

**T.C.  
IŞIK UNIVERSITY  
SCHOOL OF GRADUATE STUDIES**

**MASTER THESIS  
DEPARTMENT OF CIVIL ENGINEERING  
CIVIL ENGINEERING PROGRAM**

**Abdelrahman HASSAN**

**ADDRESSING DELAYS IN CONSTRUCTION PROJECTS IN  
SOMALIA: MITIGATION OF CONTRIBUTING  
FACTORS**

**SUPERVISOR  
Asst.Prof. Bora AKŞAR**

**İSTANBUL, August 2024**

**T.C.  
IŞIK UNIVERSITY  
SCHOOL OF GRADUATE STUDIES**

**MASTER THESIS  
DEPARTMENT OF CIVIL ENGINEERING  
CIVIL ENGINEERING PROGRAM**

**Abdelrahman HASSAN  
(21CIVL5008)**

**ADDRESSING DELAYS IN CONSTRUCTION PROJECTS IN  
SOMALIA: MITIGATION OF CONTRIBUTING  
FACTORS**

**SUPERVISOR  
Asst.Prof. Bora AKŞAR**

**İSTANBUL, August 2024**

**T.C.  
IŞIK UNIVERSITY  
SCHOOL OF GRADUATE STUDIES**

**MASTER THESIS  
DEPARTMENT OF CIVIL ENGINEERING  
CIVIL ENGINEERING PROGRAM**

**Abdelrahman HASSAN  
(21CIVL5008)**

**ADDRESSING DELAYS IN CONSTRUCTION PROJECTS IN  
SOMALIA: MITIGATION OF CONTRIBUTING  
FACTORS**

Date: 07.08.2024

Thesis Supervisor:

Asst. Prof. Bora AKŞAR / Işık University

Jury Members:

Asst. Prof. Önder UMUT / Işık University

Asst. Prof. Ercan Şerif KAYA / Alanya Alaaddin Keykubat University

**İSTANBUL, August 2024**

## ÖZET

### **SOMALİ'DEKİ İNŞAAT PROJELERİNDE GECİKMELERİN ELE ALINMASI: KATKIDA BULUNAN FAKTÖRLERİN AZALTILMASI.**

Gecikmeler, inşaat projelerinde yaygın bir sorundur ve işin planlanan veya sözleşmeli programa göre geç tamamlanması ile karakterizedir. Gecikmelerin nedenlerini belirlemek, onları en aza indirmek için çok önemlidir. Bu çalışma, Somali'deki inşaat projelerinde gecikmelere neden olan faktörleri, gecikmelerin etkilerini ve azaltma stratejilerini belirlemeyi amaçladı. Veriler, Somali'deki A sınıfı müteahhitlik firmalarından 50 katılımcıyı içeren bir anketle toplandı.

Anket, gecikmelere katkıda bulunan 32 faktör, gecikmelerin 37 etkisi ve 27 azaltma stratejisi belirledi. Verilerin analizi, betimleyici istatistiksel yöntemlerle Sosyal Bilimler İçin İstatistik Paket (SPSS) yazılımı kullanılarak yapıldı. Çalışma, Somali'deki inşaat projelerinde gecikmelere danışman faktörleri, malzeme faktörleri, müşteri faktörleri, ekipman faktörleri, iş gücü faktörleri ve müteahhit faktörlerinin neden olduğunu buldu. Bu gecikmelerin etkileri arasında maliyet aşırımları, yasal ihtilaflar, zaman aşırımları, kaybedilen kar ve projenin terk edilmesi yer almaktadır.

Çoğu katılımcı, kaynak mevcudiyetini sağlama, yetkin personel bulundurma, yetkin bir proje yöneticisi atama ve doğru başlangıç maliyeti ve zaman tahminleri yapma gibi önemli azaltma stratejileri üzerinde hemfikirdi. Çalışma, gecikmeleri azaltmanın en iyi yolunun bu faktörleri proaktif olarak ele almak olduğunu sonucuna varmıştır. Yetkin bir proje yöneticisi istihdam etmek ve doğru maliyet ve zaman tahminleri yapmak gibi stratejilerin uygulanması, inşaat projelerindeki gecikmeleri önemli ölçüde azaltabilir.

## **ABSTRACT**

### **ADDRESSING DELAYS IN CONSTRUCTION PROJECTS IN SOMALIA: MITIGATION OF CONTRIBUTING FACTORS.**

Delays are a common issue in construction projects, characterized by the late completion of work compared to the planned or contract schedule. Identifying the causes of delays is crucial for minimizing them. This study aimed to identify the factors causing delays, the effects of delays, and the mitigation strategies for construction projects in Somalia. Data were collected through a questionnaire survey involving 50 respondents from Grade (A) contractor companies in Somalia.

The survey identified 32 factors contributing to delays, 37 effects of delays, and 27 mitigation strategies. Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS) software with descriptive statistical methods. The study found that delays in construction projects in Somalia were caused by consultant factors, material factors, client factors, equipment factors, labor factors, and contractor factors. The effects of these delays included cost overruns, legal disputes, time overruns, lost profit, and project abandonment.

Most respondents agreed on several significant mitigation strategies: ensuring resource availability, having competent personnel, appointing a competent project manager, and making accurate initial cost and time estimates. The study concludes that the best way to mitigate delays is to proactively address these factors. Implementing strategies such as employing a competent project manager and making accurate cost and time estimates can significantly reduce delays in construction projects.

## **ACKNOWLEDGEMENT**

I would like to express my deepest gratitude to my major professor and dissertation supervisor, Dr. Bora Aksar, whose guidance, support, and expertise were invaluable throughout this research. His encouragement and insightful feedback have been fundamental to the completion of this work.

I am also deeply thankful to my previous academic advisor, Dr. Ali Sercan Kesten, for his significant contributions during the early stages of this research.

Special thanks to my friend, Eng. Ahmed Moalim, for his invaluable help and unwavering support throughout this journey. His technical assistance and moral support have been instrumental in overcoming many challenges.

Finally, I am profoundly grateful to my parents, Ahmed, Halima, and my sister, Sahra, for their unwavering support, patience, and encouragement. Their belief in me has been a constant source of strength and motivation.

Abdelrahman HASSAN

## TABLE OF CONTENTS

	<u>PAGE NO</u>
APPROVAL PAGE.....	i
ÖZET.....	ii
ABSTRACT .....	iii
ACKNOWLEDGEMENT.....	iv
TABLE OF CONTENTS.....	v
LIST OF FIGURES .....	ix
LIST OF TABLES .....	x
CHAPTER 1 .....	1
1.INTRODUCTION.....	1
1.1 BACKGROUND OF STUDY .....	1
1.2PROBLEM STATEMENT .....	3
1.3 RESEARCH QUESTIONS .....	4
1.4 AIM & OBJECTIVE .....	4
1.5 SCOPE OF RESEARCH.....	4
1.6 SIGNIFICANCE OF RESEARCH .....	5
CHAPTER 2 .....	6
2.LITERATURE REVIEW.....	6
2.1 INTRODUCTION.....	6
2.2 CONCEPT OF RESEARCH TITLE .....	6
2.1.1 Delay.....	6
2.2.2 Construction Projects Delays .....	7
2.3 FACTORS THAT CAUSE DELAY OF CONSTRUCTION PROJECT .....	7
2.3.1 Consultant-Related Factors Causing Project .....	10
2.3.2 Material-Related Factors Causing Delay In Projects .....	11
2.3.3 Client-Related Factors Causing Delays In Projects.....	11
2.3.4 Factors Related To Equipment That Lead To Project Delays..	12

2.3.5 Labor-Related Factors Causing Delays In Construction Projects.....	12
2.3.6 Environmental Factors That Cause Project Delays In General.....	12
2.3.7 Factors Related To Contractors That Lead To Project Delays.	13
2.3.8 Contractor’s Responsibility.....	14
2.3.9 Consultant’s Responsibility.....	14
2.3.10 Owner’s Responsibility.....	14
2.3.11 External Factors.....	15
2.3.12 List Of Factors Causing Delays In Construction Projects .....	15
2.3.13 Summary of some Factors Causes Delay of Construction Projects.....	16
2.4 IMPACTS OF CONSTRUCTION PROJECT DELAYS .....	18
2.4.1 Overview of Delay Effects on Projects .....	20
2.5 MITIGATION DELAY OF CONSTRUCTION PROJECTS.....	21
2.5.1 Summary Methods of minimizing delays in projects .....	22
2.6 CONCEPTUAL FRAMEWORK.....	22
2.7 SUMMARY .....	24
CHAPTER 3 .....	25
3.RESEARCH METHODOLOGY .....	25
3.1 INTRODUCTION.....	25
3.2 RESEARCH DESIGN .....	25
3.3 LOCATION OF STUDY.....	26
3.4 SAMPLING PROCEDURE.....	28
3.5 POPULATION SIZE .....	28
3.6 SAMPLING SIZE .....	28
3.7 QUANTITATIVE RESEARCH.....	29
3.8 PRIMARY DATA .....	30
3.9 SECONDARY DATA .....	30
3.10 METHOD OF DATA COLLECTION .....	30
3.10.1 Distribution Of Questionnaire Form.....	31
3.11 METHOD OF DATA ANALYSIS .....	32

3.12 QUESTIONNAIRE DESIGN .....	32
3.13 LIKERT'S SCALE .....	33
3.14 PILOT OF STUDY .....	34
<b>CHAPTER 4 .....</b>	<b>36</b>
<b>4.DATA ANALYSIS AND DISCUSSION .....</b>	<b>36</b>
4.1 INTRODUCTION.....	36
4.2 RESULT OF PILOT TEST .....	36
4.3 QUESTIONNAIRE RESPONSES RATE .....	37
4.4 RELIAJBILITY TEST.....	38
4.5 RESULT AND DISCUSSION.....	39
4.5.1 Respondents Background.....	40
4.5.1.1 Organization Type .....	40
4.5.1.2 Academic Qualification .....	41
4.5.1.3 Work Experience In The Construction.....	42
4.5.1.4 Position In The Organization.....	43
4.5.1.5 The Type Of Building Projects You Get Involved .....	44
4.6. OBJECTIVE 1: EXAMINATION OF THE FACTORS LEADING TO CONSTRUCTION PROJECT DELAYS IN SOMALIA .....	45
4.6.1 Consultant-Related Factors Cause Delay Projects In Somalia.	47
4.6.2 Material-Related Factors Cause Delay Projects .....	48
4.6.3 Client-Related Factors Cause Delay Projects.....	49
4.6.4 Equipment-Related Factors Cause Delay Projects .....	50
4.6.5 Labor-Related Factors Cause Delay Projects.....	51
4.6.6 Contractor-Related Factors Cause Delay Projects .....	52
4.7 OBJECTIVE 2: ANALYSIS OF EFFECTS OF CONSTRUCTION PROJECT DELAYS IN SOMALI .....	53
4.7.1 Cost overrun .....	55
4.7.2 Legal Disputes .....	56
4.7.3 Time overrun .....	57
4.7.4 Lost profit .....	58
4.7.5 Abandonment .....	59

<b>4.8 OBJECTIVE 3: THE MITIGATION OF THE FACTORS THAT CAUSE CONSTRUCTION PROJECT DELAYS IN SOMALIA.</b>	<b>61</b>
<b>4.8.1 Discussion Of The Mitigation Of Construction Project Delays In Somalia.</b>	<b>65</b>
<b>4.8.2 Discussion Factors That Cause Of Construction Project Delays In Somalia</b>	<b>66</b>
<b>4.8.3 Discussion Effects of Delay in Construction Projects in Somalia</b>	<b>67</b>
<b>4.8.4 Discussion of strategies to mitigate the factors contributing to construction project delays in Somalia.</b>	<b>68</b>
<b>CONCLUSION</b>	<b>69</b>
<b>CONCLUSION AND RECOMMENDATION</b>	<b>70</b>
<b>REFERENCE</b>	<b>76</b>
<b>APPENDICES</b>	<b>81</b>
<b>CURRICULUM VITAE</b>	<b>91</b>

