Engineers: The engineer has not yet been provided with permanent facilities as per the conditions of the contract. These facilities should have been fully operational before the six-month mobilization milestone. The engineer has not yet received any permanent vehicles, nor has a material testing laboratory been built for the engineer's and contractor's use. The building of the engineer's camp facilities, including the office, laboratory, and housing, is still awaited. Repercussions of the Woito Turmi Design and Build Road Project's project delay; Cost increases: If more labor, equipment, or materials are needed to finish the project, delays may result in higher expenditures overall. Local communities that were expecting the road to be finished in a specific amount of time may experience disruptions to their daily schedules as a result of project delays. Reputational damage: A construction company's reputation may suffer as a result of project delays, which may result in lost future business possibilities. Legal ramifications: If a project is delayed, there may be disagreements over contracts and even litigation between the building company and other project participants.

This study aimed to analyze the factors contributing to project delays and associated negative impacts in road construction projects. Its primary goal was to propose a practical solution to reduce the occurrence of project failures and delays in such projects. By identifying the causes, consequences, and extent of delays, the study aimed to recommend effective measures for mitigating them.

1.3 Research Questions

1. How effectively do road projects perform in terms of time frame?

2. What is the performance of the road project in terms of budget?

3. What are the primary causes of delays in road construction projects?

4. What are the primary consequences of project delays in relation to constructing roads?

1.4 Objectives of the Study

1.4.1 General Objective

The Woito-Turmi Design and Build Road Project was the research's focus. Its objective was to evaluate the reasons for road project delays as well as the effects of such delays.

1.4.2 Specific Objectives:

1) To investigate time and budget performance.
2) To evaluate causes of delay.
3) To evaluate consequences of delay

1.5 Significance of the Study

This research is significant because it may provide insight into how long road construction projects take to finish. Additionally, it would be helpful for us to comprehend the key causes of the delay in this specific road construction project, as well as the distribution of these causes and their consequences among the main players involved in road construction projects. Additionally, by lowering the most common reasons of delays, it can provide management of ELRC with information to assist corrective action and accurate decision-making, ultimately leading to the successful completion of projects. It can also offer solutions to regulate and mitigate the causes of project delays.

Therefore, the purpose of this research study was to determine and evaluate the significant causes of delays in the completion of road projects that might have been brought about by consultants, clients, or contractors during the construction phase. Furthermore, the addition of theoretical and practical information on research methodology will be of significance to the researcher. Scholars and researchers who need a foundation for additional research in this field may also find it to be of great importance.

1.6 Scope of the study

The research was solely concentrated on the Woito-Turmi Design and Build road project, which is located in Ethiopia's Southern Omo zone and administered by the Federal Democratic Republic of Ethiopia (FDRE), was the primary subject of this study due to its construction delays. A local company known as RAMA PLC was given the project, which must be completed within 48 months plus the additional 12 months of defect liability time, under the direction, control and supervision of Omega Consulting Engineers.

1.7 Organization of the Paper

There are five chapters that are linked to this research. The work's introduction, comprising a problem description and the goals, background, scope, and limitations of the study, is covered in the first chapter. The second chapter's primary focus was a review of the literature on the topic of this study. The third chapter covers the study approach, procedures, and methodologies used for data collecting and analysis. The fourth chapter presents the overall study findings, which highlight the key and often recurrent causes of delays from the perspectives of the four main groups (consultants, contractors, clients/owners, and the local residents in Turmi and Woito area). The fifth and final chapter discusses the study's findings, conclusion and recommendations. We will make some inferences from the previous chapter so that we can provide a few recommendations.

1.8 Limitation of the study

It’s important to address several key areas where the study may have encountered constraints. The research is limited to a single project, which may not represent the broader context of road construction projects in different regions or under varying conditions. Findings from a single case study may not be generalizable to other projects without considering the unique factors that affect each project. The specific political, economic, and social context of the Woito Turmi area may limit the applicability of the findings to other settings.

CHAPTER TWO

2 REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter's main primary focus is on a survey of the literature on the subject being studied. The literature reviews are in the field of project management, with a particular emphasis on road and other construction project management sectors. Books, articles, theses, reports, and international journals that are pertinent to the research topic are among the reviewed literature. The majority of the literature reviewed below is based on research done in many nations, environments, and eras to determine that the reasons for delays may vary depending on the context and country.

2.2 Overview of Project and Project Management

2.2.1 Project

According to the Project Management Body of Knowledge (PMBOK), a project is a brief endeavor that is initiated with the goal of generating a unique good, service, or result. Projects' ephemeral nature implies that they have a distinct beginning and conclusion. The project has reached its completion when its objectives are met, at which point it is deemed unnecessary and proclaimed over, or it is terminated because its objectives cannot be met. Furthermore, initiatives could have a lasting impact on the environmental, social, and economic domains (PMBOK, 5th ed.). As to the International Project Management Association (IPMA), a project is an endeavor that is limited by time and budget and has the objective of accomplishing a defined set of deliverable s that satisfy quality standards and specifications. In contrast, a project is any unique, brief action that is initiated with the aim of accomplishing a particular goal, according to the Association of Project Managers (APM).

A project is defined as a series of distinct, intricate, and related tasks that have a single objective or purpose and that need to be finished on schedule, within budget, and in compliance with specifications (Robert K. Wysocki, 2014). According to the same author, Robert K. Wysocki (2014), a project is defined as a series of finitely dependent actions that, when successfully completed, produce the anticipated commercial value that supported the project's existence. According to Gary R. H. (2003), A project is sometimes defined as a short-term endeavor completed with a clear objective in mind.A project is actually an effort to meet a need or offer a

solution to a problem. It's also a solution that provides a benefit, typically a financial one. Making money or saving money are the two major objectives of most attempts.

A project is, by definition, temporary in nature, meaning it has a beginning and an end. A project is made up of a set of clearly defined minor jobs, or tasks, that usually result in the construction of one or more final products, or deliverables. The project's tasks will be executed according to a preferred order (the timetable). According to Gary R. H. (2023), a project is a unique, one-of-a-kind undertaking that will never be finished exactly the same way, by the same people, or in the same location repeatedly.

- Among the unique characteristics of a project, according to Roy B. and Steve B. (2017), are:
- A project has a defined beginning and end.
- A project goes through various distinct phases, such as commence, design, implementation, and handover.
- Time constraints are common in projects; they must be completed by a specific date.
- Clear budgets for projects are available, and these are often divided into budgets for each work item.
- The activities are mostly unique and non-repetitive; you only get one chance to complete them successfully.
- Resources may need to be coordinated as they may come from many functional departments and contractors.
- The project manager has the ultimate responsibility for the project's successful completion in their role as project leader.
- Diverse project teams are formed to supervise the project. A large company's project team would probably be set up like a matrix.

2.2.2 Project Management

Project management (PMI, 2013) is the application of knowledge, skills, tools, and processes to project operations in order to meet project requirements. For this application of knowledge, effective project management methods must be administered. A set of interconnected actions performed to generate a predefined good, service, or result is called a process.. Every process has three main characteristics: inputs, applicable tools and techniques, and outputs. Project management is the appropriate use and integration of the 47 logically organized (split into five process groups) project management processes. The five process groups are as follows: closure, monitoring and controlling, planning, initiating, and executing. The PMBOK's fifth edition.

The group is responsible for **initiating** activities that define a new project or a new phase of an already-existing project by securing approval to begin the project or phase.

Group Responsible for **Planning**: Those procedures needed to define the project's goals, clarify its scope, and specify the steps that must be performed to fulfill the goals for which the project was started.

Executing Process Group: The procedures followed in order to fulfill the project specifications by completing the tasks outlined in the project management plan.

Monitoring and controlling Process Group: The group of procedures needed to monitor, assess, and control the project's performance; pinpoint any areas where the plan needs to be modified, and then start those modifications.

Closing Process Group: The steps taken once every activity within every Process Group has been finished in order to officially end the project or phase.

The purpose of Robert K. Wysocki's (2021) definition of project management is to serve as a working definition. It includes a six-question litmus test that can be performed to evaluate the term's validity. The tools, templates, and procedures that make up project management are intended to address the following six queries: Which business issue is this project trying to solve? What has to be done by the company? How are you going to respond? How are you going to accomplish this? How will you know that you succeeded? How did you fare, too?

Project management, according to Kerzner H. (2019), is the planning, organizing, directing, and regulating of business resources for a short-term goal that has been set in order to accomplish

particular goals and objectives. Moreover, functional staff members (the vertical hierarchy) are assigned to certain projects (the horizontal hierarchy) in project management, which makes use of the systems approach to management.

Project management, according to David M. (2019), is defined by BS 6079 as the planning, directing, and managing of all project aspects as well as motivating all stakeholders to achieve the project's objectives with regard to schedule, budget, quality, and performance. Establishing a system for foreseeing and identifying as many risks and issues associated with a project as possible, followed by organizing, supervising, and planning the steps required to reduce those risks and issues and successfully finish the project, is the aim of project management, according to Lock.

2.3 Theoretical Review

2.4 Project Schedule

Schedules are working timetables that are created from project action plans. Given that it serves as the basis for monitoring and overseeing project activities, it is possibly the most crucial tool for project management when paired with the plan and budget.

The scheduling function is more important in a project setting than it would be in an ongoing one, because projects lack the continuity of continuing operations and often present far more complex coordination challenges. Project scheduling is so important, in fact, that clients will sometimes ask for an exact deadline. When creating the project's monitoring and control systems, a well-considered, detailed schedule can also be quite important (Jack R. M., Samuel J. M. 2019).

2.5 Project Success

Evidently, defining what constitutes a successful endeavor is essential. It is how your project management performance will be assessed, after all. Regretfully, the number of definitions of project success is about equal to the number of experts in project management. Every organization has a different idea of what constitutes a successful project, which furthers the confusion (Gary R. H. 2014). Given that projects are transient in nature, their success should be evaluated by how well they are completed in relation to the scope, time, money, resources, quality, and risk

restrictions that have been agreed upon by senior management and the project managers (Fifth Edition of the PMBOK).

2.6 Project Delay

A number of studies have attempted in the last several years to classify and differentiate delays in road construction projects based on their unique conditions (Rosazuwad, 2010; Chai and Yusof, 2015; Elawi et al., 2015). According to these studies, there are three main categories of construction delay causes: non-excusable delays, excusable delays that do not require payment, and excusable delays that do require payment.

According to Sambasivan and Soon (2007), delays in construction are a worldwide problem that has an impact on both the building sector and a nation's total economy (Faradi and El-Sayegh, 2006).

2.6.1 Excusable delays with compensation

These are delays brought on by unforeseen situations outside the control of the contractor or subcontractor, generally as a result of the client's actions or inactions. Contractors that incur this kind of delay are entitled to a time extension in addition to monetary damages for the delay. When the owner refuses to grant access to the site after the notice to proceed is provided, that is an example of an excused delay with compensation. This form of delay is not the product of the contractor's error; rather, it results from unforeseen events (Chai and Yusof, 2015; Elawi et al., 2015).

2.6.2 Excusable delays without compensation

When neither the contractor nor the client are held accountable, delays of this kind happen. There will only be a time extension granted in cases of this kind of delay, as there are no grounds for damages. Due to this delay, there is now more time to complete the construction without having to pay the contractor. This kind of delay can be brought on by worker protests, unforeseen weather circumstances that hinder or impair production, equipment deliveries that arrive later than expected, and material deliveries that arrive later than expected (Adam et al., 2015).

2.6.3 Non-excusable delays

This occurs as a result of the contractor disobeying the conditions specified in the building contract. Clients who have a contract that clearly states their loss are entitled to make such a claim. The client must identify these delays, as they rarely review the timetable for the construction project. Predictable weather-related delays, delays from the subcontractor, the contractor's incompetence in overseeing the construction site, the contractor's mishandling of the project's finances, a shortage of labor, the inability to manage work in accordance with the contract schedule, and repeated but preventable errors or failure to meet the owner's specifications are all common causes of this kind of delay (Vasilyeva-Lyulina et al., 2015).