## LIST OF FIGURES

<b>Figure 2. 1</b> Conceptual Framework.....	24
<b>Figure3.1</b> Somalia Map showing the location of Mogadishu .....	26
<b>Figure 3. 2</b> Flow chart of methodology.....	27
<b>Figure 4. 1</b> Type of Organization.....	40
<b>Figure 4. 2</b> Academic Qualification.....	41
<b>Figure 4. 3</b> Work experience in the construction.....	42
<b>Figure 4. 4</b> Position in the organizations.....	43
<b>Figure 4. 5</b> The type of the building projects.....	44
<b>Figure 4. 6</b> Consultant Related Factors Causes Delay Projects.....	47
<b>Figure 4. 7</b> Material Related Factors Causes Delay Projects.....	48
<b>Figure 4. 8</b> Client Related Factors Causes Delay Projects.....	49
<b>Figure 4. 9</b> Equipment Related Factors Causes Delay Projects.....	50
<b>Figure 4. 10</b> Labor Related Factors Causes Delay Projects.....	51
<b>Figure 4. 11</b> Contractor Related Factors Causes Delay Projects.....	52
<b>Figure 4. 12</b> cost overrun.....	55
<b>Figure 4. 13</b> Legal Disputes.....	56
<b>Figure 4. 14</b> time overrun.....	57
<b>Figure 4. 15</b> Lost profit.....	58
<b>Figure 4. 16</b> Abandonment.....	59

## LIST OF TABLES

<b>Table 2. 1</b> Categorized Causes of Delay (Ousseni & Jinbo, 2016).....	15
<b>Table 2. 2</b> Summary of some Factors Causes Delay of Construction Projects ....	17
<b>Table 2. 3</b> Summary of some Effects of construction project delays.....	20
<b>Table 2. 4</b> Methods of mitigating delays in construction projects according to (Wei, 2010). .....	22
<b>Table 3. 1</b> Five-point of the Likert scale.....	33
<b>Table 3. 2</b> Score percentage interval .....	34
<b>Table 4. 1</b> Research questionnaire distributed & collected.....	38
<b>Table 4. 2</b> Cronbach’s Alpha Reliability .....	39
<b>Table 4. 3</b> Average Index for likert Scale.....	39
<b>Table 4. 4</b> Academic Qualification.....	41
<b>Table 4. 5</b> Work experience in the construction.....	42
<b>Table 4. 6</b> Position in the Organization .....	43
<b>Table 4. 7</b> The type of building projects .....	44
<b>Table 4. 8</b> Ranking of Factors that Causes the Delay in Construction Projects in Somalia.....	45
<b>Table 4. 9</b> Ranking of Effects of the Construction Project delays in Somalia .....	53
<b>Table 4. 10</b> Ranking the Mitigation for the Factors that Causes Construction Project delays in Somalia. ....	61

# CHAPTER 1

## 1. INTRODUCTION

### 1.1 BACKGROUND OF STUDY

Delay is a widespread occurrence that consistently happens across the world, particularly in developing or rebuilding countries like Somalia. This study seeks to examine the causes and impacts of delayed construction projects in Somalia with the goal of proposing a plan for mitigation. The study will specifically focus on delayed projects in Mogadishu as a case study. Delays not only result in project time extensions but also lead to other negative consequences such as financial loss, damage to reputation, and opportunity costs. Delay can be defined as an event or action that prolongs the necessary time for completing work under contract, leading to additional working days. While previous studies have used various terms to describe delays, they generally refer to the same concept due to its global impact on both the overall economy and the construction industry. In the construction sector, delays are classified based on contract delay, construction issues, client-related factors, and their associated effects.

In the construction management, a delay is briefly defined as follows (Duat, 2014):

1. Delay caused by postponing one or more of the completion times,  
Prolongation of time-related costs of the contractor or subcontractor,
2. Delay to progress that causes contractors or subcontractors to suffer failure and or cost,
3. Reduction in productivity (or disruptions) leading to losses and/or expenses for contractors and/or subcontractors.

A construction project is typically considered successful when it achieves its intended goals, which include being completed on time, within the allocated budget, and according to the specified standards (Al-Tmeemy, Samiaah M, Hassen M., Abdul-Rahman, & Harun, 2011). Delays are one of the critical challenges in the construction process, with their impact differing significantly across various projects. Given the negative effects on project objectives, any threats to these goals can result in project delays. Therefore, the objectives of mitigation strategies for construction project delays are to anticipate the negative consequences of these delays and control their impacts on project progress so as to ultimately meet project objectives within the schedule, budget, and quality constraints. Delays cause many complications on the construction site such as financial problems, decrease of productivity and profit, conflicts among stakeholders, and even termination of contracts. Hence, it is very necessary from the point of view of the project managers to complete the tasks at their period and the cost decided initially. In addition, research has noted that inflation-induced cost increase puts additional strain on the prompt delivery of projects (Alsendi, 2015); (Mohammed & Isah, 2012); (Sunjka & Jacob, 2013)

Delays are at all times considered as expensive to the entire parties concerned in the project and very often consequences in quarrels, claims, entire abandonment, and rejection as well as blight the achievability of project owners and delay the progress of the construction industry (Bin Johan, 2013). They divided the twenty-one delay factors into three categories: those related to the owner, the contractor, and the consultant. Furthermore, based on the literature review there are ten methods to lessen the project delays, Their findings indicated that the primary factor and major cause of project delays was the owner's slow decision-making. In addition, it was assumed that the contractors were responsible for the project construction delays. As well the most effective way to decrease the project delay was suggested to choose and award the appropriate, experienced contractors and its effective solution in resolving those contractor's related delay factors (Bin Johan, 2013).

## **1.2 PROBLEM STATEMENT**

Since the central government collapsed in 1991 and decades of civil war, Somalis and their international supporters have intensified their efforts to rebuild state institutions and restore stability. Since 2012, significant progress has been made, particularly in the capital, Mogadishu. The improved stability has boosted the local economy as people return from the diaspora and enterprising businessmen invest in new housing developments. This construction boom has led to a significant increase in rents and the refurbishment of long-abandoned seafront villas.

However, delays in construction projects are a global issue, especially prevalent in developing or rebuilding countries like Somalia. These delays not only extend project timelines but also lead to financial losses, damage to reputations, and missed opportunities. This research aims to identify the causes and impacts of construction project delays in Somalia and propose effective mitigation measures.

Ensuring construction projects meet predefined cost, time, and quality benchmarks is of growing significance in today's fiercely competitive economic environment. Delays commonly result in cost overruns, extended completion times, subpar quality, and even contract terminations. In Somalia, delays have been a significant issue, often leading to project abandonment. Factors such as inexperienced project managers, unskilled labor, material shortages, and lack of local manufacturing contribute to these delays.

In Mogadishu, both the Somali government and private companies, including collaborations with the Turkish government, are actively involved in construction projects. However, many projects fail to meet the desired outcomes due to poor performance, resulting in delays, increased costs, and substandard quality (Abtidon, 2014).

This study aims to explore the reasons behind delays and their impacts on construction projects in Somalia, as well as to devise an effective plan to mitigate them. By filling this knowledge gap, the research aims to provide valuable

insights and practical solutions for the construction industry in Somalia, helping to prevent delays and improve project outcomes.

### **1.3 RESEARCH QUESTIONS**

Due to poor performance, construction companies in Somalia face delays in construction projects caused by poor quality, cost overruns, and, worst of all, project abandonment since it does not match customer expectations.

In our study, these queries will be posed in order to address the aforementioned issues.

1. What are the contributing elements to building project delays?
2. What consequences arise from construction project delays?
3. How might delays in construction projects be minimized?

### **1.4 AIM & OBJECTIVE**

This study endeavors to analyze the reasons for delays and their consequences in construction projects in Somalia with the objective of formulating a comprehensive mitigation strategy. The main objectives of this project are:

1. To ascertain the factors contributing to delays in construction projects within Somalia.
2. To determine the consequences of these delays in Somali construction projects.
3. To propose solutions for mitigating delays in somalia's construction projects.

### **1.5 SCOPE OF RESEARCH**

To help with fixing the problem, this study will look at why construction projects in Somalia get delayed and what happens because of it. The research will focus on projects in Mogadishu, Somalia, where work gets postponed. The

majority of Somalia's delayed projects, according to (Ahmed, 2018), are in Mogadishu and require a plan for mitigating the variables that contribute to project delays. The target respondents for this research, which will be conducted online utilizing a questionnaire survey, will be Somalian contractor companies.

## **1.6 SIGNIFICANCE OF RESEARCH**

This research is significant for construction firms in Somalia as it draws attention to the factors leading to delays and their consequences in construction projects. It provides valuable insights for construction companies, researchers, and the wider society, contributing significantly to the existing knowledge on this subject in Somalia. There is currently limited understanding of delays in construction projects within Somalia, making this study crucial for enhancing comprehension and adding to the relevant literature for construction companies in Somalia. Additionally, it is beneficial for potential researchers looking into further studies in this field. The findings will also help stakeholders such as developers, construction companies, and government agencies involved with the building sector by offering direction on explaining the true determinants of delay causes in construction projects. This expanded excerpt adds more detail while maintaining a similar tone and structure.

## **CHAPTER 2**

### **2. LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

In Chapter Two, the causes that lead to delays in building projects are reviewed, and the elements are divided into groups based on the work of previous researchers. Previous research and literature indicate that a large number of writers have looked into the reasons for building project delays. Even if all of the projects are of the same kind, these variables may differ by area. This variance results from the research being done in different nations, as documented in the literature. Books, research reports, journals, conference papers, and other sources are included in the literature review. Finding the factors pertinent to the research issue is the aim of the literature review.

#### **2.2 CONCEPT OF RESEARCH TITLE**

##### **2.1.1 Delay**

Delay is commonly considered the most prevalent, expensive, complex, and unpredictable issue in the construction sector. Delays are significant for both the owner and the contractor, impacting overall performance and financial aspects respectively. This often leads to disputes and claims, resulting in grievances. Delays not only lead to project time extensions but also result in other detriments such as decreased profits, negative impact on reputation, and opportunity costs. Although previous research has described delays using different terminology, they aim to convey the same concept due to its widespread use globally affecting not just construction projects but also the overall economy. Various perspectives exist on the reasons behind time delays in construction and engineering projects; some blame a single party, while others

attribute the delays to multiple sources or systemic issues rather than specific organizations.

Construction project delays can be attributed to two main categories:

- External factors cause delays
- Internal factors cause delays

Internal factors contributing to construction project delays stem from the involvement of four key parties: the owner, designers, contractors, and experts. Delays not linked to these parties are attributed to external causes such as government regulations, material suppliers, or weather conditions.

### **2.2.2 Construction Projects Delays**

Construction delay refers to a project being completed after its estimated completion time. This encompasses the entire process of constructing and delivering buildings to customers. Timely delivery becomes crucial for buyers who require their houses within specific time frames due to expiring rental agreements.

Inspections play a vital role in construction but can lead to delays if scheduled too early or late or if there are failures in the process itself. Furthermore; subcontractor engagement and unpredictable issues with material shipping from factories also contribute significantly toward causing delays. This study aims at exploring and addressing the primary causes and effects of delayed construction projects in Somalia for effective mitigation strategies.

### **2.3 FACTORS THAT CAUSE DELAY OF CONSTRUCTION PROJECT**

according to Divya and Ramya, construction delays are a frequently occurring issue in the construction industry, impacting project success through time, cost, safety, and quality. There are various factors contributing to these delays from different stakeholders including users, clients, designers, consultants, suppliers, contractors, and owners. The causes of such delays have been categorized into eight groups by the researchers: Project-related issues

Owner-related problems Materials and Equipment issues Laborers External Factors Design related concerns Contractor linked challenges Consultant involved difficulties. Contractors and consultants view numerous factors as major contributors to construction project delays. These include poor ground conditions, insufficient inspectors, inappropriate designs, monopolistic practices, and natural disasters. Obodoh and Chikasi address concerns including inaccurate equipment counts, payment challenges, erroneous time estimates, inaccurate cost estimates, ineffective site management, material shortages, insufficient modern equipment, change orders, inadequate project team competence, and deficient planning and scheduling. On the other hand, Durdyev, Omarov, and Ismail conducted a survey-based study on residential projects in Cambodia. Their findings revealed shortages in on-site labor, unrealistic schedules, late delivery of skilled workers, project complexity, absenteeism, delayed payments, subpar site management, and subcontractor accidents due to poor safety practices.

Najafabadi and Pimplikar carried out a research study focusing on identifying the reasons for construction project delays in Iran, as well as their impact. The causes were categorized into contractor-related, consultant-related, client-related factors and external factors. They listed nine significant causes including inappropriate planning by contractors, changes in design, poor site management by contractors alongside mistaken managerial decisions, lack of contractor experience, financial shortages from clients which led to delayed payments for finished work, issues with subcontractors' performance and communication gaps between parties. Their findings emphasized that design changes and material price escalation were highly influential factors.