While these cover the main categories of delays in road construction projects, Shebob et al. (2012) also found other reasons such as subpar quality, inadequate planning and resources, government rules, poor site management, and environmental conditions at the construction site. However, the many delay reasons observed in road construction projects can be divided into four primary groups as follows when compared to the findings of Nyasetia et al. (2016): causes pertaining to contractors, consultants, owners, and other elements (such as supplies, labor, and equipment), project causes, and delays brought on by outside sources. Table 1 presents an overview of all the reasons for road building delays found in the literature. Table 1 clearly illustrates the variety of factors that might affect road construction project delays. Typically, this phenomenon is accompanied by cost overruns that negatively impact consultants, contractors, and clients. A delay results in lost revenue and unavailable facilities for the owner. On the other side, a delay costs the contractor money because it causes them to hire more workers, buy more materials and equipment, and lose time. All of these detrimental consequences may lead to disputes in court, arbitration, cash flow issues, and a generalized sense of unease about one another. Consequently, the reasons for the delays varied depending on the party involved (Motaleb, 2014).

According to Al-Kharashi and Skitmore (2009), the reasons behind delays in road construction projects differ depending on the nation. For instance, it can be argued that the three main factors that significantly influence the growth of the road construction industry are national economic growth, government spending, and the level of demand by the communities in developing countries where governments are the only owners of road construction projects (Tang et al., 2003). Delays will therefore inevitably result from several factors in African nations like Ethiopia,

where the government is the exclusive owner of road construction projects. Previously, Okpala and Aniekwu (2010) had proposed that governments, particularly those in developing nations, were primarily focused on building roads. Thus, based on data from the literature, it can be concluded that, as a result of various surroundings and applied methodologies that have an impact on the construction processes, the main causes and impacts of delays in the road construction business change from country to country.

2.7 Review of Empirical literature on Causes of Delay in Construction Projects

Turkey's contractor and investor public agencies were surveyed by Arditi et al. (2019) in order to determine the reasons behind the delays. According to the report, the average delay for 126 public projects that contractors had taken on was 34.6%, whereas the average delay for projects that public agencies had outsourced was 43.65%. In 1975, just 22% of Turkey's public projects were finished on time, while 18% took up to 4 years longer than expected to complete.

Mansfield et al. (2015) evaluated the level of delays in some of the highway projects in Nigeria, and the time overrun in nine highway projects was found to range from 92% to as high as 343%.

Chan and Kumara Swamy (2008) stated that only 40% of government buildings, 25% of private sector buildings, and 35% of civil engineering works were finished within schedule out of 111 building and civil engineering projects completed in Hong Kong between 1990 and 1993. The average time overrun was observed to be more than 20%.

Assaf et al. (2016) used a questionnaire survey of consultants and contractors to investigate the reasons for building project delays in the Eastern Province of Saudi Arabia. According to their analysis, 76% of contractors and 56% of consultants indicated delays of between 10% and 30%, and roughly 25% of consultants indicated delays between 30% and 50% of the initial contract period. Elinwa and Joshua (2001) discovered that between 80% and 90% of Nigerians experience time overruns.

Sambasivan and Soon (2017) state that in 2005, 17.3% of Malaysia's 417 government projects either had delays exceeding three months or were abandoned and deemed unhealthy. In 2020, Koushki and colleagues conducted a study on 450 private residential housing projects in Kuwait.

Their findings indicated that over 56% of the projects failed to finish on time, over 54% experienced delays of four months or more, and one-third experienced delays of more than six months.

Every stage of construction project has been the subject of much research, with the exception of a small number of studies that concentrated on the particulars listed below.

In their research on engineering-related delays in Egypt, Marzouk et al. (2018) found 22 causes in four categories: project parties' amendments, workshop drawing approval, workshop drawing supervision, and design development. According to their study, some of the most significant reasons for delays were errors or modifications in the design documents provided by the employer, a delay on the part of the employer in answering the contractor's questions, a delay on the contractor's part in preparing the drawings because of a lack of resources, experience, management, and mistakes, and constructability issues in the design documents produced by the employer.

In the study by Rahman et al. (2019), the most important factors causing project delays in Malaysia that are related to finances are unstable financial markets, inadequate cash flow management, late payments, and insufficient financial resources.

According to Yang and Wei (2020), the main reasons behind delays in the planning and design phases of construction projects in Taiwan are changes in the client's requirements, inadequate scope definition, unrealistic and unworkable initial plans, client change orders, and project complexity.

We have been able to identify the primary reasons for construction project delays by reviewing the literature.

Table 2.1: Causes of delays in road construction projects (Salunkhe & Patil, 2014)

Delay Causes	Causes of delays
Contractor-Related Delay Causes	1. Contractor's insufficient planning & scheduling.
	2. Lack of experience of contractor in decision-making.
	3. Contractor's tardiness in site mobilization.
	4. Contractor's tardiness in preparation of paperwork
	5. Contractor's inadequate site management & monitoring.
	6. Disagreements with subcontractors.
	7. The contractor had to rework the construction.
	8. Incompatibility of contractors with modern technology.
	9. The contractor's lack of knowledge with new software.
	10. The contractor has mediocre managerial abilities.
	11. The contractor failed to oversee the project's progress well.
	12. The contractor's lack of risk management and analysis.
	13. The consultant experienced difficulties to communication.
Consultant-Related Delay Causes	1. The consultant's tardiness in approving drawings.
	2. The consultant was not given enough power to make decisions.
	3. Errors in the consultant's drawings
	4. The inexperienced consultant.
	5. The consultant is having financial troubles.
	6. The consultant's lack of working or practical knowledge.
	7. The consultant and contractor are not coordinating.
	8. The leadership capacity of consultants.
	9. Consultant conflicts with design engineers on specification modifications made by the consultant
	10. The consultant received insufficient site information.
	11. A delay in transferring the contractor's site.
	12. Disagreements between contractors and consultants..
	13. The consultant addressed the complexity of the project design.
	14. The consultant encountered communication barriers.
Owner/Client-Related Delay Causes	1. Owner's tardy revision and approval of the necessary documents
	2. Owner modifications to the contract during construction
	3. Owner payments for finished work are delayed.
	4. The owner's poor coordination and communication.
	5. Owner disputes when there is joint ownership.
	6. Work suspension because of the owner.
	7. Miscommunications in technical interactions with contractors and vendors.
Material-Related Delay Causes	1. Lack of available material.
	2. Modifications in material quality.
	3. Frequent unexpected modifications in specification of material during construction.
	4. The material selection procedure moves slowly.
	5. Ineffective handling of materials.
	6. Damage to materials during storage.

	7. Increase in the cost of materials.
	8. The delay in completing finishing materials due to availability of certainties in market.
	9. A lack of turnover and initial resources causes a project to move
	10. Materials not in right place when needed.
	11. Untimely delivery of labor
Labor & Equipment-Related Delay Causes	1. Inadequate labor productivity and supply.
	2. Labor disputes and strikes.
	3. The equipment is not present.
	4. Equipment delivery is delayed.
	5. Shortage of recent technology equipment.
	6. Requests for large or long-lead time equipment were not fulfilled.
	7. No use of checklist.
	8. The lack of relevant design data and equipment listings.
	9. A lack of operators.
	10. Restrictions on site space for both permanent and temporary equipment.
	11. The project's ineffective safety inspection and accelerated visits
Project-Related Delay Causes	1. Traffic control at site.
	2. Modifications to the location.
	3. Unexpected ground conditions.
	4. Inadequate survey and data gathering.
	5. Topographical changes at the location following design.
	6. Restricted access.
	7. Accidents on site.
	8. Problems due to existing structures.
	9. The location's utilities are unavailable.
	10. Rework because of a construction error
	11. Adverse weather conditions.
	12. Improper estimates of costs.
	13. Limitation as a result of site location.
	14. Modifications to laws and government regulations

We have been able to identify the primary reasons of construction project delays by reviewing the literature.

Table 2.2: Critical causes of delay

Significant factors behind delay	
1	Clients' payment delays
2	Errors, modifications, and delays in the drawings
3	Financial issues facing the contractor
4	Planning and scheduling errors
5	Material delivery is delayed
6	Orders for changes or an expansion of the work's scope Poor site
7	Poor site supervision and management
8	Political instability, inflation, law and order, and the economy
9	Slow decision making by owner
10	Owner's delayed decision-making due to issues with suppliers and subcontractors
11	Natural disasters or acts of God

Construction projects are influenced and governed by certain country-specific variables, which need to be caused and investigated, even though they have common characteristics with other projects worldwide (Olawale and Sun, 2020). There are no broadly applicable fundamental causes for the delays; instead, the categories and causes are distinct to each country, region, and project (Ramanathan et al., 2022). These is the first study on the topic of woito-turmi road design and build project delays, despite the fact that there have been other studies conducted to evaluate the reasons behind project delays. The pattern and severity of delays call for more study on this subject.

2.8 Effects of construction project delay

Delays in construction projects frequently have detrimental impacts on the parties involved. A study by Aibinu and Jagboro (2022) illustrated the consequences of the delay on Nigeria's building sector. They identified six potential common impacts of delay that arise in most nations. These included disagreements, overspending, time and money overruns, arbitration and litigation, and complete project abandonment.

2.9 The Relevant Nature of Delay and Its Impact

It's possible that the client or project owner and the construction project's performance are impacted by delays. Construction clients are recognized to place a high priority on delay certainty (Davenport, 1997). Construction time is influenced by numerous internal and external factors. But these days, clients are less concerned with quick turnaround times and cheap costs than they were a few years ago (Flanagan et al., 1998), and time and cost certainty rank among the most crucial contractor performance criteria for client satisfaction (Soetanto et al., 2021; Construction Industry Board, 1996).

According to Sidwel (1988) and Ahmed and Kangari (1995), client satisfaction is a key factor in evaluating and comparing contractor performance and serves as the catalyst for ongoing performance improvement. Businesses set themselves apart from rivals and preserve a competitive advantage by satisfying customers and retaining them (Torbica and Stroh, 2021).
The work completed is what the client is ultimately interested in from the contractor's performance. It needs to meet the project's defined specifications. Both delay (time overrun) and cost overrun are expensive, frequently lead to disagreements and claims, hinder project owners' viability, and impede the growth of the construction sector (Odeh, A. M. and Battaineh, H. T., 2022).

2.10 Techniques for Reducing Road Construction Project Delays

Various studies have previously suggested various methods and strategies to deal with project delays in the road building industry. This study was able to adopt a better approach to addressing these delay issues if it has a better understanding of their strengths and weaknesses, especially in light of Ethiopia's various influential causes, despite the fact that there are some variations and differences in degree among all of these earlier techniques and approaches.

According to the approach put forth by Abdul Rahman et al. (2013), financial concerns ought to be given a lot of weight by making sure that there is a functional system in place for prompt payment of suppliers and employees as well as between contractors and subcontractors. They also advised construction firms to make large investments in the newest machinery, tools, and technology rather than renting them, given the considerable influence that equipment-related causes have on project execution. These suggestions are based on the idea that construction

companies should have adequate materials to guarantee a steady supply during the project's construction phase.

Memon et al. (2014) suggested that a strong communication system, dedicated leadership and management, and careful work planning can all significantly enhance time performance. In order to reduce the impact of delay causes on road construction projects in Padang and Pekanbaru, Indonesia, Harisaweni (2017) devised a framework. These frameworks demonstrate how the cycling processes in each framework are essentially the same and provide the same function of project control. However, because it included thorough explanations of the potential activities and undertakings, Bakhary et al.'s (2016) framework offered a more succinct description than others. Table 2.2 provides a summary of the fundamental ideas of earlier frameworks, which can serve as a foundation for creating a theoretical framework.

It is evident from the discussions above and Table 2 that using a structured framework will contribute to a more methodical approach to the road construction process and a logical implementation sequence based on predetermined tasks at each project stage. Additionally, a well-defined plan for the project's execution will aid in anticipating delays and mitigating their effects by detecting them early on. This will make it easier for the project manager and the team to oversee and manage the advancement of the tasks they have been given, reducing delays and advancing the project overall.

2.11 Experiences of delay in Ethiopian road construction projects

Every kind and stage of a construction project has construction delays, which are a prevalent issue in Ethiopian construction projects. Ethiopia's road network is constantly expanding, and the country's construction industry is booming. Nevertheless, historical data on finished road projects reveals that not a single project was finished on schedule or for the projected amount of money (Shambel and D. Patel, 2018). According to Werku and Jha (2016), one of the main reasons for project failure is construction delays, which happen during every stage of a project and are a typical issue in Ethiopian building projects.

According to Siraw Y. (2014), who conducted research on the factors influencing time overruns in road construction projects under the Ethiopian Road Administration, the primary causes of time overruns in Ethiopian road construction were imprecise cost estimation, sluggish site clearance,

inflation, owner delays in progress payments, and financial difficulties with the contractors. Worku and Jha (2016) classified the following groups according to importance in their study, "Investigating Causes of Construction Delay in Ethiopian Construction Industries": causes connected to contractors; (2) causes related to materials; (3) causes related to labor; (4) causes related to designers; (5) causes related to consultants/supervisors; (6) causes related to clients; and (7) causes related to external factors.

In Tsegay and H. Luo's 2017 study, "Analysis of Delay Impact on Construction Project based on RII and Correlation Coefficient," they examined the major categories of causes of delay—external, responsibility, resource, and contract-related—and summarized their findings using the average relative important index (RII). This held true for all stages of the investigation, with the exception of those that were influenced by different levels and subgroups of causes of delay.

Getachew Tsegaye (2009) examined design risk management in federal road projects in Ethiopia and found that errors in quantity estimation, inadequate subsurface investigation and interpretation, poor pavement investigation and interpretation, inadequate or inaccurate topographic survey data, lack of design details, omission of works, change of alignment, poor specification, late design implementation, and poor drainage assessment were the main causes of time and cost overruns.

In his case study on Jimma Town Internal Asphalt, Getachew Ligdi (2015) stated that the information gathered from a detailed examination of the client and consultant's project document, oral interviews with the client and consultant engineers, oral communication with the contractor advocator, the bid document, and written data (from prepared questioners) from the client and Employer’s representative, indicated that the project's initial cost, including supplementary funds, was ETB 130,345,304.71. It was anticipated to be completed in 433 days. Despite the fact that the project's contract was delayed (extended) for multiple reasons, the construction was not finished, and after the original contractor breached the agreement, the project's construction was outsourced to the ERCC for a sum of 120,878.000 ETB. Only three of the contractor's five issues—which had to do with weather, ROW issues, and design flaws—were approved by the client, despite the fact that the contractor had presented over five that were directly connected to time extensions. The

contractor says that a 377-day extension was given during this period. This sum represents 87% of the initial contract duration.

According to ERA (2005), design consultants don't have their own quality assurance system; instead, they replicate or use pre-existing methodologies rather than working to establish their own for the specific conditions in the area. In several instances, they lack adequate understanding of the kinds of services that ERA requires and do not take responsibility for the services they provide. Furthermore, the majority of consultants are inexperienced and eager to accept contracts at drastically reduced rates, which leads to the production of subpar work. The investigation also showed that the ERA's Terms of Reference lacked precision and clarity. These issues show that there are design hazards that must be taken care of.

2.12 Conceptual Framework

Decades of research have been dedicated to the topic of construction delays, with researchers proposing a variety of individual and cluster explanations. Seventy delay causes were found in the literature reviews conducted for this investigation. The survey form provides a description of each delay factor. The literature review shows how different causes are categorized. L. Muhwezi et al. (2014) divided the causes of timetable delays in construction projects into four major categories: those related to clients, consultants, contractors, and external sources.

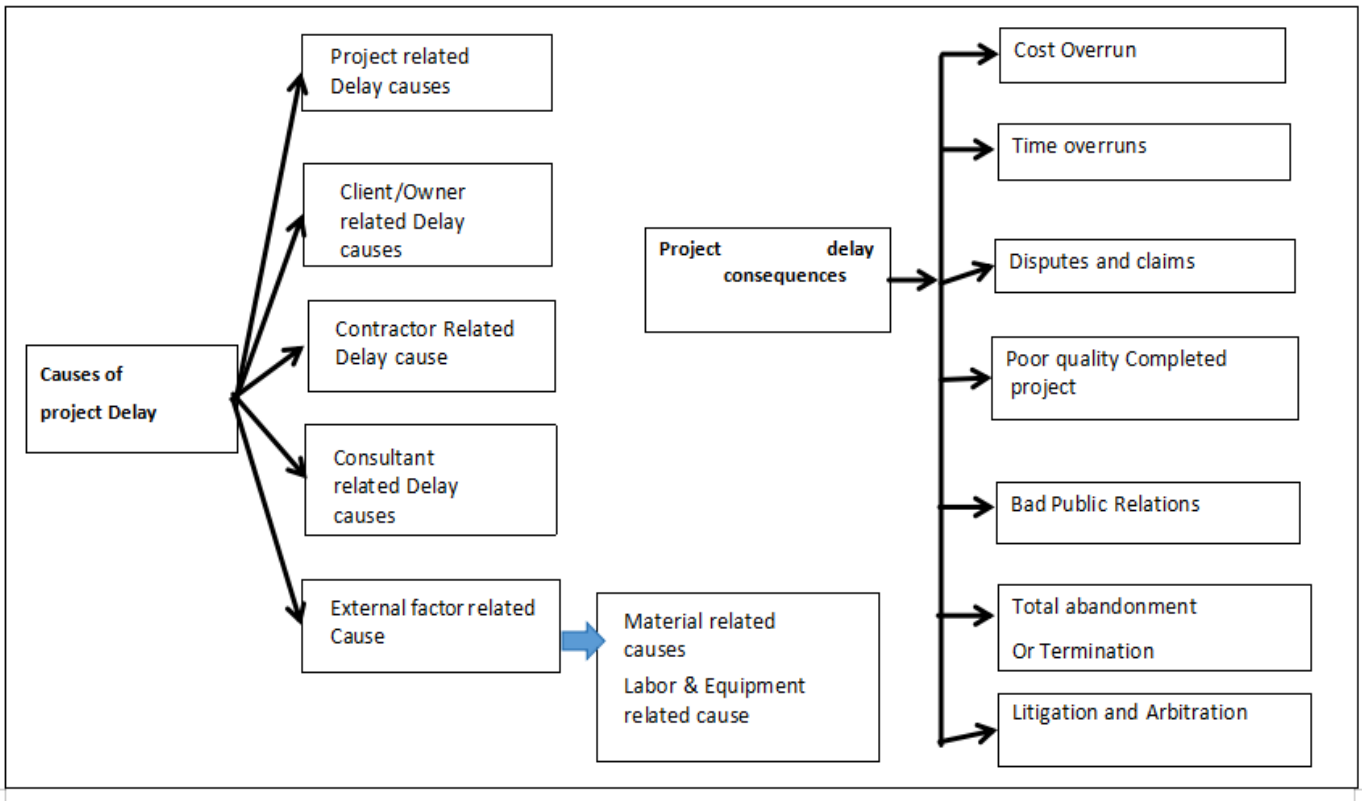
However, Salunkhe & Patil (2014) identified eight (8) categories of causes: project-related, labor-related, material- and equipment-related, consultant-related, contractor-related, owner-related, and external cause-related. In light of this, the study recategorized these factors into seven (7) categories: causes relating to clients, consultants, contractors, materials, labor and equipment, projects, and external sources.

According to the studied literature, time overruns can be the direct result of one or more events and can be caused by any party to the contract. The evaluation lists numerous causes, but the most significant ones are those that are related to the project: the owner/client, consultants, contractors, and externalities. Different variables might create delays in construction projects, according to each category of causes of delays. As a result, this study looked at four distinct types of causes of road construction project delays that were developed from a thorough literature review.

There are delays in almost all construction projects in Ethiopia, and the extent of these delays varies greatly from project to project, according to contractual documents of road projects in the road administration and correspondence letters, specifically permits to time extension in ERA. Depending on the reasons for delay that were examined, some projects are only a few days behind schedule, while others are over a year behind. Determining the true reasons for delays is therefore crucial to reducing, mitigating, and maybe completely avoiding delays in road building projects.

Furthermore, in addition to having negative consequences for the owner and contractor (such as increased costs or missed income), a contract time overrun can also give rise to the controversial question of delay culpability, which can lead to disputes that commonly end up in court. The majority of countries experience cost overruns, schedule overruns, disagreements, arbitration, litigation, and complete project abandonment as a result of delays in road construction projects.

Figure 2.1 **Conceptual framework (Salunkhe & Patil, 2014) and Diagrammatic representations of effects of project delay**



CHAPTER THREE

3 RESEARCH DESIGN AND METHODOLOGY

3.1 Study Design

The methodology, which included data collection, research design, and research strategy, is covered in this third chapter of the thesis. The Woito-Turmi Design and Build Road Project approach aims to gather and analyze relevant data in order to determine the factors and causes of road construction project delays and their consequences. This research employed a quantitative research approach to meet the study's goal. This study specifically used a descriptive research design with ranking method. Important experts in the field of research participated in the questionnaire-based survey of the respondents.

Quantitative research is the method employed in this study. In order to understand the opinions of stakeholders regarding issues that cause delays, the effects of delay and the ranking of road construction projects in Woito-Turmi that are relevant to ERA road projects, quantitative research was chosen. For a more thorough explanation of the primary reasons and the effects of delay, some qualitative data were also added.

The term "research design" describes the structure or plan of a scientific investigation. Creating a research study entails creating a strategy or plan that will guide the data gathering and analysis (Poilt & Hungler, 1985). As a result, the following five-part categories make up this research: The proposal for describing and characterizing the issues and establishing the study's objectives makes up the first section. A review of the literature is included in the second section of the study, where construction delays will be examined.

3.2 Types and Sources of Data

Addressing the subject of discussion, both primary and secondary data were employed. Primary source of information derived from survey responses. Secondary data gathered from secondary data sources, including similar articles and reports. The primary participants in the construction, namely the owner/client, contractor, consultant and local residents in the area served as the data sources.

3.3 Data collection and Instrument

The questionnaire and document review methods employed in this study were utilized to collect data from the primary participants in the construction (clients, contractors, consultants and local residents in the area) in this road construction project. The questionnaire, consisting of Likert-scale questions, was closed-ended. In order to gather pertinent secondary data from secondary sources (project progress reports, books, journals, reports, and contract documents), document review was also used.

Primary data was information gathered from surveys and responses given to a specific demographic with the goal of creating a straightforward, unambiguous questionnaire with a few closed-ended questions and a number of checkboxes. English was the medium used for data collection in the questionnaires. The study sought information on the reasons and impacts of delays, as well as the opinions of representatives for the client, consultant, contractor and local residents in the area. The respondents were not forced to reveal their identities in order to answer the questionnaire; instead, they were given detailed instructions on how each problem was expected to be handled, what data was needed, and how to safeguard it. Every response was handled with the utmost confidentiality.

Standard questionnaire utilized in this study was adapted from Salunkhe & Patil's (2014) questionnaire. There was six main categories of causes for delays in road construction projects, including those related to clients, consultants, contractors, materials, labor and equipment which was included in external factors, project related, and their consequences. The questionnaire contains forty eight well-organized causes for delays in road construction projects and eleven consequences of delay. Each group's specific delay factors and their effects were detailed on the questionnaire.

The purpose of the questionnaire was to assess respondents' perspectives on the significance, severity, likelihood, and frequency of delay causes and their effects from the perspectives of clients, consultants, contractors and local residents in the area. The Relative Importance Index was then constructed using the descriptive analysis on SPSS 26.0, and each delay and its outcome attribute were ranked according to importance.

3.4 Research Population and Sample Size

The respondents will be chosen using a purposeful, non-probabilistic sample technique under the categories of project related, the owner, the consultant, contractor and local residents in the area of the Woito-Turmi road project. The small study population was the reason for using this strategy. According to William (2005), the purposive sampling technique is crucial for obtaining data from a sample of the population thought to be the most knowledgeable about the topic at hand. The statistical package for social science (SPSS 26.0) was used to generate the output for ranking. 50 sample sets were distributed to six employee staff members, fifteen contractor staff members, ten consultant staff members, and five government officials of the woreda Turmi in order to implement the questionnaire survey framework. These distributed questionnaires yielded 36 replies

3.5 Data Processing and Analysis

The survey data was analyzed to evaluate the relative importance of different factors and outcomes that lead to construction delays. The Likert scale used in the data collection ranged from 1 (Strongly agree) to 5 (Strongly disagree). Based on the perspectives of respondents, primary data were gathered and subjected to quantitative analysis. Using the Statistical Package for Social Science (SPSS 26.0) in order to generate outputs of the factors that lead to project delays as well as the consequences that follows. Secondary data is gathered from secondary data sources, including similar journals, and reports. The primary participants in the construction, namely the owner/client, contractor, consultant, and local residents in the area served as the data sources. At the Woito-Turmi design and build road project, identifiable causes and consequences were ranked and categorized according to their degree of contribution to avoiding delays using the Relative Important Index (RII) technique. The following equation was used to compute each delay cause and its implications.

$$RII = \sum \frac{W}{A * N}$$

W ≡ is the weight that the respondents assigned to each cause.