Similarly, Gündüz, Nielsen, and Özdemir explored delay-causing elements such as ineffective project planning & scheduling (pertaining to the contractor), deficient site supervision & management (by the contractor), unanticipated owner or agent-initiated design alterations during construction (design-linked factor), late delivery of materials (material-associated cause), unreliability of

subcontractors(contractual origination). Additionally,Late duties regarding inspection&testing (by consultants);

inexperienced or unqualified laborers, owner-triggered change orders, and delays stemming from unfavorable circumstances characterize the challenges faced in construction projects. In contrast, Al-Moghany's 2006 investigation aimed to address waste reduction and managing propositions. It found that factors contributing to delays included non-compliance rework due to lack of materials, closure reworks resulting from failures, mishaps, and social environment-driven outcomes, inadequate engagements between owner construction interest groups, sites coupled with government authorities, breakdowns of equipment commitments, decelerated resolution-making, ambiguities or asymmetry in drawings leading to errors, and the use of unskilled labor (Al-Moghany, 2006).

Panday and Gupta (2016) discovered that cash flow issues, a lack of building materials, client financial hardships, inexperienced project teams, and a lack of consultant experience were the main reasons for construction projects's delays. Financial constraints, alterations to design and scope, delays in owner approvals and decision-making, difficulties in obtaining work permits, and communication challenges and coordination all played major roles in the delay (Sepasgozar, Razkenari, & Barati, 2015).

(Odeh & Battaineh, 2002) looked into the reasons behind construction delays and found that owner meddling, insufficient contractor expertise, payments and funding, labor productivity, late decision-making, inadequate planning, and problems with subcontractors were the main contributing factors.

According to Pakir and Omran (2008), inadequate planning was the main cause of construction project delays, which were then followed by ineffective communication, supply constraints, poor design, sluggish decision-making, and budgetary concerns. Furthermore, (Tumi, Omran, & Pakir, 2009)investigation into the reasons behind delays in Libya's construction sector revealed that ineffective planning, poor communication, a lack of supplies, poor design, sluggish decision-making, budgetary concerns, and a shortage of materials were

the main contributing factors (Tumi, Omran, & Pakir, 2009).

Amer (2011) talked about the issues with delays in Egypt's construction sector.

The research identified the primary causes of time delays in Egypt's construction industry: ineffective contract management, unrealistic scheduling, limited financial resources from clients, payment delays, design changes during construction, and the unavailability of key construction materials such as cement and steel. This concern has also been notable in other Arab nations. In Pakistan, delays within the construction sector have been a prominent issue. However, only two studies have concentrated on categorizing the causes of these delays within Pakistan's construction industry. These studies proposed a theoretical framework based on an analysis of past research, emphasizing that client-related problems are among the main factors contributing to project delays. The studies concluded that financial issues were particularly critical and top-ranked among the causes of delay in Pakistani construction projects. They specified various financial-related delays such as late payments to suppliers or insufficient fund allocations due to monthly payment challenges and inflation. Nonetheless, there is a necessity to identify all factors—including those related to clients, contractors consultants, equipment, labor, and general aspects—that contribute to project execution setbacks.

### **2.3.1 Consultant-Related Factors Causing Project**

Several studies have investigated the consultants' role previously. However, it's evident that current projects often demand specialized technical expertise from consultants, which they may lack due to their experience and delays in analyzing design documents. Additionally, contractors and clients frequently attribute delays to the limited workforce in consultancy firms.

Gardezi (2014) highlighted that delays, from the consultant's viewpoint, stem from inadequate planning by contractors, deficient site management, delayed client payments for completed work, and shortages of equipment and materials. Furthermore, challenges like alterations in drawings, consultant inefficiency, delays in drawing preparation and approval, inaccurate site

surveys, issues in slow response and contract management and inspection times are prevalent in Pakistan's construction industry due to consultants.

(Wong & Vimonsatit, 2012) concluded in their research that consultants need to be equipped with certain knowledge about construction methods and site conditions before embarking on the design process.

### **2.3.2 Material-Related Factors Causing Delay In Projects**

In the world of construction, materials play a pivotal role. Many researchers have delved into the factors surrounding materials that lead to project delays. Among these factors, the timely delivery of materials emerges as one of the most crucial. As Bekker (2011) points out, a scarcity of materials during project execution stands out as a significant culprit behind delays. The study underscores that the choice of materials greatly impacts project timelines. Bekker (2011) specifically pinpoints material shortages and late deliveries as primary causes of delays. Furthermore, the research sheds light on how challenges in material management can substantially prolong project timelines .

### **2.3.3 Client-Related Factors Causing Delays In Projects**

Researchers have pinpointed various issues stemming from clients that lead to project delays. For clients themselves, these delays often translate into financial losses, decreased efficiency, reliance on current resources, and a shortage of assets available for rent. A study by Abdul-Rahman (2013) on Malaysian construction projects found that clients are particularly concerned with financial issues, which are the main cause of delays. Clients often focus on prime contracting to shift the risk of time delays and other associated liquidated damages to contractors. Multiple investigations conducted in Saudi Arabia have revealed that when clients fail to make timely payments or neglect to pay contractors altogether, it significantly disrupts construction projects, causing considerable delays. Additionally, change orders by clients significantly contribute to delays. Client approvals are also a major cause of delays, with slow decision-making by clients being a critical problem in the construction industry.

#### **2.3.4 Factors Related To Equipment That Lead To Project Delays.**

Equipment-related factors significantly impact the progress of construction projects. Gardezi's (2014) study on the Saudi construction industry sheds light on this, highlighting equipment failures, shortages, inexperienced operators, and low equipment productivity and efficiency as key challenges. Moreover, the rising cost of renting construction equipment adds to project delays. Additionally, shortages in construction materials pose significant hurdles to project completion. Major equipment-related issues causing delays include equipment failures, material shortages, insufficient operator skills, efficiency of materials and less productivity, and a lack of advanced mechanical equipment.

#### **2.3.5 Labor-Related Factors Causing Delays In Construction Projects**

A significant challenge confronting the global construction industry presently is the shortage of labor, resulting in project delays. Several factors contribute to this issue, such as the growing demand for labor and the consequent scarcity of skilled workers. As highlighted by Bekker (2011), the limited availability of skilled, semi-skilled, and unskilled laborers is a primary cause of Construction project delays. Bekker's study also revealed that Malaysian labor supply ranked seventh out of twenty-eight in terms of factors causing delays, underscoring the importance of labor-related issues. The research emphasized the pivotal role played by individuals directly involved in construction projects in ensuring their timely completion. Among the factors contributing to delays, Bekker highlighted labor shortages, dependence on foreign labor, the prevalence of unskilled workers, low productivity levels, and interpersonal conflicts among laborers.

#### **2.3.6 Environmental Factors That Cause Project Delays In General.**

When it comes to building stuff in Nigeria, outside factors can throw a wrench in the works. These can be things like changes in the weather, new rules popping up, dealing with neighbors, or running into unexpected issues at the site.

Gardezi (2014) found similar troubles in Pakistan's construction scene, where natural disasters, unexpected site snags, shifts in how things are organized, rule changes, clashes, and neighbor problems caused major headaches. Likewise, in Saudi Arabia, they're grappling with weather challenges, rule tweaks, neighbor disputes, and site surprises, according to Gardezi (2014). The study identified eight big external factors gumming up the works. Among them, dealing with what's under the ground (like tricky soil or high water tables), getting the green light from local authorities, battling the elements, managing traffic on-site, dealing with accidents, adapting to policy changes, hooking up utilities like water and power, and making sure everything's signed off on properly.

### **2.3.7 Factors Related To Contractors That Lead To Project Delays.**

Numerous studies conducted by various researchers have identified factors associated with delays caused by contractors. According to Bekker, inadequate planning, inefficient site management, and lack of contractor experience are the primary reasons for delays. Furthermore, financial challenges faced by contractors and issues with subcontractors' work quality contribute significantly to project delays. The study emphasizes that these contractor-related factors play a crucial role in causing construction project delays.

When discussing delay-causing factors related to contractors, Bekker indicated that poor site management, subcontractor issues, poor planning methods, construction approaches utilized, and insufficient contractor experience are key concerns. The research further highlighted difficulties in financing projects alongside conflicts in subcontractor schedules during project execution as well as rework due to errors. Additionally, identified were deficiencies in communication and organization; unsuccessful project arrangements and scheduling; improper implementation of construction methods; inadequacies within both the contractor's work and the sub-contractor's work; frequent changes among sub-contractors; technical staff qualifications lacking proficiency; together with challenges related to site deployment.

### **2.3.8 Contractor's Responsibility**

If there is a lack of contractor responsibility, the project may encounter challenges such as delayed material delivery to the site, inadequate on-site materials, construction errors and faulty workmanship, insufficiently skilled or experienced labor, shortage of onsite labor force and low worker productivity. Additionally, financial difficulties and coordination issues with other parties can arise. Subcontractor skill shortages, inadequately staffed site contractors team and poor on-site management also contribute to problems in the project. Furthermore, equipment and tool shortages at the site are potential concerns; hence it is imperative for the contractor to prevent these issues from occurring during the course of the project.

### **2.3.9 Consultant's Responsibility**

The responsibility lies with the consultant to diligently address the identified issues. Insufficiency of consultant personnel at the project site, coupled with inadequate experience among the consultant and their team, particularly in managerial or supervisory capacities, can significantly impede progress. Protracted decision-making processes and tardy dissemination of instructions are common causes of delays. Furthermore, the completeness of project documentation is paramount. Effective project management stands as the linchpin for adhering to project timelines and budgetary constraints, necessitating the active engagement and proactive role of the consultant

### **2.3.10 Owner's Responsibility**

The progression of the project could be hampered if the homeowner encounters several challenges. These include a deficiency in working knowledge, which may impede decision-making processes and hinder effective coordination with contractors. Additionally, modifications to the contract, such as the inclusion of new work or changes in specifications, can disrupt the project timeline. Furthermore, financial issues, such as delayed payments or economic

hardships, may exacerbate delays by causing disruptions in funding and resource allocation. Thus, it is imperative for homeowners to address these potential obstacles proactively to mitigate the risk of project delays.

### 2.3.11 External Factors

The project delays are due to several external factors, including market equipment availability and material shortages, adverse weather conditions, suboptimal site conditions (such as location and soil quality), economic issues (like currency fluctuations and inflation), legal and regulatory changes, transport disruptions, and reliance on external work from public entities (such as infrastructure, utilities, and public services).

### 2.3.12 List Of Factors Causing Delays In Construction Projects

Several factors contribute to construction delays, involving users, consultants, clients designers, suppliers, contractors, and owners.

**Table 2. 1** Categorized Causes of Delay (Ousseni & Jinbo, 2016)

No	Causes of delay	group
1	Interference from the owner	Client
2	Delayed decision-making processes	Client
3	Subpar performance by subcontractors	Contractor
4	Inadequate site supervision and management	Contractor
5	Repetitive work due to construction errors	Contractor
6	Poor scheduling and planning	Contractor
7	Lack of contractor expertise	Contractor
8	Low bidding by contractors	Contractor
9	Inefficient management of contracts	Contractor

10	Slow approval of drawings and preparation	Contractor
11	Delays in quality assurance and approval processes	Contractor
12	Slow Inspection of finished Work	Consultant
13	Issues with material quality and shortages	Resource
14	Challenges in labor supply	Resource
15	Problems with equipment availability	Resource
16	Financial constraints faced by the owner	Resource
17	Concerns about contractor's financial capability	Financial
18	Delays in payment for completed work	Financial
19	Fluctuations in prices	Financial
20	Change Orders	Financial
21	Errors or inconsistencies in contract documentation	Contract
22	Legal Disputes	Contract
23	Poor communication among stakeholders	Contract relationship
24	Delays in obtaining government permits	Contract relationship
25	Adverse Weather Conditions	External
26	Unfavorable site conditions	External

### **2.3.13 Summary of some Factors Causes Delay of Construction Projects**

The table provides a condensed overview of factors contributing to construction project delays across various countries, drawing from previous research findings.

**Table 2. 2** Summary of some Factors Causes Delay of Construction Projects

No.	Author	Factors of Delay	Country
1	Durdyev & Omarv(2017)	<ul style="list-style-type: none"> <li>• Poor site management.</li> <li>• Lack of Skilled Labour.</li> </ul>	Cambodia
2	Najfabadi & Pimplikar (2013)	<ul style="list-style-type: none"> <li>• Contractor's improper Planning.</li> <li>• Design Changes.</li> <li>• Inadequate communication among involved parties.</li> <li>• Problems with Subcontractors.</li> </ul>	Iran
3	Al-Moghany (2006)	<ul style="list-style-type: none"> <li>• Lack of Materials (Closure).</li> <li>• Work Mistakes for the Drawings and Specifications.</li> </ul>	Palestine
4	Omran & Pakir (2009)	<ul style="list-style-type: none"> <li>• Insufficient supply availability.</li> <li>• Delayed decision-making.</li> <li>• Financial constraints.</li> <li>• Design Errors.</li> <li>• Impractical Scheduling.</li> </ul>	Libya
5	Al- Gardezi (2014)	<ul style="list-style-type: none"> <li>• Weather Condition.</li> <li>• Accident During Construction.</li> <li>• Government Policies.</li> <li>• Soil and Water Problems.</li> </ul>	Saudi

## **2.4 IMPACTS OF CONSTRUCTION PROJECT DELAYS**

Moreover, Gupta and Pandey (2016) identified several factors contributing to delays in construction projects, including disputes, cost overruns, time overruns, negotiations, complete abandonment, litigation, lawsuits, and project abandonment. Additionally, their research underscored the principal consequences of delays, including cost overruns, heightened loss rates, time overruns, adverse community impacts, and litigation. Likewise, (Najafabadi & Pimplikar, 2013) delineated six primary ramifications of delay: cost overruns, time overruns, abandonment, disputes, litigation, and arbitration. (Mydin, Sani, Taib, & Alias, 2014) elucidated the outcomes of delays including schedule overruns, budget overruns, disputes, bargaining, litigation, and complete abandonment. They emphasized that time and cost overruns were the most prevalent delays in construction projects.

Omonori and Olowokere (2016) highlighted time overruns, cost overruns, and disputes as the most significant effects of delay (Alade, Alade, Lawal, Omonori, & Olowokere, 2016), while Motaleb and Kishk (2010) emphasized cost overruns and time overruns as the primary effects of delay. They noted that delays in one aspect of the project often cascade into delays in other areas, as disputes typically stem from single or simultaneous issues, compounded by incomplete preconstruction documents.

In addition, (Pourrostan & Ismail, 2012) echoed the findings of previous researchers, identifying six primary effects of delays: cost overrun, time overrun, disputes, total abandonment, arbitration, disputes, and litigation. Their study highlighted time and cost overruns, claims, arbitration, disputes, and loss of profit as prevalent consequences in the construction industry. They delved into these effects, pinpointing cost and time overrun, and litigation as the most common culprits behind project delays. Similarly, (Abedi, Fathi, & Mirasa, 2011) uncovered cost overrun, time overrun, disputes, arbitration, total abandonment, and litigation as significant effects of delays. (Kikwasi, 2012)

further emphasized time overrun, cost overrun, negative social impact, idle resources, and disputes as primary effects of construction delays.

(Sidawi, 2012) attributed cost overrun to mismanagement of resources, often exacerbated by currency exchange fluctuations. Cost overruns have become a prevalent issue in the construction sector, reflecting broader challenges in project management and the initial setting of schedules and budgets. While unforeseen factors like extreme weather can impact budgets, most overruns stem from inadequate analysis or planning prior to project commencement. Enhancing planning processes and leveraging technology can mitigate these common issues, promoting efficiency and profitability in construction endeavors (Sidawi, 2012).

In times of economic strain, when finances are tight, conflicts often surface because construction project stakeholders may not be as inclined or financially capable to find common ground and smooth over rough patches with money. Consequently, many of these disputes end up tangled in the legal system. Considering the inherent nature of construction processes, disagreements are commonplace, putting electrical contractors - often positioned as subcontractors - in a challenging spot, especially when they can only directly communicate with the general contractor, even if the conflict arises with the owner (Kulabi Ahmed & Avetisyan, 2016). (Mukuka, J., Aigbavboa, & Thwala, 2014) highlighted major effects of construction project schedule overruns, including time extensions, cost overruns, profit losses, disputes, rushed work leading to poor quality, client stress, acceleration costs, strained relationships within the construction team, claims, and delays in client profitability. They also underscored four primary effects of delays: time and cost overruns, disputes, and negative social impacts. Furthermore, Abedi, Mohamad, and Fathi (2011) emphasized how delays can disrupt workflows, decrease efficiency, prolong project completion times, escalate time-related expenses and third-party claims, and even lead to contract abandonment or termination (Abedi, Fathi, & Mirasa, 2011). Mukuka, Aigbavboa, and Thwala (2014) reiterated that construction

project schedule overruns result in time and cost overruns, litigation, disputes, arbitration and complete project abandonment.

#### 2.4.1 Overview of Delay Effects on Projects

The table is a summary of some factors that cause construction project delays in different countries based on past research as shown below.

**Table 2. 3** Summary of some Effects of construction project delays

No.	Author	Impacts of Construction Project Delays
1	(Khattri, Agarwal, Gupta, & Pandey, 2016) (Khattri, Agarwal, Gupta, & Pandey, 2016)	<ul style="list-style-type: none"> <li>• Cost Overrun</li> <li>• Abandonment</li> <li>• Disputes</li> <li>• Arbitration</li> <li>• Litigation</li> </ul>
2	(Pourrostan & Ismail, 2012)	<ul style="list-style-type: none"> <li>• Negative Social Impact</li> <li>• Loss of Profit</li> <li>• Time Overrun</li> <li>• Legal Disputes</li> </ul>
3	(Mydin, Sani, Taib, & Alias, 2014)	<ul style="list-style-type: none"> <li>• Abandonment Time Overrun</li> <li>• Differences in Opinion</li> </ul>
4	(Abedi, Fathi, & Mirasa, 2011)	<ul style="list-style-type: none"> <li>• Claim</li> <li>• Loss Profit</li> <li>• Litigation</li> </ul>
5	(Mukuka, J., Aigbavboa, & Thwala, 2014)	<ul style="list-style-type: none"> <li>• Poor quality</li> <li>• Construction project schedule overruns</li> </ul>

The summary outlines several consequences of construction projects delays. Researchers identified six primary effects: cost overrun, time overrun, litigation, arbitration, disputes, and abandonment.

## **2.5 MITIGATION DELAY OF CONSTRUCTION PROJECTS**

Despite the suggestions put forth by researchers regarding different project management methodologies and the utilization of project monitoring software, project teams still find it challenging to achieve their cost and time goals. Delays remain inevitable in projects, despite the implementation of numerous mitigation plans. Mitigation efforts play a crucial role in minimizing losses, achieved through early prediction and identification of issues, followed by diagnosing the causes of delay and executing the most cost-effective solutions. Construction projects are complex and multifaceted, involving numerous variables and uncertainties due to extensive construction activities. This complexity increases the likelihood of delays, underscoring the importance of effective project management to prevent deviations from planned schedules and budgets (CHAI, Yusof, & Habil, 2015).

Prior research papers and studies have delved into conventional strategies for mitigating delays in construction projects, with the objective of offering guidance to construction stakeholders. For example, (Abdul-Rahman, Berawi, Mohamed, Othman, & Yahya, 2006) advocated for the implementation of a quality management system and underscored the importance of improving project communication and coordination (Abdul-Rahman, Berawi, Mohamed, Othman, & Yahya, 2006). Abedi, Fathi, and Mohammad (2011) examined prevailing success factors in project management literature and pinpointed common methods for mitigating delays that are commonly employed (Fathi & Abedi, 2011). Olawale and Sun categorized delay mitigation strategies into predictive, preventive, corrective, and organizational approaches (Olawale & Sun, 2010). The success of construction projects holds significant importance for all stakeholders, particularly clients and the national economy, as it contributes

to overall development. (Omran, peter, Aziz, Hussin, & mahmood, 2005) concluded that accurate planning is essential to avoid any delays during the construction phase (Omran, peter, Aziz, Hussin, & mahmood, 2005). Nguyen et al. (2013) examined project success factors in big construction projects in Vietnam, identifying sixteen factors that can minimize construction delays, with the most significant being resource availability, a competent multidisciplinary project team, a skilled project manager, precise initial cost estimates, and accurate initial time estimates.

### 2.5.1 Summary Methods Of Minimizing Delays In Projects

Based on past research (Wei, 2010), we listed a summary of 21 methods that have been identified to mitigate construction delays as shown in Table 2.4.

**Table 2. 4** Methods of mitigating delays in construction projects according to (Wei, 2010).

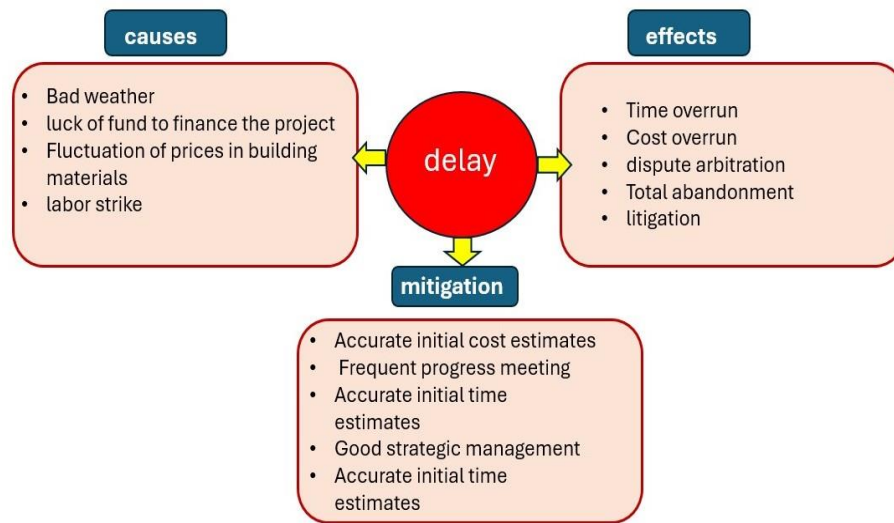
No.	Methods of Mitigating Delays
1	Ensuring precise initial cost estimation
2	Implementing a revised approach to contract award procedures with reduced emphasis
3	Conducting thorough preconstruction planning to determine project tasks and required resources
4	Choosing a skilled consultant and dependable contractor for project execution
5	Allocating sufficient time and funds during the design phase
6	Ensuring resource availability
7	Demonstrating dedication to projects
8	Employing a competent project manager
9	Creating comprehensive contract documentation
10	Securing adequate and accessible financing until project completion

**Table 2.4** Continue

11	Holding frequent progress meetings
12	Enforcing liquidated damage clauses.
13	Providing incentives for early project completion
14	Hiring an independent supervising engineer to monitor project advancement
15	Forming a multidisciplinary and capable project team
16	Incorporating current technology
17	Minimizing bureaucratic hurdles
18	Establishing accurate initial time estimates
19	Implementing innovative contracting methods like Design-Build (D/B)
20	Contracts for Construction Management (CM).
21	Selecting experienced and qualified consultants and contractors for bid awards

## **2.6 CONCEPTUAL FRAMEWORK**

Success in a construction project is attained when meticulous planning and scheduling are executed, adhering to the allocated budget and prescribed quality standards, completed within the designated timeframe, and meets the satisfaction of all stakeholders involved.



**Figure 2. 1** Conceptual Framework

The conceptual framework encompasses the research objectives and the questionnaire derived from the research referring to the previous study, these are not all the causes, effects, and mitigation plans for the delay of construction projects.

## 2.7 SUMMARY

This chapter delves into existing literature, gathering secondary data to explore the factors contributing to construction project delays. It examines studies conducted in both developing and developed nations, focusing on various aspects such as the causes, types, and classifications of delays. Additionally, it compares findings from previous research endeavors. Drawing from diverse sources including journal papers, articles, newspapers, past dissertations, books, and conference papers, the aim is to compile comprehensive information to formulate accurate solutions for addressing project delays.

## **CHAPTER 3**

### **3. RESEARCH METHODOLOGY**

#### **3.1 INTRODUCTION**

This chapter explores the methodological approach to studying the causes and repercussions of construction project delays in Somalia. It primarily comprises sections on research design, research population, sample size determination, data collection procedures, and sampling methods.

#### **3.2 RESEARCH DESIGN**

This research will utilize a survey research design with a quantitative methodology, this entails gathering numerical data through methods like surveys or statistical analysis. The study will be structured in three phases. Firstly, we will identify the research concept by conducting a preliminary review of the current issues in construction projects. Data collection will focus on gathering relevant information related to the research aspects, which will be presented through literature derived from diverse sources such as reference books, academic journals, articles, and governmental reports. The second phase involves soliciting feedback and perspectives from stakeholders in construction companies through the distribution of questionnaires. This primary data collection will be instrumental in shaping the results to meet the study objectives.