A ≡The highest weight is A ≡.

N ≥The total number of responders is N ≥.

Keep in mind that $0 < RII \leq 1$

The many causes and effects are ranked (R) using the RII. Cross-referencing the relative significance of the causes and consequences as viewed by the three respondent groups—clients,

consultants, contractors and local residents in the area —was made possible by these rankings. To provide a general and overall ranking of the causes and consequences of construction delays in the Ethiopian construction sector, the RIIs of each cause and consequence as perceived by all respondents were used. Next, each item's rank was ascertained using the indices (RII). The relative relevance of the items as judged by the groups of respondents could be cross-compared thanks to these rankings. Each item for the four respondent groups must have a weighted average calculated, and ranks (R) must be assigned to each item to reflect the three groups' respective perceptions.

The following part of the study, which ranks the relative significance index (RII) of the identifiable causes and consequences, aims to demonstrate the studies and outcomes that satisfy the study's objectives based on the research methodology. The goals will be achieved through the use of a questionnaire survey. This part includes:

- Response rate to the first questionnaire and the demographics of the respondents
- To determine the causes of delays and the fallout from errors made by contractors, consultants, and employers while the project is being built.
- Filtering the situations according to who is responsible for the reasons for the delays and how much of an impact they have on the contractor, employer, and consultant
- Relative Important Index-based ranking of delay causes and outcomes

The effect will be measured using a five-point Likert scale that went from "very high" to "very low." Jawal N. A. (2015) employed the same classification in his paper, "Assessment of delay causes of construction projects in Palestine." Should be the average value range:

Table 3.1: Average value range

From	Considered to be
1 - 1.8	Very high effect- extremely powerful impact
1.81 - 2.6	High effect- high impact
2.61 - 3.4	Medium effect- moderate impact
3.41 - 4.2	Low effect- minimal impact
4.21 – 5.0	Very Low effect- extremely little impact

3.6 Ethical Considerations

This study takes ethical considerations into account. The organization's evaluation documents was kept private. This study's conclusions and outcomes won't be applied to any other situation. Respondents to this study are also free to share their own opinions based on their experiences; their names and religions were kept private.

CHAPTER FOUR

4 RESULTS AND DISCUSSION

4.1 Introduction

This chapter aims to discuss the issues related to the distribution of survey questionnaires, response rates by sector organizations, respondent designations, and the distribution of work experience. It also collects and analyzes the responses from professionals who work for the three stakeholders involved in the road construction sector: consultants, contractors, and clients. The answers to the questions meant to pinpoint the reasons for delays and rank their significance are included in the results and discussion. In the same way, the eleven possible impacts that were chosen from earlier research and ranked according to their prospective effects were examined, along with the most significant and common consequences of delay.

4.2 Questionnaires Response Rate and Respondent Demographics

Professions from employers (ERA Jinka Area Project Management Office), consulting firms (Prome Consultants Ltd. in JV Omega Consulting Engineers Plc), contractors (Rama Construction Plc), and government officials of the woreda Turmi made up the sample population. These professionals included project engineers, office engineers, project team leaders, and site project supervisor engineers. The questionnaire survey structure was implemented by distributing 50 sampling sets to 6 employee staff members, 15 contractor staff members, 10 consultant staff members, and 5 government officials of the woreda Turmi. 36 responses were obtained from these distributed questionnaires.

Table 4.1: Distributed Questionnaires, Respondents and Response

Respondent	**Questionnaire Distributed (#)**	**Questionnaire Collected (#)**		**Response from Total (%)**
		Invalid/ Incomplete Questionnaire	**Complete/ Valid response**	
Client	10	4	6	16.7%
Consultant	20	5	15	41.7%
Contractor	10	0	10	27.8%
Gov. officials	10	5	5	13.8%
Total	**50**	**14**	**36**	**100%**

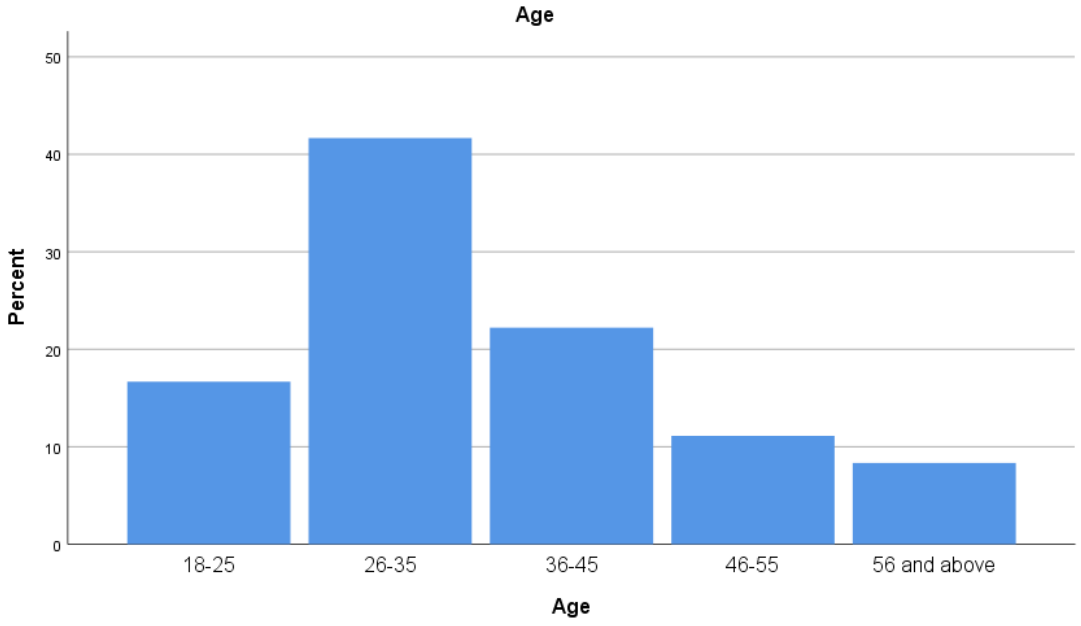
4.2.1 Gender Distribution and age of the Respondents

Table 4.2. Gender Distribution of the Respondents

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	28	77.8	77.8	77.8
	Female	8	22.2	22.2	100.0
	Total	36	100.0	100.0	

The gender and age distribution of the respondents was determined by the study, and it is shown in table 4.2 below. The majority of respondents—77.8% of whom are men and 22.2% of whom are women—. Age distribution of the respondents are determined in chart shown in Figure 4.1, 6 of respondents are in between the age of 18-25, 15 of respondents are in between the age of 26-35, 8 of respondents are in between the age of 36-45, 4 of respondents are in between the age of 46-55, and 3 of respondents are 56 and above.

Figure 4.1. Age Distribution of the Respondents



4.2.2 Educational Level

Table 4.3. Educational Background

Educational Background				
	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Diploma	14	38.9	38.9	38.9
	Bachelor's Degree	20	55.6	55.6	94.4
	Master's Degree	2	5.6	5.6	100.0
	Total	36	100.0	100.0	

The goal of the study was to determine the respondents' level of education, and the outcomes are shown in the table below. The data presents a demographic breakdown of 36 respondents involved in a study on construction project delays. In terms of Educational Background, the majority hold a Bachelor's Degree (55.6%), followed by those with a Diploma (38.9%), and a minority with a Master's Degree (5.6%).

4.2.3 Occupation

Table 4.3. Occupation

Occupation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Construction industry professional	7	19.4	19.4	19.4
	Engineer	13	36.1	36.1	55.6
	Project manager	2	5.6	5.6	61.1
	Government official	7	19.4	19.4	80.6
	Other	7	19.4	19.4	100.0
	Total	36	100.0	100.0	

Professionally, the group is diverse, with Engineers making up the largest portion (36.1%), followed by Construction industry professionals and Government officials (each 19.4%), Project managers (5.6%), and others in various roles (19.4%).

4.2.4 Years of Experience in the Construction Industry

Table 4.4. Years of Experience in the Construction Industry

Years of Experience in the Construction Industry(if applicable)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 1 year	3	8.3	8.3	8.3
	1-5 years	8	22.2	22.2	30.6
	6-10 years	16	44.4	44.4	75.0

	11-15 years	2	5.6	5.6	80.6
	More than 15 years	7	19.4	19.4	100.0
	Total	36	100.0	100.0	

Experience-wise, the largest group has 6-10 years in the construction industry (44.4%), indicating a moderately experienced cohort. Those with 1-5 years of experience account for 22.2%, while more than 15 years and less than 1 year are represented by 19.4% and 8.3%, respectively. A small group has 11-15 years of experience (5.6%). This distribution suggests that the study's insights are informed by a range of perspectives, from relatively new entrants to highly experienced professionals in the field.

4.3 Extent of delay (Secondary data Result)

For the Woito Turmi design and build road project of about 120Kms to be carried out in a period of 4 years, the average expected performance rate would be 30Kms/year. With almost three year (35 months) elapsed from the commencement date, achievement of equivalent 30.31 Km is much lower than the expected rate of 71.28km. The actual average accomplishment is about 10.399km/year. Clearly, the performance is low with all indications that the Contractor may not be able to complete the works within the allocated time for completion as evidenced from the about 25.22% of actual progress against planned 59.30%. a summary of delayed time of the selected projects were shown in Table 4.5 below

Table 4.5 Time elapsed and Slippage of Woito Turmi design and build road project

Description	Unit	Previous Period	Total To Date
Time Elapsed	**Calendar Days**	1033	1064
	%	70.75%	72.88%
Planned (overall BoQ items)	**Birr**	1,377,411,818.86	1,466,169,621.41
	%	55.71%	59.30%
	KM	66.96	71.28
Executed (Finanacial ;- Pay Item 1-8)	**Birr**	621,861,174.29	623,567,899.12
	%	25.15%	25.22%
	KM	30.23	30.31
Actual / Plan	**(%)**	45.15%	42.53%
Slippage from Time	**%**	-45.60%	-47.65%
Slippage from Planned	**%**	-30.56%	-34.08%

Source – Woito Turmi design and build road project April 2024 report

4.4 Causes of delay

A questionnaire survey was adopted to identify the causes of delays. In light of this, 48 reasons for delay were found in the literature review and how the stakeholders are involved in the delay of the project. The importance of each of these reasons for delays was assessed on a response scale from 1 (strongly disagree) to 5 (strongly agree) in the surveys. Subsequently, the Relative Importance Index (RII) was computed to rank those lists of causes. Along with the corresponding response form the client, consultant, and contractor, and the local resident in the area, the weighted RII values of each factor related to the Woito Turmi design and build road project contributing to the delay were also computed. The weighted RII and Relative Importance Index of the causes causing delay are divided in to project related questions, owner/client related, contractor related, consultant related, and external factors related to the delay of the project are assessed in this study.

4.4.1 Project related delays

Table 4.6 project related delays

Factors for Causes of project delay A. Project Related	ID	RII	Rank importance
Change order/Changes in site conditions.	A3	0.822222222	1
Discrepancies between contract documents	A1	0.811111111	2
Suspension of work by owner or contractor	A2	0.8	3
Insufficient data collections & survey.	A4	0.8	4
Unavailability of utilities in site area.	A7	0.788888889	5
Rework due to error in construction	A8	0.777777778	6
Changes in site topography after design	A5	0.761111111	7
Accidents on site.	A6	0.627777778	8

Table 4.6 shows the questionnaire asked respondents to rate the importance of various factors that contribute to project delays. The factors considered include change orders/changes in site conditions, discrepancies between contract documents, suspension of work by the owner or contractor, insufficient data collections and survey, unavailability of utilities in the site area, rework due to construction errors, changes in site topography after design, and accidents on-site.

According to the results, the factor rated as the most important cause of project delays is "change order/changes in site conditions," with a high RII of 0.822. This implies that changes in project scope, site conditions, or requirements significantly impact project timelines.

The second most important factor is "discrepancies between contract documents" (RII = 0.811). This suggests that inconsistencies or conflicts within the contract documents can lead to delays during the project execution phase.

The third-ranked factor is "suspension of work by the owner or contractor" (RII = 0.8). This indicates that project interruptions or halts initiated by either the owner or the contractor have a notable influence on project delays.

Other factors such as insufficient data collections and survey, unavailability of utilities in the site area, rework due to construction errors, changes in site topography after design, and accidents on-site are also considered significant, but to a slightly lesser extent.