### 3.3 LOCATION OF STUDY

Our study will take place in Somalia, an independent country located in the Horn of Africa. It borders Ethiopia to the west, the Gulf of Aden to the north, the Somali Sea to the east, and Kenya to the southwest, as depicted in Figure 3.1.



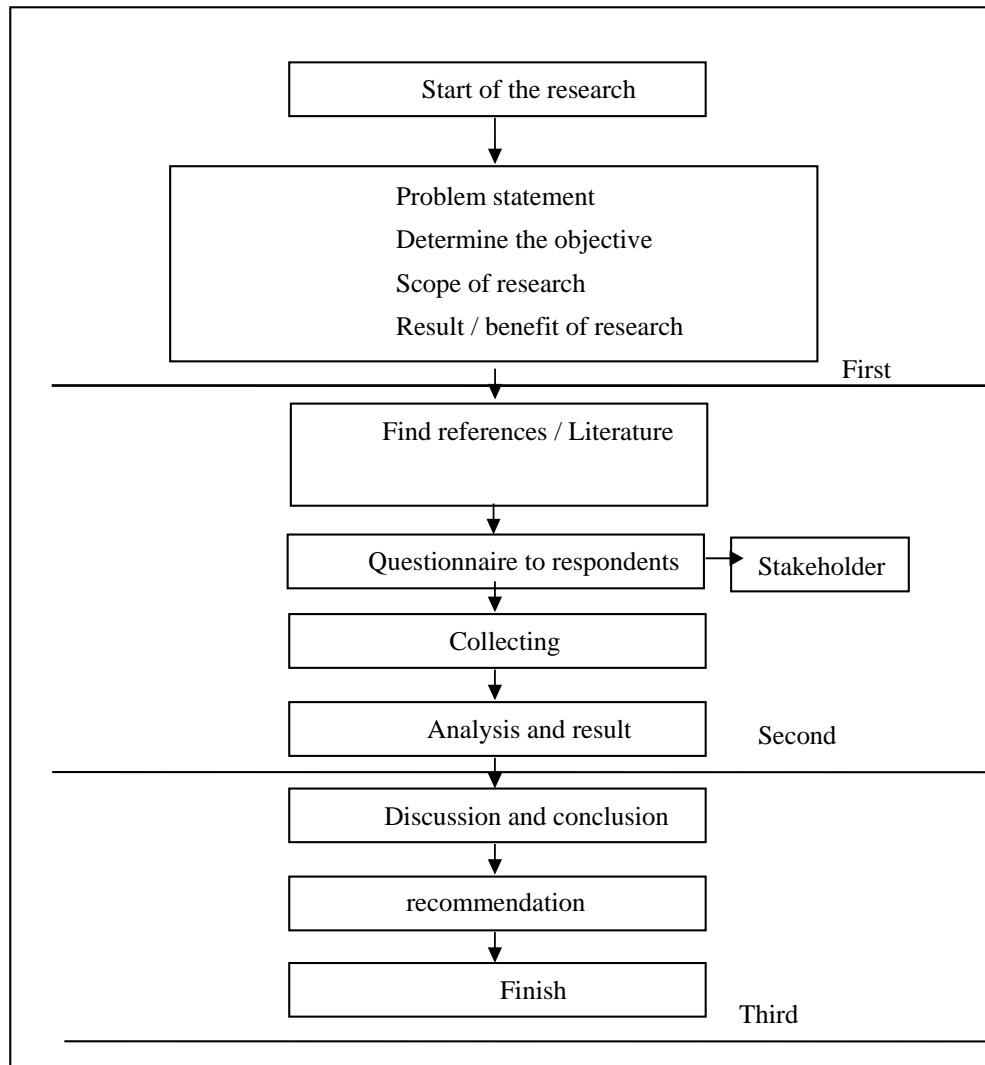
**Figure 3. 1** Somalia Map showing the Location of Mogadishu, Banaadir

The study will be conducted using a structured questionnaire distributed via Google Forms and email to respondents representing contractors in construction companies in Somalia. The research will focus on Mogadishu, Banadir, Somalia. Mogadishu, the capital city of Somalia, is the hub for most investment projects, both international and local.

According to (Ahmed, 2018), many projects in Mogadishu have experienced delays. This study seeks to explore the causes of construction project delays in Somalia, analyze their impacts, and propose strategies for mitigating these delays.

During the third stage, we will discuss the findings of this case study, which will guide the formulation of various strategies and recommendations. These suggestions will be grounded in the analysis of the questionnaire results.

For a visual representation of the research process, please refer to the flow chart provided in Figure 3.2.



**Figure 3. 2** Flow chart of methodology

The above flow chart is the process for this research and contained these three stages, first stage, second stage and third stage. This study focuses on examining the factors contributing to delays in construction projects in Somalia, as well as their repercussions, while emphasizing the formulation of mitigation

strategies. Specifically, the research will be conducted as a case study of a delayed project in Mogadishu, Somalia.

### **3.4 SAMPLING PROCEDURE**

The concept of "sample" pertains to a segment of the overall population, chosen to represent its attributes (Naoum, 2012). Sampling aims to offer a practical method for facilitating data collection and processing in research. Additionally, it ensures that the sample adequately represents various construction companies in Somalia.

The initial step in sampling involves defining the population (Naoum, 2012). The outcomes of this study aim to accurately represent a selection of construction companies in Somalia. Therefore, it is imperative that the construction company is connected to individuals knowledgeable about delays in construction projects in Somalia.

### **3.5 POPULATION SIZE**

To get the population of construction companies in Somalia is difficult to get an accurate number of populations so the research prefers to target some of the contractor companies in Somalia who have experience, which contains 71 numbers of populations. These include all stakeholders, Project Managers, Quantity Surveyors, Engineers, and Consultants as well as others. The target population holds significant importance as they possess relevant information crucial to the research, thereby enhancing its utility and applicability.

### **3.6 SAMPLING SIZE**

The sample will comprise 60 respondents, encompassing various stakeholders such as contractors, project managers, quantity surveyors, accountants, engineers, and consultants. The sample size was determined using Slovan's statistical formula, which calculates the desired sample size. While

there are several techniques available for determining the actual sample size, this study opted to utilize Slovan's statistical formula.

Sloven's Formula

$$N=71 \quad e= 5\%= 0.05 \quad n=?$$

Solution:

$$n = \frac{N}{1+(N*e^2)}$$

$$n = \frac{71}{1 + (71 * 0.05^2)}$$

$$n = \frac{71}{1 + (0.1775)}$$

$$n = \frac{71}{1.1775}$$

$$n=60.2972 \sim 60$$

The selection of this number is based on the researcher's capacity. However, the researcher allocated distributing the sample size for selected respondents from some of the Construction Companies in Mogadishu, Somalia.

### **3.7 QUANTITATIVE RESEARCH**

Quantitative research methods fall into two main categories: descriptive and experimental. Descriptive quantitative research is utilized for subjects that are measured only once, whereas experimental quantitative research is employed for subjects measured both before and after treatment. Descriptive quantitative methods are particularly suitable for estimating precise relationships between

variables, as they establish connections between them. However, descriptive analysis often necessitates a sample size of hundreds of subjects.

### **3.8 PRIMARY DATA**

In addition to gathering secondary data, this study also involved the collection of primary data. Primary data, also referred to as original data, is collected directly from the source. This research employs primary research methods, such as data reviews conducted for specific purposes in uncontrolled scenarios, as well as the use of questionnaires for data collection.

### **3.9 SECONDARY DATA**

Secondary data comprises pre-existing information available in diverse formats, including literature, governmental publications, official records, yearly summaries, economic analyses, and country-wide data. In this study, secondary data were sourced from published materials. Moreover, secondary data can also be obtained through questionnaires. The main objective of this study is to investigate the underlying reasons behind construction project delays in Somalia.

### **3.10 METHOD OF DATA COLLECTION**

Data collection involves systematically gathering information from various sources to make a comprehensive and proper understanding of a certain area of interest, enabling the evaluation of outcomes. This research utilizes both secondary and primary data collection methods. For this study, the questionnaire survey method was selected as the primary means of collecting data, as it is widely used for conducting surveys. Questionnaires have been widely utilized for both descriptive and analytical surveys to collect factual information, opinions, and perspectives (Naoum, 2012). They provide benefits such as maintaining confidentiality, supporting external and internal validity, facilitating

analysis, and conserving resources. Data is collected in a standardized format from samples of the population, allowing researchers to conduct statistical analyses, often with the assistance of computers. However, questionnaires also have limitations, such as the need for simple questions, lack of control over respondents, and the potential for generalized responses (Naoum, 2012). In this research, data will be collected through a questionnaire distributed to contractor companies in Somalia via a Google form.

### 3.10.1 Distribution of Questionnaire Form

The distribution of the questionnaire is used to identify and rank Factors, Effects, and Mitigation of Construction Projects Delays in Somalia. This study employs a questionnaire survey conducted through Google Forms, chosen for its ease of response and time efficiency for participants. It is employed to get a professional opinion and other relevant data through a questionnaire. The main aim of the research is to identify the Mitigation Plan of Delay on Construction Projects in Somalia. The questionnaire was designed in such a way as to get a high response rate from respondents. Generally, the questions contained two types of selective questions related to the background of the respondent, and rate ranks related to achieving the objective questions of the project were used so that responding would be easier.

### **3.10.1 Distribution Of Questionnaire Form**

The questionnaire distribution aims to identify and prioritize factors, effects, and mitigation strategies for construction projects delays in Somalia. Google Forms are utilized for this survey to ensure that respondents can easily answer the questions without consuming too much time. This method allows for the collection of professional opinions and other pertinent data through a structured questionnaire. The primary goal of this research is to pinpoint effective mitigation plans for delays in construction projects in Somalia. The questionnaire is designed to maximize response rates from participants. It consists of two types of questions: those pertaining to the background of the

respondent, and rating questions related to achieving the project objectives. This design simplifies the response process for participants.

### **3.11 METHOD OF DATA ANALYSIS**

Data analysis involves reviewing and assessing collected data using various methods to derive useful information and insights. In quantitative research, particularly non-experimental studies, multivariable analyses are commonly employed. For this study, quantitative data will be computed using statistical techniques. The Statistical Package for the Social Sciences (SPSS) is widely utilized for this purpose in education (Thalheimer & Cook, 2002). The findings will be presented in tabular form to enhance understanding.

In this research, data analysis is primarily descriptive, enabling examination of the interrelationships between variables and facilitating the study of delays in construction projects. Frequency distribution is a basic approach to illustrate data values, showing the frequencies of each unique data value in rank order (Johnson, Christensen, & Kagermann, 2008). Mean values are utilized to rank challenges and key factors, representing the arithmetic average of scores and serving as a common measure of central tendency.

### **3.12 QUESTIONNAIRE DESIGN**

This questionnaire consists of two types. The first type involves the questions that relate to information of the respondents and the second type involves the questions that relate to our research objectives. Participants will be asked to select the relevant columns to indicate their degree of agreement regarding the factors contributing to construction project delays in Somalia. This will be done using a four-point Likert scale, comprising options such as "strongly agree," "agree," "disagree," and "strongly disagree," as illustrated in Table 3.1.

**Table 3. 1** Five-point of the Likert scale

Scale	1	2	3	4	5
Description	Strongly disagree	Disagree	Neutral	Agree	Strongly agree

The average index method will utilize a scale of 5 categories to indicate priority. Closed-format or closed-ended multiple-choice questions, where respondents are restricted to choose from the given options, were used. In addition, A Likert scale with five categories was employed in the questionnaire survey, allowing respondents to indicate their preferences using the average index method to prioritize the research objectives' variables.

### **3.13 LIKERT'S SCALE**

The Likert scale is a widely used psychometric scale in questionnaire surveys, commonly employed in survey research. This scale is used when using this type of research are survey descriptive. The Likert scale is not only used to measure perceptions, attitudes, or opinions regarding individuals, groups, events, or social phenomena, but it also relies on operational definitions established by researchers. In analysis, the data Likert scale of four ordinal measures of agreement ranging has been used in the questionnaires. It has been shown in Table 3.3 before. In general, the formula for analysis Likert scale is expressed as follows:

Formula:  $T \times P_n$

Where; T = represents the total number of respondents.

$P_n$  = denotes the Likert scale selection number.

To interpret the results, determine the highest score (X) and the lowest score (Y) denotes the evaluation items according to the following calculation:

Y = (Highest Likert scale score) multiplied by (Number of respondents)

X = (Lowest Likert scale score) multiplied by (Number of respondents)

To complete this calculation, need to know the interval and the percentage of intersection to determine using a percentage score interval.

$$I = 100 / \text{Total score (Likert)}$$

Where I = Percentage of interval score

From all of the formulas, the data will be analyzed with the Interval percentage as presented in Table 3.2.

**Table 3. 2** Score percentage interval

<b>Scale (%)</b>	<b>Interval consistency</b>
0 – 24.9	Indicates a strong disagreement
25 – 49.9	Signifies a disagreement
50 – 72.9	Represents an agreement
75 - 100	Denotes a strong agreement

The table above shows the scores on the percentage scale. For example, choosing 'strongly agree' indicates that you are 75-100% certain that the statement is correct."

### **3.14 PILOT OF STUDY**

A pilot study is a preliminary test carried out to ensure the effectiveness of a questionnaire before launching the main study. Usually involving 5 to 10 participants, this test aims to confirm the questionnaire's functionality. (Van Teijlingen & Hundley, 2002) observe that the term 'pilot study' is employed in two contexts within social science research: it may denote feasibility studies, which are scaled-down versions of the primary study, or it may indicate the preliminary testing or trial of a particular research tool. Carrying out a pilot study offers several benefits, such as uncovering potential issues in the main research

endeavor, including deviations from research protocols or the intricacy of proposed methods or tools. Moreover, a pilot study can serve to showcase the viability of the research proposal to funding agencies.

## **CHAPTER 4**

### **4. DATA ANALYSIS AND DISCUSSION**

#### **4.1 INTRODUCTION**

Chapter four seeks to examine and analyze the data obtained from participants who responded to the research questionnaire, in line with the study's objectives. This data was collected from individuals involved or accountable for delays in construction projects in Somalia, including project managers, civil engineers, architects, and construction site managers.

The chapter focuses on achieving the objectives set forth after analyzing the data obtained from the research questionnaire using SPSS. By ranking the variables across different groups, the chapter facilitates the study of mitigation strategies for factors contributing to construction projects delays in Somalia.

Data analysis in this chapter encompasses assessing the reliability of the questionnaire design, examining the demographics of the respondents, identifying factors causing construction project delays in Somalia, exploring the effects of these delays, and devising mitigation plans. Through thorough discussion, the data collected from respondents will inform the development of mitigation strategies to address construction project delays in Somalia.

#### **4.2 RESULT OF PILOT TEST**

A preliminary study was taken place before distributing the complete questionnaire by sending out 10 copies to respondents registered under the Ministry of Public Works & Reconstruction in Somalia by Contractor Companies of Grade A. The purpose of this pilot study was to assess the functionality of the questionnaire. The results indicated that respondents did not encounter any challenges or difficulties in understanding the questionnaire.

Moreover, the pilot study positively contributed to improving the quality of the questionnaire in terms of content, language, and design. As a result, respondents were able to understand and respond to the questionnaire easily and confidentially, without facing any challenges.

### **4.3 QUESTIONNAIRE RESPONSES RATE**

The research questionnaires were distributed to Contractor Companies in Somalia. The sample size for this study is 60, determined based on (Krejcie & Morgan, 1970) Table Scale, despite the population being identified as 71 according to the Ministry of Public Works & Reconstruction in Somalia. The online questionnaire was distributed and sent via Google Form. After distributing the questionnaire this study was able to collect back 50 respondents. This study found a constitutes a sum of 83.33% by response rate. The responses for this study show it is normal to use according to (Al-Tmeemy, Samiaah M, Hassen M., Abdul-Rahman, & Harun, 2011), the normal response useable ranges between 25% to 35%. Therefore, the number of participants in this study is sufficient to consider the purpose of this study. Table 4.1 describes the number of questionnaires distributed and the collected data after the completed distribution. Since the target of this study is to distribute the questionnaire to the Contractor Companies under the Ministry of Public Works & Reconstruction in Somalia it was not easy to get all the respondents and COVID-19 took place the challenges experienced during this study.

**Table 4. 1** Research questionnaire distributed & collected

<b>Description</b>	<b>Total</b>
Research questionnaires were distributed to participants.	60
Research questionnaires were collected from participants.	50
Percentage of questionnaires collected(%)	83.33%

#### **4.4 RELIABILITY TEST**

The Reliability Test is utilized to evaluate the dependability of the data collected through the questionnaire, ensuring its accuracy. In this research, Cronbach's Coefficient Alpha is employed as a measure of reliability.

In Sun et al.'s (2007) study, the Cronbach's Alpha Coefficient is presented, indicating different levels of reliability. A coefficient ranging from 0.80 to 0.99 suggests very good reliability, while 0.70 to 0.80 signifies good reliability. For coefficients falling between 0.60 to 0.70, the reliability is deemed fair, whereas a coefficient lower than 0.60 denotes poor reliability.

In this study, Cronbach's Alpha was used to evaluate the test's reliability. The reliability of the variables was measured using 96 questions from the questionnaire. an Alpha value below 0.6 signifies poor reliability, 0.6 to 0.7 signifies fair reliability, 0.7 to 0.8 signifies good reliability, and 0.80 to 0.99 signifies very good reliability. Table 4.2 shows the Cronbach's Alpha Coefficient of reliability for the research, which includes 96 questions concerning respondent demographics and the main study objectives. The reliability test produced a value of 0.910, indicating very good reliability for this study.

**Table 4. 2** Cronbach’s Alpha Reliability

<b>Cronbach’s Alpha</b>	<b>N of Questions</b>
0.910	96

#### **4.5 RESULT AND DISCUSSION**

This research aimed to investigate the mitigation plan for construction project delays in Somalia by identifying the factors causing delays, examining their effects, and proposing mitigation strategies. Utilizing a quantitative research approach, the data obtained from the questionnaire underwent analysis using IBM SPSS 27.0.

The mean values were calculated to determine the maximum and minimum ranks achieved.

The analysis method involved evaluating the data from the survey to identify the most significant factors using the average mean index scale, as presented in Table 4.3. Descriptive analysis was employed to determine the mean ranking of the research objectives using the average index for likert scale.

**Table 4. 3** Average Index for likert Scale

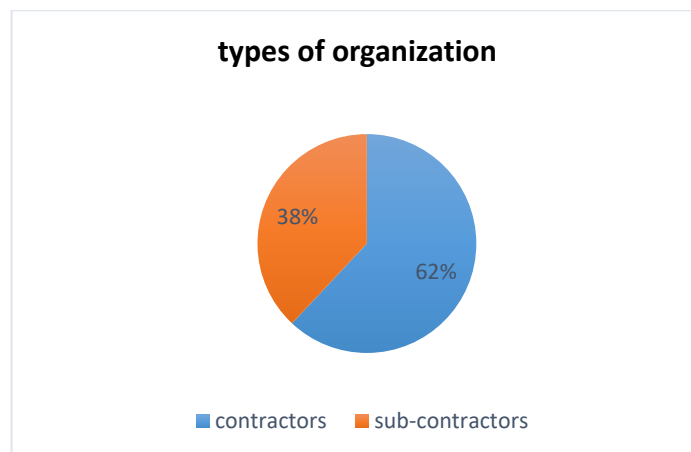
<b>score</b>	<b>item</b>	<b>Average index(AI)</b>
1	Strongly disagree	AI between 0.00 and 1.5
2	disagree	AI between 1.50 and 2.50
3	neutral	AI between 2.50 and 3.50
4	agree	AI between 3.50 and 4.50
5	Strongly agree	AI between 4.50 and 5.00

### 4.5.1 Respondents Background

In this section, the background of the respondents will be assessed based on the nature of the research. A different aspect of the research background was taken into consideration, organization type, academic qualification, work experience, position in the organization, and the type of building projects that they have experience and get involved in. However, only the demographic of the respondents that related to the study was been asked. In addition, for this research, the questions on the background of the respondents were asked positions of the organization. However, 50 respondents in this survey, which include Project Manager, Civil Engineer, Architecture, and Contractor will be discussed in this section.

#### 4.5.1.1 Organization Type

This section focuses on the type of organization the participants are involved in, allowing them to select either Contractor or Subcontractor. Among the 50 respondents in this research, the analysis revealed that 31 respondents (62%) are Contractors, while 19 respondents (38%) are Subcontractors.



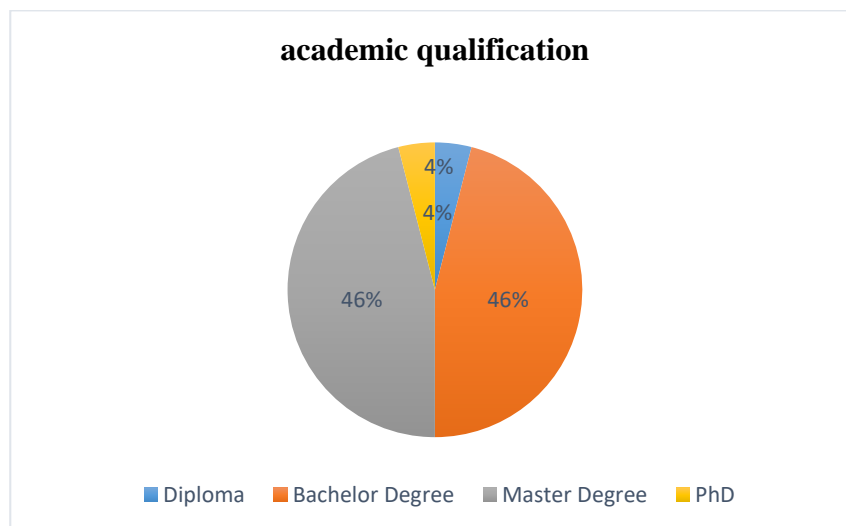
**Figure 4. 1** Type of Organization

#### 4.5.1.2 Academic Qualification

The academic qualifications of the respondents are displayed in Table 4.4, highlighting their competitiveness. The qualifications vary among the respondents as detailed in Table 4.8. Specifically, 23 respondents (46%) hold a Master's degree, and another 23 respondents (46%) have a Bachelor's degree. Additionally, there are 2 respondents (4%) with a Diploma and 2 respondents (4%) with a PhD.

**Table 4. 4** Academic Qualification

Academic Qualification	Frequency	Percent
Diploma	2	4%
Bachelor Degree	23	46%
Master Degree	23	46%
PhD	2	4%



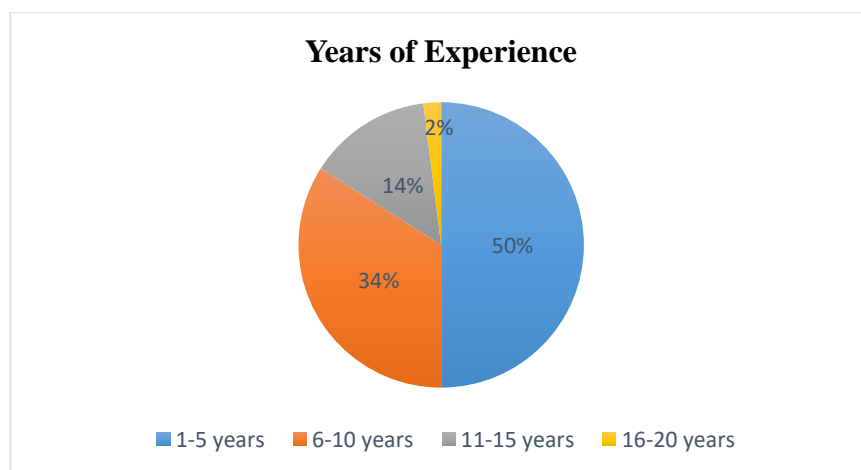
**Figure 4. 2** Academic Qualification

### 4.5.1.3 Work Experience In The Construction

The working experience of the respondents in this study is detailed in Table 4.5. This factor is crucial as it reflects the respondents' level of expertise. The respondents have varied working experiences as summarized in Table 4.10. Specifically, 25 respondents (50%) have 1-5 years of experience, 17 respondents (34%) have 6-10 years, 7 respondents (14%) have 11-15 years, and 1 respondent (2%) has 16-20 years of experience. These findings indicate that the respondents possess a substantial amount of experience.