4.4.2 Owner Related/ Client Related Delays

Table 4.7 Owner Related/ Client Related Delays

Factors for Causes of project delay B. Owner Related/ Client Related	ID	RII	Rank importance
Delay to deliver the site (Right of way problem)	B1	0.888888889	1
Delays in Finance and payments of completed work	B3	0.872222222	2
Slow decision-making by owners/Client	B5	0.844444444	3
Poor contract management	B8	0.833333333	4
Owner interference/ Suspension of work due to owner.	B4	0.794444444	5
Poor communication and coordination	B2	0.788888889	6
Unrealistic imposed contract duration	B6	0.783333333	7
Contract changes by owner during construction	B7	0.761111111	8

Table 4.7 provided focuses on factors related to the owner or client that can contribute to project delays. These factors, along with their corresponding IDs, Relative Importance Index (RII), and rank of importance, were collected from a questionnaire. Here is a short summary of the findings:

The questionnaire aimed to assess the level of importance of various owner/client-related factors in causing project delays. The factors considered in this category include:

Delay to deliver the site (Right of way problem) - Ranked as the most important factor with an RII of 0.889. This indicates that delays in obtaining the necessary right of way or access to the project site significantly impact project timelines.

Delays in Finance and payments of completed work - Ranked as the second most important factor with an RII of 0.872. This suggests that delays in providing financial resources and timely payments for completed work can lead to project delays.

Slow decision-making by owners/clients - Ranked as the third most important factor with an RII of 0.844. This implies that delays in decision-making processes by the owners or clients can impede project progress and cause delays.

Poor contract management - Ranked as the fourth most important factor with an RII of 0.833. This highlights the significance of effective contract management in ensuring smooth project execution and avoiding delays. Owner interference/Suspension of work due to owner - Ranked as the fifth important factor with an RII of 0.794. This suggests that instances where the owner interferes with the project or suspends work can contribute to project delays.

Poor communication and coordination - Ranked as the sixth important factor with an RII of 0.789. This emphasizes the importance of clear and effective communication and coordination between the owner/client and the project stakeholders to avoid delays. Unrealistic imposed contract duration - Ranked as the seventh important factor with an RII of 0.783. This points to the significance of setting realistic project timelines and contract durations to prevent delays. Contract changes by owner during construction - Ranked as the eighth important factor with an RII of 0.761. This highlights the potential impact of changes made by the owner to the project contract during the construction phase, leading to delays.

Woito Turmi design and build road project, factors related to the owner or client that can contribute to project delays were assessed through a questionnaire. The findings revealed that several owner/client-related factors can significantly impact project timelines. The most critical factor identified was the delay to deliver the site due to right-of-way problems, emphasizing the importance of obtaining necessary access to the project site in a timely manner. Delays in finance and payments of completed work were also highlighted as a key factor, underlining the significance of ensuring adequate financial resources and timely payments to avoid project delays. Additionally, factors such as slow decision-making, poor contract management, owner interference or work

suspension, poor communication and coordination, unrealistic contract duration, and contract changes during construction were recognized as potential contributors to project delays. Understanding and addressing these owner/client-related factors will be crucial for minimizing delays and promoting smooth progress in the Woito Turmi design and build road project.

4.4.3 Contractors related delays

Table 4.8 Contractors related delays

Factors for Causes of project delay C. Contractors related delays	ID	RII	Rank importance
Shortage in material	C9	1.016666667	1
Contractor's inadequate planning & scheduling.	C1	0.888888889	2
Lack of experience of contractor in decision-making.	C2	0.861111111	3
Contractor's slowness in site mobilization.	C3	0.855555556	4
Contractor's poor site management & supervision.	C5	0.838888889	5
Lack of risk analysis & management by contractor.	C10	0.833333333	6
Poor managerial skills of contractor.	C7	0.827777778	7
Inadequate handling of project progress by contractor.	C8	0.827777778	8
Communication barriers faced by consultant.	C11	0.811111111	9
Contractor incompatibility with new technology	C12	0.783333333	10
Contractor's slowness in preparation of documents	C4	0.783333333	11
Mistakes during construction and Reworking of construction faced by contractor.	C6	0.761111111	12

The questionnaire aimed to assess the level of importance of various contractor-related factors in causing project delays. The factors considered in this category included in Table 4.8

Shortage in material - Ranked as the most important factor with an RII of 1.017. This indicates that a lack of necessary materials can significantly delay project progress. Contractor's inadequate planning & scheduling - Ranked as the second most important factor with an RII of 0.889. This suggests that insufficient planning and scheduling by the contractor can lead to project delays. Lack of experience of the contractor in decision-making - Ranked as the third most important factor with an RII of 0.861. This implies that the contractor's limited experience in making crucial decisions can hinder project progress.

Contractor's slowness in site mobilization - Ranked as the fourth most important factor with an RII of 0.856. This highlights the impact of delays in the contractor's mobilization efforts on project timelines.
Contractor's poor site management & supervision - Ranked as the fifth important factor with an RII of 0.839. This points to the significance of effective site management and supervision by the contractor in avoiding project delays.

Lack of risk analysis & management by the contractor - Ranked as the sixth important factor with an RII of 0.833. This underscores the importance of thorough risk analysis and effective risk management practices by the contractor to prevent delays. Poor managerial skills of the contractor - Ranked as the seventh important factor with an RII of 0.828. This suggests that inadequate managerial skills on the part of the contractor can contribute to project delays. Inadequate handling of project progress by the contractor - Ranked as the eighth important factor with an RII of 0.828. This emphasizes the significance of the contractor's ability to effectively handle and monitor project progress to avoid delays.
The remaining factors, such as communication barriers faced by the consultant, contractor incompatibility with new technology, contractor's slowness in preparation of documents, and mistakes during construction with the need for reworking, were also identified as contributors to project delays but ranked lower in importance.

In the context of the Woito Turmi design and build road project, the factors related to the contractor that can contribute to project delays were assessed through a questionnaire. The findings highlight several important factors that could potentially impact the project timeline. Specifically, factors such as shortage in material, contractor's inadequate planning and scheduling, lack of experience in decision-making, slowness in site mobilization, poor site management and supervision, lack of risk analysis and management, poor managerial skills, and inadequate handling of project progress were identified as potential causes for delays. Understanding and addressing these contractor-related factors will be crucial for mitigating delays and ensuring the smooth execution of the Woito Turmi design and build road project. It is important for the project stakeholders to pay attention to these factors and take appropriate measures to optimize the contractor's performance and minimize the risk of project delays.

4.4.4 Consultant related delays

Table 4.9 Consultant related delays

Factors for Causes of project delay D. Consultant related delays	ID	RII	Rank importance
Slowness in preparing and approving drawing by the consultant.	D4	0.833333333	1
Conflicts of consultant with design engineer changes in specification during construction by consultant.	D9	0.805555556	2
Lack of co-ordination and proper communication between consultant with contractor.	D8	0.794444444	3
Waiting time for approval of tests and inspections	D7	0.783333333	4
Lack of experience and practical (working) knowledge on the part of the Consultant	D3	0.783333333	5
Quality assurance/control	D6	0.738888889	6
Financial difficulties affecting the consultant.	D5	0.733333333	7
Inadequate authority given to consultant to take decision.	D1	0.727777778	8
Inadequate site information given to consultant.	D10	0.711111111	9
Lack of consultant's resident staff (Engineers, Conservators, etc.)	D2	0.677777778	10

Table 4.9 provided focuses on factors related to the consultant that can contribute to project delays. The factors are accompanied by their respective IDs, Relative Importance Index (RII), and rank of importance. The questionnaire aimed to assess the level of importance of various consultant-related factors in causing project delays. The factors considered in this category include:

Slowness in preparing and approving drawing by the consultant - Ranked as the most important factor with an RII of 0.833. This indicates that delays in the consultant's preparation and approval of drawings can significantly impact project timelines. Conflicts of consultant with design engineer changes in specification during construction - Ranked as the second most important factor with an RII of 0.806. This suggests that conflicts between the consultant and design engineer regarding specification changes during construction can contribute to project delays.

Lack of coordination and proper communication between consultant and contractor - Ranked as the third most important factor with an RII of 0.794. This highlights the significance of effective coordination and communication between the consultant and contractor in avoiding project delays.
Waiting time for approval of tests and inspections - Ranked as the fourth important factor with an RII of 0.783. These points to the impact of delays in the approval of tests and inspections on project progress.
Lack of experience and practical (working) knowledge on the part of the consultant - Ranked as the fifth important factor with an RII of 0.783. This emphasizes the importance of the consultant possessing sufficient experience and practical knowledge to prevent delays.

Quality assurance/control - Ranked as the sixth important factor with an RII of 0.739. This suggests that inadequate quality assurance and control measures by the consultant can contribute to project delays.

The remaining factors, which were ranked lower in importance, were also found to contribute to project delays; these included the consultant's financial struggles, the lack of resident staff, the consultant's insufficient authority to make decisions, and the consultant's inadequate access to site information.

Woito Turmi design and build road project, the factors related to the consultant that can contribute to project delays have been identified through a questionnaire. The findings indicate that several consultant-related factors can potentially impact the progress of the project. These factors include slowness in preparing and approving drawings, conflicts with design engineer changes, lack of coordination and communication with the contractor, delays in test and inspection approvals, lack of experience and practical knowledge, and inadequate quality assurance and control measures. It is crucial for the project stakeholders to address these factors to minimize delays and ensure the smooth progress of the Woito Turmi road project. Effective coordination, clear communication, timely approvals, and sufficient expertise on the part of the consultant will be essential in mitigating the risk of project delays and facilitating successful project completion. It is important to note that while the factors related to the consultant are significant, contractor-related delays can also impact the progress of the project. Therefore, in addition to addressing the consultant-related

factors, it is essential for the project stakeholders to consider and mitigate any potential delays caused by the contractor. By optimizing both the consultant's performance and the contractor's efficiency, the project can minimize delays and ensure smooth progress towards the successful completion of the Woito Turmi road project.

4.4.5 External factors that contribute to project delays

Table 4.10 External factors that contribute to project delays

Factors for Causes of project delay E. External factors that contribute to project delays	ID	RII	Rank importance
Escalation of material prices.	E6	0.877777778	1
Equipment availability and failure	E1	0.855555556	2
Poor labor supply & labor productivity.	E7	0.85	3
Delay in equipment delivery.	E8	0.827777778	4
Lack of safety effective inspection & expediting visits project	E9	0.811111111	5
Major disputes and negotiations	E2	0.794444444	6
Lack of communication between the parties	E3	0.783333333	7
Changes in quality of material.	E10	0.777777778	8
Weather condition	E4	0.766666667	9
Regulatory changes	E5	0.733333333	10
Escalation of material prices.	E6	0.877777778	1

Table 4.10 presents the level of importance of various external factors in causing project delays, as determined through a questionnaire. The factors considered in this category include:

Escalation of material prices - Ranked as the most important external factor with an RII of 0.878. This indicates that increases in material prices can have a significant impact on project timelines. Equipment availability and failure - Ranked as the second most important factor with an RII of 0.856. This suggests that the availability and failure of equipment can contribute to project delays. Poor labor supply and labor productivity - Ranked as the third important factor with an RII of 0.850. This emphasizes the significance of adequate labor supply and productivity in project execution. Delay in equipment delivery - Ranked as the fourth important factor with an RII of 0.828. This highlights the impact of delays in equipment delivery on project progress. Lack of safety effective inspection and expediting visits project - Ranked as the fifth important factor with an RII of 0.811. This points to the importance of safety inspections and expediting visits in

preventing project delays. The remaining factors, such as major disputes and negotiations, lack of communication between parties, changes in the quality of material, weather conditions, and regulatory changes, were also identified as contributors to project delays but ranked lower in importance.These findings provide insights into the perceived importance of external factors in causing project delays, as indicated by the respondents of the questionnaire. Addressing these factors, such as monitoring and managing material prices, ensuring equipment availability and maintenance, optimizing labor supply and productivity, and implementing effective safety measures, will be crucial in minimizing delays and facilitating the successful completion of projects.

Woito Turmi design and build road project, the findings from the questionnaire shed light on the external factors that can potentially contribute to project delays. These factors include the escalation of material prices, equipment availability and failure, poor labor supply and productivity, delay in equipment delivery, and lack of effective safety inspections and expediting visits. It is important for the project stakeholders to be aware of these factors and take appropriate measures to address them in order to minimize delays and ensure smooth progress. This may involve closely monitoring material prices, ensuring timely availability and maintenance of equipment, optimizing labor resources, and implementing robust safety inspection protocols. By effectively managing these external factors, the Woito Turmi road project can mitigate delays and enhance the overall progress and successful completion of the project.

Additionally, the questionnaire also identified other external factors, such as major disputes and negotiations, lack of communication between parties, changes in the quality of material, weather conditions, and regulatory changes, which may contribute to project delays to a lesser extent. While these factors may have a relatively lower impact, it is still crucial for the project stakeholders to proactively address them. Strategies such as open and effective communication channels, proactive risk management, and adapting to changing regulatory requirements can help minimize the potential delays caused by these factors. By considering and managing both the significant and lesser-ranked external factors, the Woito Turmi road project can enhance its resilience against delays and achieve a smooth and timely project execution.

4.5 Effects and consequences of project delays

Table 4.11 External factors that contribute to project delays

Consequences of project delay F. Effects of project delays	ID	RII	Rank importance
Budget overrun	F2	0.922222222	1
Time overrun	F1	0.883333333	2
Delays in projects have reduced or lost profits for the construction company.	F11	0.861111111	3
Missed opportunities for development and growth, including increased tourism, investment, and job creation.	F10	0.855555556	4
Negative impact on the local economy, including delayed improvements in transportation, reduced trade, and hindered economic growth.	F9	0.85	5
Project delays may lead to legal disputes and claims between the construction company and other project participants.	F7	0.833333333	6
Reduced trust and confidence in the project stakeholders.	F6	0.822222222	7
Poor quality completed project	F3	0.766666667	8
Total abandonment	F8	0.755555556	9
Damage to the reputation of the construction company. the project delay has had any reputation damage to the construction company involved	F4	0.738888889	10
Conflicts with in the employees	F5	0.733333333	11

Table 4.11 presents the level of importance of various effects and consequences of project delays, as determined through a questionnaire. These factors provide insights into the potential impacts of project delays on the Woito Turmi design and build road project. Here is a summary of the results:

Budget overrun - Ranked as the most important effect of project delays with an RII of 0.922. This indicates that delays can significantly impact the project's budget, leading to cost overruns.
Time overrun - Ranked as the second most important factor with an RII of 0.883. This highlights the significance of delays in project timelines, which can have adverse effects on overall project scheduling and completion. Delays leading to reduced or lost profits for the construction company - Ranked as the third important consequence with an RII of 0.861. This emphasizes the financial impact of delays, potentially resulting in reduced profitability for the construction company.

Missed opportunities for development and growth, including increased tourism, investment, and job creation - Ranked as the fourth important factor with an RII of 0.856. This points to the potential loss of beneficial opportunities due to project delays. Negative impact on the local

economy, including delayed improvements in transportation, reduced trade, and hindered economic growth - Ranked as the fifth important consequence with an RII of 0.850. This highlights the broader economic repercussions of project delays on the local community.

The remaining factors, such as legal disputes and claims, reduced trust and confidence in project stakeholders, poor quality of the completed project, total abandonment, reputation damage to the construction company, and conflicts within employees, were also identified as potential consequences of project delays, but ranked lower in importance.

These findings underscore the importance of timely project completion in the Woito Turmi road project. Addressing and mitigating these consequences, such as effective project management, maintaining quality standards, proactive risk management, and fostering positive stakeholder relationships, will be crucial to minimize the negative effects of project delays. By prioritizing timely delivery and mitigating these consequences, the project can achieve its objectives, maintain financial stability, and contribute to the local economy and community development.

In the case of Woito Turmi design and build road project, the questionnaire results highlight the potential consequences of project delays. The most significant factor identified is budget overrun, indicating that delays can have a substantial impact on the project's budget, leading to cost overruns. This emphasizes the importance of effective budget management and control to ensure the project remains financially viable. The second important consequence is time overrun, underscoring the significance of delays in project timelines. Time delays can disrupt the overall project schedule, hampering progress and potentially affecting the project's successful completion. It is crucial for the project team to actively monitor and manage the project schedule to minimize delays and maintain timely progress.

Furthermore, the survey indicates that project delays can result in reduced profits for the construction company, missed opportunities for development and growth, and negative impacts on the local economy. These consequences highlight the broader implications of project delays, including financial repercussions, missed chances for economic advancement, and hindered community progress.

To mitigate the effects of project delays, the Woito Turmi road project should prioritize efficient project management, implement effective risk management strategies, and foster strong

relationships with stakeholders. These measures can help minimize budget overruns, adhere to project timelines, and mitigate the negative economic impacts. By addressing these consequential factors, the project can maintain financial stability, leverage development opportunities, and contribute to the growth and well-being of the local community.

Since each study has a distinct ranking for the causes and consequences of delay and the groups, the overall ranking of group causes may not be consistent with other studies. Additionally, none of the studies are comparable to one another because project characteristics are unique and may even be region-specific. As noted by Sambasivan and Soon (2007), "the effects of delays in construction projects can be country-specific." Due to the unique nature of projects, delay features and rankings may vary throughout nations, regions, and even individual projects.. As a result, this study's rating of the causes and categories cannot be compared to those of other research. The following assertion from Ahmed et al. (1999) supported this issue: Construction projects differ in terms of nature's complexity, the setting, the kind of contract, and the parties' communication.

CHAPTER FIVE

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Major Findings

The data provided highlights various factors that can cause project delays and their potential consequences. These factors fall into different categories, including project-related, owner/client-related, contractor-related, consultant-related, and external factors. Some common causes of delays include changes in site conditions, discrepancies in contract documents, financial issues, poor communication, and inadequate planning.

The consequences of project delays can be significant and wide-ranging. They include budget overruns, time overruns, reduced profits for the construction company, missed development opportunities, negative impacts on the local economy, legal disputes, damage to the reputation of the construction company, and conflicts among employees. These consequences can have financial, operational, and reputational implications for all project stakeholders.

To mitigate the risks associated with project delays, it is crucial to address the root causes identified in each category. This involves effective project management, clear communication and coordination, proper planning and scheduling, realistic contract duration, proactive risk analysis and management, and competent and experienced contractors and consultants. Additionally, managing external factors such as material prices, equipment availability, labor supply, and regulatory changes is vital to minimize delays.

By understanding and proactively addressing these factors, project stakeholders can work towards ensuring timely project completion, avoiding budget overruns, and achieving successful project outcomes. Collaborative efforts, effective decision-making, and efficient project management practices are essential in overcoming the challenges posed by project delays and delivering projects successfully.

5.2 Conclusion

Woito Turmi design and build road project has experienced significant delays, with the actual progress falling far below the expected rate. The causes of these delays have been identified through interviews, questionnaires, and discussions with various

stakeholders involved in the project.

Project-related factors such as change orders or modifications to the site conditions, discrepancies between contract documents, and work suspension by the owner or contractor have been identified as major contributors to the delays. These factors highlight the importance of proper planning, clear communication, and effective management of project scope and site conditions.

Owner/client-related factors have also played a significant role in the project delays. Delays in delivering the site due to right-of-way issues, delays in finance and payments, slow decision-making, poor contract management, owner interference or work suspension, poor communication and coordination, unrealistic contract duration, and contract changes during construction have all been identified as important factors affecting project timelines. Addressing these factors will be crucial for minimizing delays and ensuring smooth progress in the project.

The assessment of contractor and consultant-related factors in the Woito Turmi design and build road project has identified several key elements that can contribute to project delays. For contractors, factors such as material shortages, inadequate planning and scheduling, lack of decision-making experience, slow site mobilization, poor site management and supervision, inadequate risk analysis and management, poor managerial skills, and insufficient handling of project progress were recognized as potential causes of delays. On the other hand, consultant-related factors that can impact project timelines include delays in preparing and approving drawings, conflicts with design engineer changes, lack of coordination and communication with the contractor, waiting time for test and inspection approvals, lack of experience and practical knowledge, and inadequate quality assurance and control measures.

External factors in the Woito Turmi design and build road project provides valuable insights for project stakeholders. The identified external factors, such as material price escalation, equipment availability and failure, poor labor supply and productivity, delay in equipment delivery, and lack of effective safety inspections and expediting visits, can significantly contribute to project delays. It is essential for project teams to address these factors through proactive monitoring, effective resource management, and robust safety protocols to minimize delays and ensure

smooth project progress.

The consequences of project delays, including budget overrun, time overrun, reduced profits for the construction company, missed opportunities for development and growth, and negative impacts on the local economy, highlight the importance of timely project completion. To mitigate these consequences, project stakeholders should focus on efficient project management, adherence to quality standards, proactive risk management, and fostering positive stakeholder relationships.

5.3 Recommendations

Based on the information provided regarding the causes of delay in the Woito Turmi design and build road project, here is a brief recommendation:

- Contractors: Prioritize material management, site mobilization, and site supervision.
- Contractors: Optimize labor resources and manage equipment effectively.
- Contractors: Conduct safety inspections and expedite visits for enhanced safety measures.
- Clients: Improve change management and address site conditions promptly.
- Clients: Enhance contract document consistency and strengthen financial management.
- Clients: Streamline right-of-way acquisition and proactively manage stakeholders.
- Consultants: Enhance communication, coordination, and contract management.
- Consultants: Focus on drawing preparation, coordination, and timely approvals for tests and inspections.

By implementing these recommendations, the Woito Turmi road project can minimize the negative effects of project delays, maintain financial stability, and contribute to local economy and community development.

5.4 Suggestions for Future Studies

This study focuses on the recognition and ranking factors that cause delays and their consequences in the construction of the road project Woito Turmi, Therefore, it is suggested to conduct a future study on

i. a comparative study with similar road projects in different regions to identify unique and common delay factors.
ii. Analyze the impact of geographical, cultural, and economic differences on project delays.
iii. Develop predictive models to forecast delays and their consequences.
iv. Explore the psychological and social aspects of project delays on workers and community members.

References

A.A. Aibinu, G. J. (2022). Analysis of the Impact of Project Delay on Construction Project Delivery. *The Australasian Journal of Construction Economics and Building, 2*(2), 14-23.

Abdalla M. Odeh, H. T. (2002). Causes of Construction Delay: Traditional Contracts. *International Journal of Project Management, 20*(1), 67-73.

Aftab Hameed Memon, I. A. (2014, June). Significant Factors Causing Time Overrun in Construction Projects of Peninsular Malaysia. *Modern Applied Science, 8*(4).

al, G. e. (2023). The impact of public infrastructure project delays on sustainable community development.Shahid Hussain, Mohsin Shahzad, Andrea Appolloni & Wang Xuetong. 30.

al, S. e. (2012). A comparative study of delay factors in Libyan and UK Construction Industry. *Journal of Engineering, Construction and Architectural Management, 19*(6), 688-712.

al, S. e. (2022, March). Causes of Delay in Construction Projects. *Causes of Delay in Construction Projects A Systematic Review, 11*(03), 72.

al., F. e. (1998). Clients' concerns have shifted from just quick turnaround times and low costs to a broader focus on time and cost certainty.

Albatsh), J. N. (2015). Assessment of Delay Causes of Construction Projects in Palestine. *Master's Thesis*.

Al-Ghafly, M. A. (1995, June). delays in the construction of public utility projects in Saudi Arabia. 50-64.

Al-Momani, A. H. (2000). Construction delay: a quantitative analysis. *International Journal of Project Management*, 51-59.

Aniekwu, D. C. (2010). Causes of High Costs of Construction in Nigeria. *Journal of Construction Engineering and Management, 114*(2), 233-244.

Ashwini Arun Salunkhe, R. S. (2014, January). Effect of Construction Delays on Project Time Overrun: Indian Scenario. *International Journal of Research in Engineering and Technology, 03*(01).

Ashwini Arun Salunkhe, R. S. (2014). Identification of Critical Construction Delay Factors.

Augustine Uche Elinwa, M. J. (2001). Time-Overrun Factors in Nigerian Construction Industry. *Journal of Construction Engineering and Management, 127*(5), 419.

Barrett, D. C. (2019). Understanding Project Management: A Practical Guide. In D. C. Barrett, *Understanding Project Management: A Practical Guide* (Second Edition ed., p. 276). Canadian Scholars' Press.

Chai, C. a. (2015, November). Conceptualizing Building Information Modeling in Construction Conflict Management. *Proceedings of the 26th International Business Information Management Association Conference*, 1337-1358.

Chidambaram Ramanathan, S. N. (n.d.). Construction Delays Causing Risks on Time and Cost - A Critical Review.