**Table 4. 5** Work experience in the construction

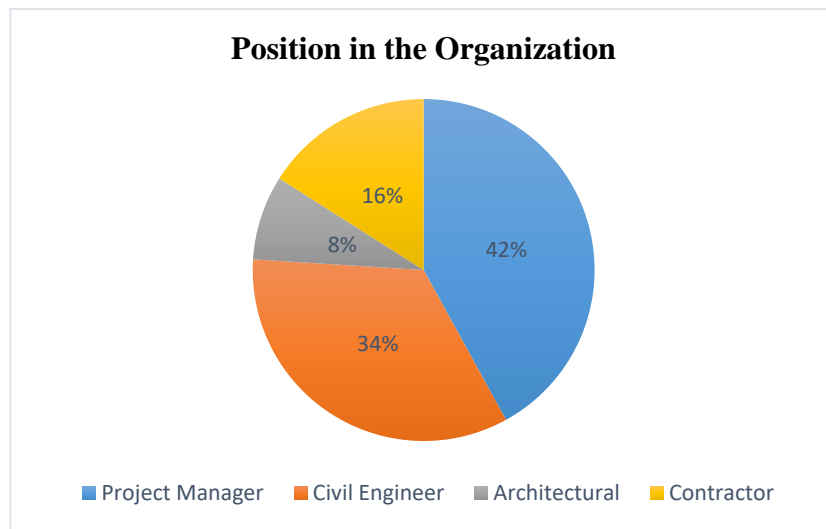
Year of Experience (year)	Frequency	Percent
1-5	25	50%
6-10	17	34%
11-15	7	14%
16-20	1	2%
20-25	0	0
26 above	0	0
Total	50	100%



**Figure 4. 3** Work experience in the construction

#### 4.5.1.4 Position In The Organization

Table 4.6 shows that most of the participants are Project Managers with 21 respondents and 42% while Civil engineering takes 34% percentage with 17 respondents. Also Architecture with 4 respondents and a percentage of 8%. Finally, the Contractor takes 16% with 8 respondents.



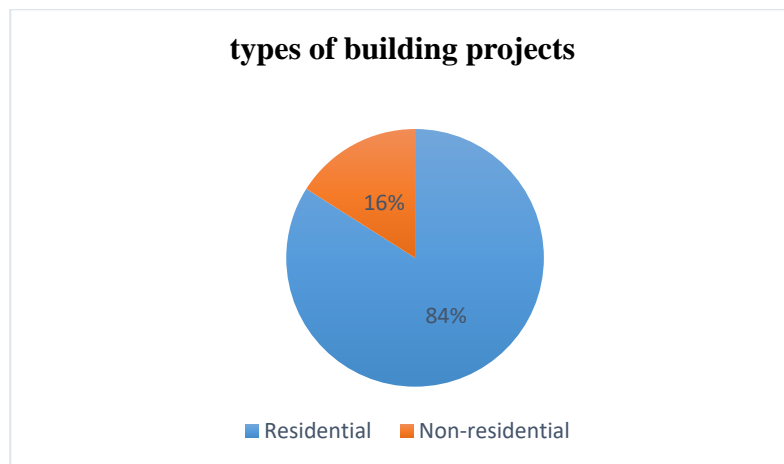
**Figure 4. 4** Position in the organizations

**Table 4. 6** Position in the Organization

Position in the Organization	Frequency	Percentage
Project Manager	21	42%
Civil Engineer	17	34%
Architectural	4	8%
Contractor	8	16%
Total	50	100%

#### 4.5.1.5 The Type Of Building Projects You Get Involved

In this part, the respondents have two options to select, which one of these they have experience and they got involved. 42 Respondents who are the majority of the respondents are residential and represent 84% of the total respondents while the other 8 respondents from the Non- residential and represent 16% of the total of the respondents. most of the respondents were involved with residential projects, as shown in Table 4.7.



**Figure 4. 5** The type of the building projects

**Table 4. 7** The type of building projects

The type of the building projects you get involved	Frequency	Percentage
Residential	42	84%
Non-residential	8	16%

#### 4.6. OBJECTIVE 1: EXAMINATION OF THE FACTORS LEADING TO CONSTRUCTION PROJECT DELAYS IN SOMALIA

The initial aim of the study was to pinpoint the factors responsible for delays in construction projects within Somalia. Respondents were tasked with indicating their degree of agreement with several statements outlining these factors. To fulfill this objective, they provided feedback on multiple statements pertaining to the causes of construction project delays, offering insights into their understanding and perspectives. The condensed findings from the participants are outlined in Table 4.8.

**Table 4. 8** Ranking of Factors that Causes the Delay in Construction Projects in Somalia

Ranking of Factors that Causes the Delay in Construction Projects in Somalia						
Descriptive Statistics						
No.	Questions	N.	Minimum	Maximum	Mean	ranking
B1.0	Consultant Related Factors Causes Delay Projects				4.09	3
B1.1	Lack of knowledge by Consultants regarding site conditions	50	1	5	4.16	1
B1.2	Lack of knowledge methods of construction before designing	50	2	5	4.12	3
B1.3	Poor site Management	50	1	5	3.94	6
B1.4	Inefficiency of consultants	50	1	5	4.1	4
B1.5	Preparation of drawing	50	2	5	4.04	5
B1.6	Slow response inspection	50	2	5	4.16	1
B2.0	Material Related Factors Causes Delay Projects				4.03	6
B2.1	Shortage of Material	50	2	5	4.24	1
B2.2	Late delivery of material	50	2	5	4.1	3
B2.3	Ordering estimated material in bulk and changing materials during construction	50	1	5	3.76	8
B2.4	The management problems for managing materials	50	1	5	3.98	5

**Table.4.8** Continue

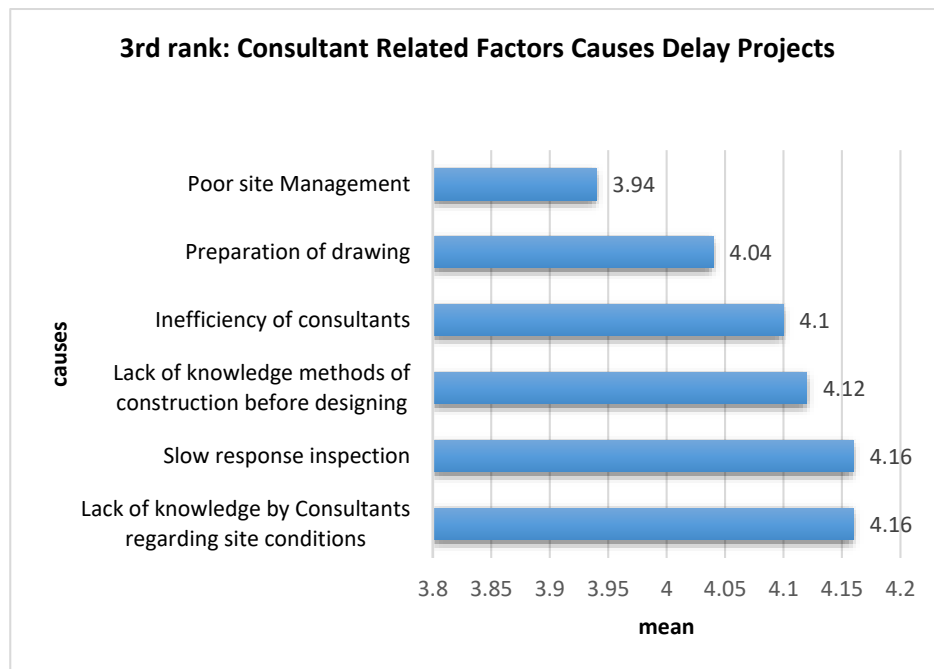
B2.5	Poor procurement of construction materials	50	2	5	3.98	5
B2.6	Delay in Manufacturing Materials	50	1	5	3.96	7
B2.7	Accidents during construction	50	2	5	4.04	4
B2.8	Low quality of material	50	1	5	4.2	2
B3.0	Client Related Factors Causes Delay Projects				4.17	1
B3.1	Non-payment to contractors by clients	50	1	5	4	3
B3.2	Change orders by clients	50	1	5	4.08	2
B3.3	Poor decision making of clients and client approval	50	2	5	4.42	1
B4.0	Equipment Related Factors Causes Delay Projects				4.04	5
B4.1	Unskilled equipment operations	50	1	5	4.1	2
B4.2	Little output and efficiency of equipment	50	1	5	3.98	4
B4.3	Absence of high technology mechanical equipment	50	1	5	4	3
B4.4	Low productivity	50	2	5	3.98	4
B4.5	Efficiency of construction equipment	50	2	5	4.16	1
B5.0	Labor Related Factors Causes Delay Projects				4.06	4
B5.1	Shortage of skilled labor	50	2	5	4.26	1
B5.2	Unskilled labor working in construction projects	50	2	5	3.82	4
B5.3	Low productivity level of labors	50	3	5	3.96	3
B5.4	Personal conflict among labors leads delay in construction	50	2	5	4.2	2
B6.0	Contractor Related Factors Causes Delay Projects				4.14	2
B6.1	Improper planning by contractor	50	2	5	4.36	1
B6.2	Inefficient of site management with poor management	50	3	5	4.14	4
B6.3	Financial difficulties of contractor	50	2	5	4.16	3
B6.4	Insufficient experience of contractor	50	2	5	3.88	6

**Table 4.8** Continue

B6.5	Clashes in sub-contractor's schedule during execution of the project	50	2	5	4.06	5
B6.6	Poor qualification of technical staff	50	2	5	4.22	2

note that the Likert scale with five points is regarded as an interval scale, and the mean holds considerable significance. The interpretation of the mean is as follows: scores from 1 to 1.8 indicate strong disagreement; scores from 1.81 to 2.60 signify disagreement; scores from 2.61 to 3.40 suggest neutrality; scores from 3.41 to 4.20 denote agreement; and scores from 4.21 to 5 indicate strong agreement.

**4.6.1 Consultant-Related Factors Cause Delay Projects In Somalia**

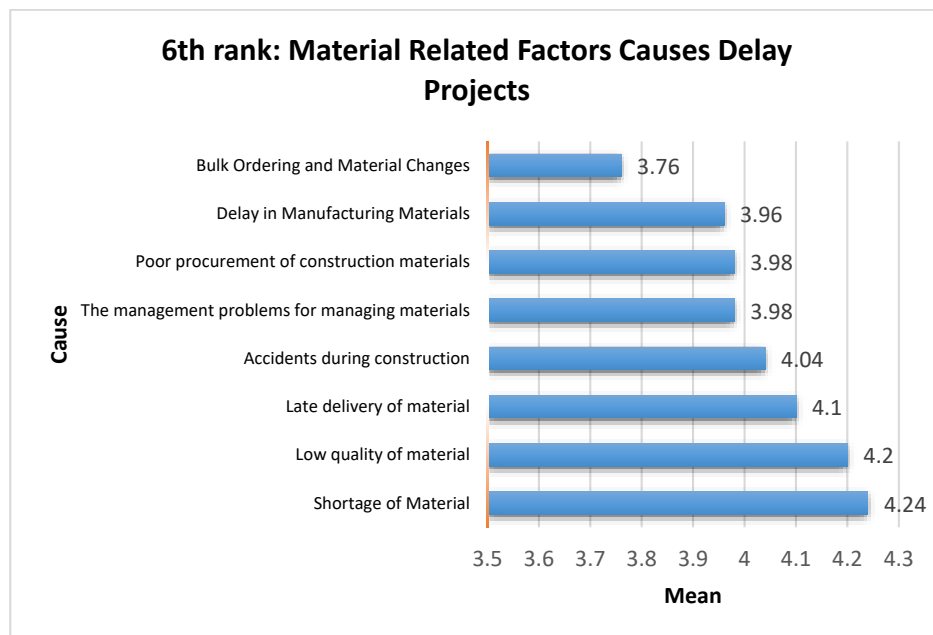


**Figure 4. 6** Consultant Related Factors Causes Delay Projects

According to the ranking of factors contributing to delays, consultant-related factors are in third position with a mean of 4.09. The leading cause under

this category is the consultants' lack of knowledge about site conditions, with a mean of 4.16 and ranked first. This suggests that the majority of respondents concur that this is a noteworthy factor contributing to construction project delays in Somalia. The second factor is the lack of knowledge of construction methods before designing, with a mean of 4.12 and ranked third, showing that respondents consider it the third most common cause of delays. Poor site management is the third factor, with a mean of 3.94 and ranked sixth. Most respondents agree this is also a contributing factor. Inefficiency of consultants is another factor, with a mean of 4.10 and ranked fourth. This suggests that respondents see it as a notable cause of delays. Preparation of drawings is the fifth factor, with a mean of 4.04 and ranked fifth. Lastly, slow response to inspections is tied with the first factor, having a mean of 4.16 and also ranked first, indicating it is considered a major cause of delays by most respondents.