Christopher S. Tang, K. Z. (2015). Incentive Contracts for Managing a Project with Uncertain Completion Time.

Construction Industry Board. (1996). *Cost certainty and time certainty are more likely to be within the control of contractors*.

D.W.M. Chan, M. K. (2010). A comparative study of causes of time overruns in Hong Kong construction projects. *International Journal of Project Management, 15*(1), 55-63.

Davenport. (1997). *High certainty in cost and time is known to be one of the top priorities for construction clients*.

Denise F. Polit, B. P. (n.d.). Essentials of Nursing Research: Methods and Applications. 414.

El-Rasas, M. M. (2014). Analyzing delay causes in Egyptian constructionprojects. *Journal of Advanced Research* , 55.

El-Sayegh, A. S. (2006). Significant Factors Causing Delay in the UAE Construction Industry. *Construction Management and Economics, 24*(11), 1167-1176.

ERA. (2024). *Woito-Turmi Design and Build road project report.* Engineers. Jinka District: ERA.

Ethiopian Road Adminstration. (2008). *Ethiopia - Road Sector Development Program Support Project.* Addis Ababa: World Development Sources, WDS 1998-1 Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/592861468771065185/Ethiopia-Road-Sector-Development-Program-Support-Project.

Ethiopian Road Adminstration. (2008). *Ethiopia - Road Sector Development Program Support Project (English).* Addis Ababa: World Development Sources, WDS 1998-1 Washington, D.C. : World Bank Group.

Ethiopian Road Adminstration Manual. (2016). Road development and its impacts in Ethiopia. In B. Dagnew, *ERA Manual* (p. 50). Addis Ababa: ERA.

G.S.A. Elawi, M. A. (2016, May). Owners' Perspective of Factors Contributing to Project Delay: Case Studies of Road and Bridge Projects in Saudi Arabia. *Procedia Engineering, 145*, 1402-1409.

Getachew Kebede Warati, T. A. (2015, June). Assessment of the Effect of Urban Road Surface Drainage: A Case Study at Ginjo Guduru Kebele of Jimma Town. *International Journal of Science, Technology and Society, 3*(4), 164-173.

Hamzah Abdul-Rahman, R. T. (2013). Financial-related causes contributing to project delays. *Journal of Retail & Leisure Property, 8*, 225-238.

Harisaweni. (2017). The Framework for Minimizing Construction Time and Cost Overruns in Padang and Pekanbaru, Indonesia. In Harisaweni, *The Framework for Minimizing Construction Time and Cost Overruns in Padang and Pekanbaru, Indonesia.*

Heerkens, G. R. (2003). Project Management. In G. R. Heerkens, *Project Management* (p. 266). New York: McGraw Hill Professional.

Hosseini, S. D. (2018, December). Causes of Delays on Construction Projects: A Comprehensive List. *International Journal of Managing Projects in Business*, 178.

(n.d.). 5th version of PMBOK. In P. M. Institute, *Project Management Body of Knowledge* (p. 589). Project Management Institute.

Jack R. Meredith, S. J. (2019). Project Management: A Strategic Managerial Approach. In S. J. Jack R. Meredith, *Project Management: A Strategic Managerial Approach* (10th edition ed., p. 544). Wiley.

Jyh-Bin Yang, M.-Y. C.-M. (2013, April 30). An Empirical Study of Schedule Delay Causes Based on Taiwan's Litigation Cases. *Project Management Journal*, 21-31.

Jyh-Bin Yang, P.-R. W. (2020). Causes of Delay in the Planning and Design Phases for Construction Projects. *Journal of Architectural Engineering, 16*(2), 80-83.

Kerzner, H. (2019). Project Management: A Systems Approach to Planning, Scheduling, and Controlling. In H. Kerzner, *Project Management: A Systems Approach to Planning, Scheduling, and Controlling* (13th ed., p. 848). John Wiley & Sons Inc.

Khalid Khair, H. F. (2016). Causes and Effects of Delay Factors in Road Construction Projects in Sudan. *International Journal of Applied Engineering, 11*, 9526-9533 .

L. Muhwezi, J. A. (2014). An Assessment of the Factors Causing Delays on Building Construction Projects in Uganda. *International Journal of Construction Engineering and Management, 3*(3), 13-23.

M. S. Cülfik, Ö. S. (2019, October). Causes of Delays in Construction Projects in Turkey.

Mohamed M. Marzouk, T. I.-R. (2018, January). Analyzing delay causes in Egyptian construction projects. *Cairo University Journal of Advanced Research*.

Mohd Ashraf Mohd Fateh, T. H. (2021). Revisiting the Financial Issues Impact to Construction Projects in Malaysia. *Malaysian Journal Of Civil Engineering*.

Motaleb, O. H. (2014, August 5). Development of a risk response model to handle delays of construction projects in the United Arab Emirates.

Muhammad Muhammad Tahir, N. A. (2018). Causes of Delay and Cost Overrun in Malaysian Construction Industry. *Lecture Notes in Civil Engineering, 9*, 47-57.

N.J. Mansfield, O. U. (2015). Causes and Effects of Delays and Disruptions in Construction Projects in Tanzania. *International Journal of Project Management, 12*(4), 254-260.

Nyasetia, N. F. (2016). Institutional factors influencing timely completion of road projects in rwanda case of government externally financed projects. *European Journal of Business and Social Sciences, 5*(1), 146-159.

Okpala, A. A. (1988). The Effect of Systemic Factors in Contract Services in Nigeria. *Construction Management and Economics, 6*, 171-182.

P. A. Koushki, K. A.-R. (2020). Delays and Cost Increases in the Construction of Private Residential Projects in Kuwait. *Global Civil Engineering Conference (GCEC 2017)*.

Prasad Kudrekodlu Venkatesh, V. V. (2017). Causes of Delays in Construction Projects: A Review of Causes, Need and Scope for Further Research. *Malaysian Construction Research Journal, 23*(3).

Proverbs, R. S. (2021, May). Modelling the satisfaction of contractors: The impact of client performance. *Time and cost certainty are among the most important contractor performance criteria for client satisfaction*.

S.M. Ahmed, R. K. (1995). Analysis of Client-Satisfaction Factors in Construction Industry. *Journal of Management in Engineering, 11*(2), 36-42.

Sambasivan, M. &. (2007, May). causes and effects of delays in the Malaysian construction industry. *International Journal of Project Management, 25*(5), 517-526.

Shambel Gebrehiwot Tadewos, D. P. (2018, January). Factors influencing Time and Cost Overruns in Road Construction Projects: Addis Ababa, Ethiopian Scenario: Review paper. *International Research Journal of Engineering and Technology (IRJET), 05*(01).

Skitmore, A.-K. a. (2009). Causes of delays in Saudi Arabian public sector construction projects. *Construction Management and Economics, 27*(1), 3-23.

Sweis, G. S. (2018, February). Factors Affecting Contractor Performance on Public Construction Projects. *Causes and Effects of Project Delay in Public Construction Projects*, 28-39.

Tsegay Gebrehiwet, H. L. (2017). Analysis of Delay Impact on Construction Project Based on RII and Correlation Coefficient: Empirical Study. *Procedia Engineering, 196*, 366-374.

Tsegaye, G. (2009, July). Design Risk Management in Ethiopian Federal Road Projects.

Vasilyeva-Lyulina, A. (2015, April 30). Delay Analysis Methods for Construction Projects: Mathematical Modelling. *International Journal of Transportation, 3*, 27-36.

Werku Koshe, K. N. (2016, December 1). Investigating Causes of Construction Delay in Ethiopian Construction Industries. *Journal of Civil, Construction and Environmental Engineering, 1*(1), 18-29.

Wysocki, R. K. (2014). Effective Project Management: Traditional, Agile, Extreme. In R. K. Wysocki, *Effective Project Management: Traditional, Agile, Extreme.* (p. 504). John Wiley & Sons, 2003.

Wysocki, R. K. (2021). Effective Project Management: Traditional, Agile, Extreme, Hybrid. In R. K. Wysocki, *Effective Project Management: Traditional, Agile, Extreme, Hybrid* (p. 656). John Wiley & Sons Inc.

Y., S. (2014). Analysis of Factors Contributing to Time Overruns on Road Construction Projects.

Yakubu Adisa Olawale, M. S. (n.d.). Cost and Time Control of Construction Projects: Inhibiting Factors and Mitigating Measures in Practice. *Construction Management and Economics, 28*(5), 509-526.

Zorica M. Torbica, R. C. (2001, July). Customer Satisfaction in Construction. *Journal of Construction Engineering and Management, 127*(4), 278-285.

Annex 1. Questionnaire

QUESTIONNAIRE

Dear Sir/ Madam

This is a questionnaire designed for a research purpose at **Addis Ababa University, College of Business and Economics, School of Commerce** in Partial Fulfilment of the Requirements for the Master of Business Administration in Project Management. The objective of this questionnaire is to obtain information in order to conduct a thesis entitled "***CAUSES & CONSEQUENCES OF ROAD PROJECT DELAY: (CASE STUDY OF WOITE-TURMI DESIGN AND BUILD ROAD PROJECT)".*** The data collected and the information to be answered in this questionnaire will be used for academic research purpose only. All information will be kept confidential at all times. Only a generalized analysis of the information contained within this completed questionnaire will be utilized in the research process.

Instruction

Please answer, rate or thick (✓) the questionnaire by choosing the appropriate choices. The questionnaire and data collection contain sections. section one contains the respondent's general information, section 2 and 3 deals with Causes & Consequences of Road Project Delay. I realize that there are numerous demands on your time. However, your involvement is a vital requisite for this.

Therefore, I kindly request your valuable cooperation to timely respond the provided information given in the questionnaire survey, and return back the questionnaire paper as soon as possible. Thank you in advance for your cooperation and honesty in providing me your valuable response. If you have any queries or seek clarifications, please contact me by a Phone or Email.

Sincerely yours
Daniel Serbessa
Graduate Student
Addis Ababa University
Phone : **0912122520**
Email: ***meet.dani18@gmail.com***

Section 1: General profile of the respondent

1.1 Gender:

a) Male

b) Female

c) Prefer not to say

1.2 Age:

a) 18-25

b) 26-35

c) 36-45

d) 46-55

e) 56 and above

1.3 Educational Background:

a) High School

b) Diploma

c) Bachelor's Degree

d) Master's Degree

e) Ph.D. or higher

1.4 Occupation:

a) Construction industry professional

b) Engineer

c) Project manager

d) Government official

e) Academic researcher

f) Other (please specify): _____

1.5 Years of Experience in the Construction Industry (if applicable):

a) Less than 1 year

b) 1-5 years

c) 6-10 years

d) 11-15 years

e) More than 15 years

Section 2: Ranking Causes of Delay

During the period of construction, which factors you think contribute to delay in the project? Please indicate the significance of each cause by ticking the appropriate boxes.

Rating Scale

Strongly agree (SA.)= (1) Agree (A.)= (2) Neutral (N.)=(3) Disagree (D.)= (4) Strongly disagree (SD.)= (5)

No	Factor	SA. (1)	A. (2)	N. (3)	D. (4)	SD. (5)
A.	**Project Related**					
1	Discrepancies between contract documents					
2	Suspension of work by owner or contractor					
3	Change order/Changes in site conditions.					
4	Insufficient data collections & survey.					
5	Changes in site topography after design.					
6	Accidents on site.					
7	Unavailability of utilities in site area.					
8	Rework due to error in construction					

B.	Owner Related/ Client Related	SA. (1)	A. (2)	N. (3)	D. (4)	SD. (5)
1	Delay to deliver the site (Right of way problem)					

2	Poor communication and coordination					
3	Delays in Finance and payments of completed work					
4	Owner interference/ Suspension of work due to owner.					
5	Slow decision-making by owners/Client					
6	Unrealistic imposed contract duration					
7	Contract changes by owner during construction					
8	Poor contract management					

C	Contractor Related	SA. (1)	A. (2)	N. (3)	D. (4)	SD. (5)
1	Contractor's inadequate planning & scheduling.					
2	Lack of experience of contractor in decision-making.					
3	Contractor's slowness in site mobilization.					
4	Contractor's slowness in preparation of documents					
5	Contractor's poor site management & supervision.					
6	Mistakes during construction and Reworking of construction faced by contractor.					
7	Poor managerial skills of contractor.					
8	Inadequate handling of project progress by					
9	Shortage in material					
10	Lack of risk analysis & management by contractor.					
11	Communication barriers faced by consultant.					

12	Contractor incompatibility with new technology?					

D.	**Consultant Related**	SA. (1	A. (2)	N. (3)	D. (4)	SD. (5)
1	Inadequate authority given to consultant to take					
2	Lack of consultant's resident staff (Engineers,					
3	Lack of experience and practical (working) knowledge on the part of					
4	Slowness in preparing and approving drawing by the					
5	Financial difficulties affecting the consultant.					
6	Quality assurance/control					
7	Waiting time for approval of tests and inspections					
8	Lack of co-ordination and proper communication					
9	Conflicts of consultant with design engineer changes in specification					
1000	Inadequate site information given to					
E	**External factors**					
1	Equipment availability and failure					
2	Major disputes and negotiations					
3	Lack of communication between the parties					
4	Weather condition					
5	Regulatory changes					
6	Escalation of material					
7	Poor labor supply & labor productivity.					
8	Delay in equipment delivery					

9	Lack of safety effective inspection & expediting visits project					
10	Changes in quality of material					

Section 3: Ranking Consequences of Delay

F	Effects/Consequences of project delays	SA. (1)	A. (2)	N. (3)	D. (4)	SD. (5)
1	Time overrun					
2	Budget overrun					
3	Poor quality completed project					
4	Damage to the reputation of the construction company. the project delay has had any reputation damage to the construction company involved					
5	Conflicts within the employees					
6	Reduced trust and confidence in the project stakeholders.					
7	Project delays may lead to legal disputes and claims between the construction company and other project					
8	Total abandonment					
9	Negative impact on the local economy, including delayed improvements in transportation, reduced trade, and hindered economic growth.					
10	Missed opportunities for development and growth, including increased tourism, investment, and job creation.					
11	Delays in projects have reduced or lost profits for the construction company.					

Thank you for taking the time to complete this questionnaire. Your input is highly valuable and will contribute to a better understanding of road project delay

Annex 2. Overall ranking of delay causes and consequences using RII

Factors for Causes of project delay	ID	RII = Total /N*5	Rank importance
A. Project Related			
Change order/Changes in site conditions.	A3	0.822222222	1
Discrepancies between contract documents	A1	0.811111111	2
Suspension of work by owner or contractor	A2	0.8	3
Insufficient data collections & survey.	A4	0.8	4
Unavailability of utilities in site area.	A7	0.788888889	5
Rework due to error in construction	A8	0.777777778	6
Changes in site topography after design	A5	0.761111111	7
Accidents on site.	A6	0.627777778	8
B. Owner Related/ Client Related			
Delay to deliver the site (Right of way problem)	B1	0.888888889	1
Delays in Finance and payments of completed work	B3	0.872222222	2
Slow decision-making by owners/Client	B5	0.844444444	3
Poor contract management	B8	0.833333333	4
Owner interference/ Suspension of work due to owner.	B4	0.794444444	5
Poor communication and coordination	B2	0.788888889	6
Unrealistic imposed contract duration	B6	0.783333333	7
Contract changes by owner during construction	B7	0.761111111	8
C. Contractor			
Shortage in material	C9	1.016666667	1
Contractor‟s inadequate planning & scheduling.	C1	0.888888889	2
Lack of experience of contractor in decision-making.	C2	0.861111111	3
Contractor‟s slowness in site mobilization.	C3	0.855555556	4
Contractor‟s poor site management & supervision.	C5	0.838888889	5
Lack of risk analysis & management by contractor.	C10	0.833333333	6
Poor managerial skills of contractor.	C7	0.827777778	7
Inadequate handling of project progress by contractor.	C8	0.827777778	8
Communication barriers faced by consultant.	C11	0.811111111	9
Contractor incompatibility with new technology	C12	0.783333333	10
Contractor‟s slowness in preparation of documents	C4	0.783333333	11

Mistakes during construction and Reworking of construction faced by contractor.	C6	0.761111111	12
D. Consultant			
Slowness in preparing and approving drawing by the consultant.	D4	0.833333333	1
Conflicts of consultant with design engineer changes in specification during construction by consultant.	D9	0.805555556	2
Lack of co-ordination and proper communication between consultant with contractor.	D8	0.794444444	3
Waiting time for approval of tests and inspections	D7	0.783333333	4
Lack of experience and practical (working) knowledge on the part of the Consultant	D3	0.783333333	5
Quality assurance/control	D6	0.738888889	6
Financial difficulties affecting the consultant.	D5	0.733333333	7
Inadequate authority given to consultant to take decision.	D1	0.727777778	8
Inadequate site information given to consultant.	D10	0.711111111	9
Lack of consultant's resident staff (Engineers, Conservators, etc.)	D2	0.677777778	10
E. External factors			
Escalation of material prices.	E6	0.877777778	1
Equipment availability and failure	E1	0.855555556	2
Poor labor supply & labor productivity.	E7	0.85	3
Delay in equipment delivery.	E8	0.827777778	4
Lack of safety effective inspection & expediting visits project	E9	0.811111111	5
Major disputes and negotiations	E2	0.794444444	6
Lack of communication between the parties	E3	0.783333333	7
Changes in quality of material.	E10	0.777777778	8
Weather condition	E4	0.766666667	9
Regulatory changes	E5	0.733333333	10
F. Effects of project delays			
Budget overrun	F2	0.922222222	1
Time overrun	F1	0.883333333	2
Delays in projects have reduced or lost profits for the construction company.	F11	0.861111111	3
Missed opportunities for development and growth, including increased tourism, investment, and job creation.	F10	0.855555556	4

Negative impact on the local economy, including delayed improvements in transportation, reduced trade, and hindered economic growth.	F9	0.85	5
Project delays may lead to legal disputes and claims between the construction company and other project participants.	F7	0.833333333	6
Reduced trust and confidence in the project stakeholders.	F6	0.822222222	7
Poor quality completed project	F3	0.766666667	8
Total abandonment	F8	0.755555556	9
Damage to the reputation of the construction company. the project delay has had any reputation damage to the construction company involved	F4	0.738888889	10
Conflicts with in the employees	F5	0.733333333	11

Calculation of RII using Excel

Factors A. Project Related	ID	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total	Total NO. of participant [N]	N * 5	RII = Total /N*5	Rank importance
Discrepancies between contract documents	A1	60	56	30	0	0	146	36	180	0.81111111	2
Suspension of work by owner or contractor	A2	70	40	30	4	0	144	36	180	0.8	3
Change order/Changes in site conditions.	A3	60	64	24	0	0	148	36	180	0.82222222	1
Insufficient data collections & survey.	A4	55	64	21	4	0	144	36	180	0.8	4
Changes in site topography after design	A5	30	84	15	8	0	137	36	180	0.76111111	7
Accidents on site.	A6	10	40	45	18	0	113	36	180	0.62777778	8
Unavailability of utilities in site area.	A7	35	88	15	4	0	142	36	180	0.78888889	5
Rework due to error in construction	A8	35	80	21	4	0	140	36	180	0.77777778	6

B. Owner Related/ Client Related											
Delay to deliver the site (Right of way problem)	B1	105	44	9	2	0	160	36	180	0.888888889	1
Poor communication and coordination	B2	35	92	9	6	0	142	36	180	0.788888889	6
Delays in Finance and payments of completed work	B3	100	40	15	2	0	157	36	180	0.872222222	2
Owner interference/ Suspension of work due to owner.	B4	45	80	12	6	0	143	36	180	0.794444444	5
Slow decision-making by owners/Client	B5	80	52	18	2	0	152	36	180	0.844444444	3
Unrealistic imposed contract duration	B6	50	60	27	4	0	141	36	180	0.783333333	7
Contract changes by owner during construction	B7	50	72	6	6	3	137	36	180	0.761111111	8
Poor contract management	B8	60	80	6	4	0	150	36	180	0.833333333	4
C. Contractor											
Contractor's inadequate planning & scheduling.	C1	105	48	3	4	0	160	36	180	0.888888889	2
Lack of experience of contractor in decision-making.	C2	100	48	3	2	2	155	36	180	0.861111111	3
Contractor's slowness in site mobilization.	C3	95	40	15	4	0	154	36	180	0.855555556	4
Contractor's slowness in preparation of documents	C4	40	72	27	2	0	141	36	180	0.783333333	11
Contractor's poor site management & supervision.	C5	65	80	0	6	0	151	36	180	0.838888889	5
Mistakes during construction and Reworking of construction faced by contractor.	C6	55	48	24	10	0	137	36	180	0.761111111	12
Poor managerial skills of contractor.	C7	70	64	9	6	0	149	36	180	0.827777778	7

Inadequate handling of project progress by contractor.	C8	50	88	9	2	0	149	36	180	0.827777778	8
Shortage in material	C9	145	36	0	2	0	183	36	180	1.016666667	1
Lack of risk analysis & management by contractor.	C10	60	72	18	0	0	150	36	180	0.833333333	6
Communication barriers faced by consultant.	C11	70	48	24	4	0	146	36	180	0.811111111	9
Contractor incompatibility with new technology	C12	55	48	36	2	0	141	36	180	0.783333333	10
D. Consultant											
Inadequate authority given to consultant to take decision.	D1	30	80	15	2	4	131	36	180	0.727777778	8
Lack of consultant's resident staff (Engineers, Conservators, etc.)	D2	20	56	30	16	0	122	36	180	0.677777778	10
Lack of experience and practical (working) knowledge on the part of the Consultant	D3	60	52	21	8	0	141	36	180	0.783333333	5
Slowness in preparing and approving drawing by the consultant.	D4	80	48	18	4	0	150	36	180	0.833333333	1
Financial difficulties affecting the consultant.	D5	20	88	12	12	0	132	36	180	0.733333333	7
Quality assurance/control	D6	30	68	27	8	0	133	36	180	0.738888889	6
Waiting time for approval of tests and inspections	D7	45	72	18	6	0	141	36	180	0.783333333	4
Lack of co-ordination and proper communication between consultant with contractor.	D8	45	80	12	6	0	143	36	180	0.794444444	3
Conflicts of consultant with design engineer changes in specification during construction by consultant.	D9	65	48	30	2	0	145	36	180	0.805555556	2
Inadequate site	D	25	68	21	14	0	1	36	1	0.711	9

information given to consultant.	10						28		80	111111	
E. External factors											
Equipment availability and failure	E1	60	88	6	0	0	154	36	180	0.8555555	2
Major disputes and negotiations	E2	20	108	15	0	0	143	36	180	0.7944444	6
Lack of communication between the parties	E3	60	40	39	2	0	141	36	180	0.7833333	7
Weather condition	E4	30	76	30	2	0	138	36	180	0.7666667	9
Regulatory changes	E5	15	84	27	6	0	132	36	180	0.7333333	10
Escalation of material prices.	E6	95	48	15	0	0	158	36	180	0.8777778	1
Poor labor supply & labor productivity.	E7	75	68	6	4	0	153	36	180	0.85	3
Delay in equipment delivery.	E8	60	68	21	0	0	149	36	180	0.8277778	4
Lack of safety effective inspection & expediting visits project	E9	45	92	3	6	0	146	36	180	0.8111111	5
Changes in quality of material.	E10	55	60	15	10	0	140	36	180	0.7777778	8
F. Effects of project delays											
Time overrun	F1	85	68	6	0	0	159	36	180	0.8833333	2
Budget overrun	F2	110	56	0	0	0	166	36	180	0.9222222	1
Poor quality completed project	F3	50	56	24	8	0	138	36	180	0.7666667	8
Damage to the reputation of the construction company. the project delay has had any reputation damage to the	F4	40	52	33	8	0	133	36	180	0.7388889	10

construction company involved											
Conflicts with in the employees	F5	40	68	18	2	4	132	36	180	0.733333333	11
Reduced trust and confidence in the project stakeholders.	F6	40	96	12	0	0	148	36	180	0.822222222	7
Project delays may lead to legal disputes and claims between the construction company and other project participants.	F7	45	96	9	0	0	150	36	180	0.833333333	6
Total abandonment	F8	60	48	24	0	4	136	36	180	0.755555556	9
Negative impact on the local economy, including delayed improvements in transportation, reduced trade, and hindered economic growth.	F9	60	84	9	0	0	153	36	180	0.85	5
Missed opportunities for development and growth, including increased tourism, investment, and job creation.	F10	70	72	12	0	0	154	36	180	0.855555556	4
Delays in projects have reduced or lost profits for the construction company.	F11	60	92	3	0	0	155	36	180	0.861111111	3