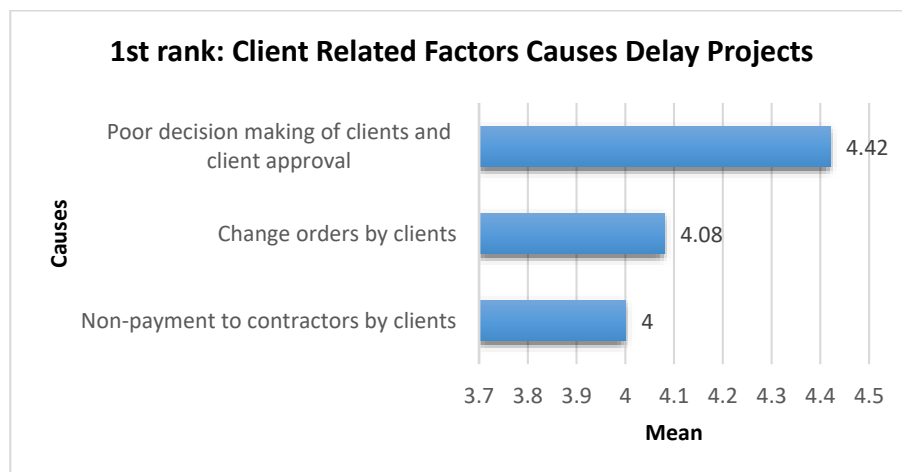
#### 4.6.2 Material-Related Factors Cause Delay Projects



**Figure 4. 7** Material Related Factors Causes Delay Projects

According to the ranking of factors contributing to delays, material-related factors are ranked sixth, with a mean of 4.03. The most significant material factor is a shortage of materials, with a mean of 4.24, ranked first. This indicates that most of the participants agree this is the primary material-related cause of construction project delays in Somalia. The second factor is the late delivery of materials, with a mean of 4.10, ranked third, showing that respondents consider this the third most significant cause of delays. The third factor is ordering estimated materials in bulk and changing materials during construction, with a mean of 3.76, ranked eighth. Most respondents agree this is also a contributing factor. Management problems for managing materials and poor procurement of construction materials are both significant factors, each with a mean of 3.98, ranked fifth. Delay in manufacturing materials is another factor, with a mean of 3.96, ranked seventh. Accidents during construction, with a mean of 4.04, ranked fourth, is also considered a significant factor. Finally, the low quality of materials, with a mean of 4.20, ranked second, indicates it is one of the primary causes of delays according to most respondents.

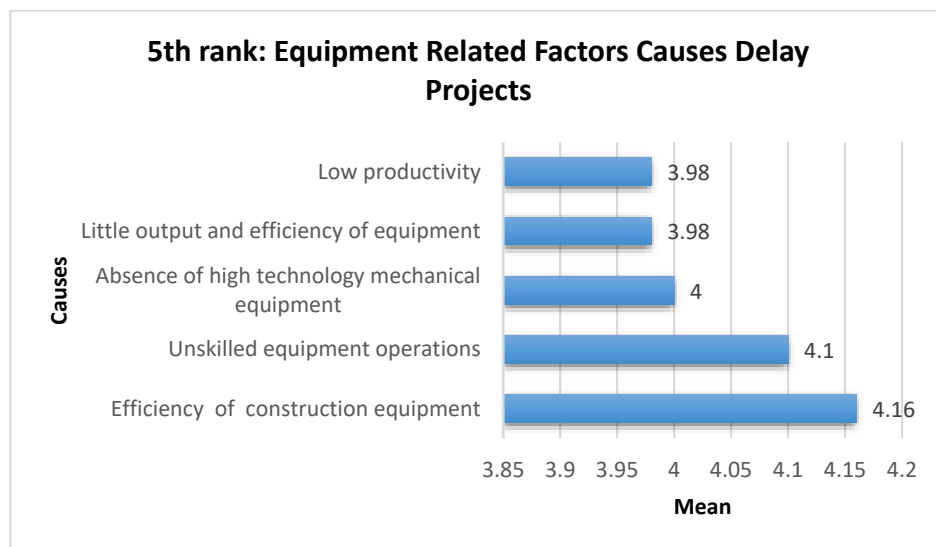
#### 4.6.3 Client-Related Factors Cause Delay Projects



**Figure 4. 8** Client Related Factors Causes Delay Projects

In terms of factors contributing to delays, client-related factors rank first with a mean score of 4.17. The primary factor under client-related issues causing delays in construction projects is non-payment to contractors by clients, with a mean score of 4.00, ranking third. This suggests that most respondents agree that this is one of the factors causing delays. The second significant factor is change orders by clients, with a mean score of 4.08, ranking second. This indicates that the majority of respondents consider this a significant cause of construction project delays in Somalia. The third statement regarding poor decision-making of clients and client approval has a mean score of 4.42, ranking first. According to the mean and ranking, the prevailing agreement among respondents suggests that this statement embodies the principal factor contributing to construction project delays in Somalia.

#### 4.6.4 Equipment-Related Factors Cause Delay Projects

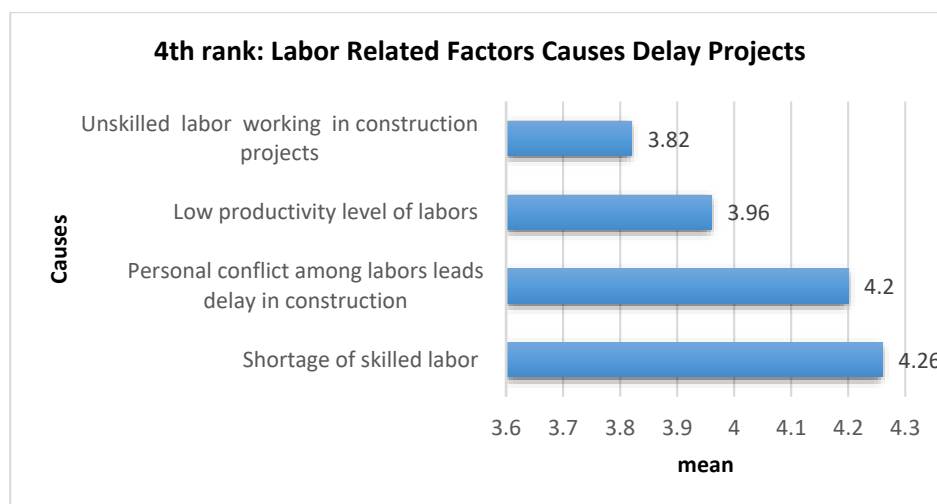


**Figure 4. 9** Equipment Related Factors Causes Delay Projects

Based on the ranking of factors contributing to construction delays, equipment-related issues are ranked fifth, with an average score of 4.04. The highest-rated statement is the unskilled operation of equipment, with a mean score of 4.10, placing it second. This indicates that most participants agree this

is a significant cause of construction delays in Somalia. The second statement, regarding the low output and efficiency of equipment, has a mean score of 3.98 and is ranked fourth, again suggesting agreement among respondents that this is a delay factor. The third statement, concerning the absence of advanced mechanical equipment, has a mean score of 4.00 and is ranked third, further confirming it as a notable cause of delays. The fourth statement, low productivity, also has a mean score of 3.98 and shares the fourth rank, indicating it is a recognized delay factor. The top-ranked statement, with a mean score of 4.20, is that personal conflicts among laborers cause construction delays, highlighting it as the most significant factor according to the respondents.

#### 4.6.5 Labor-Related Factors Cause Delay Projects

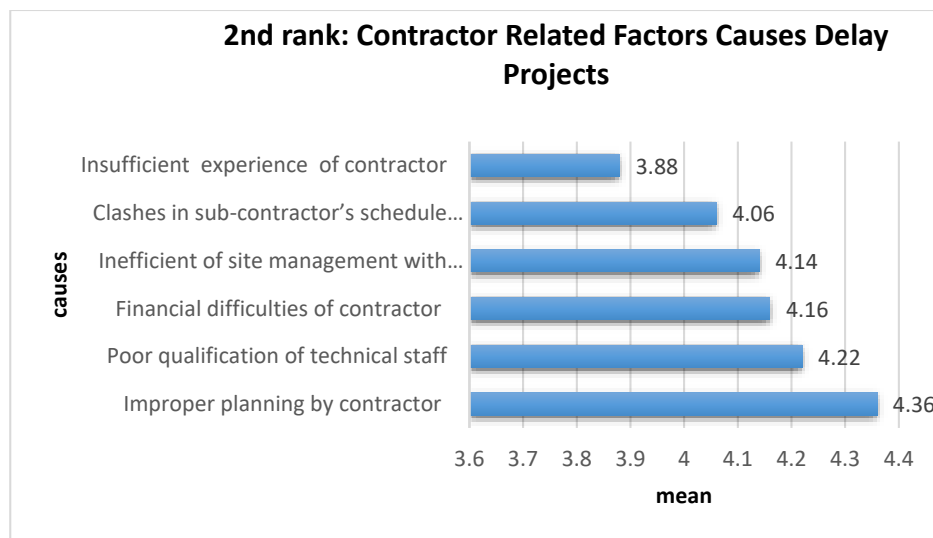


**Figure 4. 10** Labor Related Factors Causes Delay Projects

Based on the ranking of factors contributing to construction delays, labor-related issues are positioned fourth with an average score of 4.06. The leading statement in this category is the shortage of skilled labor, with a mean score of 4.26, ranked first. This indicates that most respondents agree this is the most prevalent cause of construction delays in Somalia. The second statement, involving unskilled labor working on construction projects, has a mean score of 3.82 and is ranked fourth, showing that respondents acknowledge it as a

significant delay factor. The third statement, the low productivity level of laborers, has a mean score of 3.96 and is ranked third, confirming it as a common cause of delays. The fourth statement, personal conflicts among laborers, has a mean score of 4.20 and is ranked second, highlighting it as another major factor contributing to construction delays in Somalia.

#### 4.6.6 Contractor-Related Factors Cause Delay Projects



**Figure 4. 11** Contractor Related Factors Causes Delay Projects

According to the ranking of factors contributing to construction delays, contractor-related issues are ranked second with an average score of 4.14. The leading statement is improper planning by the contractor, with a mean score of 4.36, placing it first. This indicates that most respondents agree this is the most prevalent cause of construction delays in Somalia. The second statement, inefficient site management, and poor management, has a mean score of 4.14 and is ranked fourth, showing that respondents acknowledge it as a significant delay factor. The third statement, financial difficulties of the contractor, has a mean score of 4.16 and is ranked third, confirming it as a common cause of delays. The fourth statement, insufficient experience of the contractor, has a mean score of 3.88 and is ranked sixth, indicating it is also recognized as a factor

causing delays. The fifth statement, clashes in the subcontractor’s schedule during the project execution, has a mean score of 4.06 and is ranked fifth, highlighting it as another notable factor contributing to delays. The sixth statement, poor qualification of technical staff, has a mean score of 4.22 and is ranked second, suggesting strong agreement among respondents that this is a significant cause of construction delays in Somalia.

#### 4.7 OBJECTIVE 2: ANALYSIS OF EFFECTS OF CONSTRUCTION PROJECT DELAYS IN SOMALI

The second objective of the study was to evaluate the effects of construction project delays in Somalia. Respondents were tasked with indicating their level of agreement with statements delineating the effects of such delays. In pursuit of this objective, respondents were presented with multiple statements regarding the consequences of construction project delays to gauge their insights and perspectives. The outcomes from the participants are consolidated in Table 4.9.

**Table 4. 9** Ranking of Effects of the Construction Project delays in Somalia

Ranking of Effects the Delay in Construction Projects in Somalia						
Descriptive Statistics						
No.	Questions	N	Minimum	Maximum	Mean	Ranking
C1.0	Cost overrun				4.15	1
C1.1	Cost overrun implies added costs over	50	3	5	4.08	5
C1.2	Cost is influenced by changes in the scope of work.	50	3	5	4.26	1
C1.3	Financial difficulties of contractor influenced cost overruns	50	3	5	4.2	3
C1.4	Corruption effects the cost of the project	50	3	5	4.1	4
C1.5	Poor estimation cost and schedule	50	3	5	4.02	6

**Table4.9** Continue

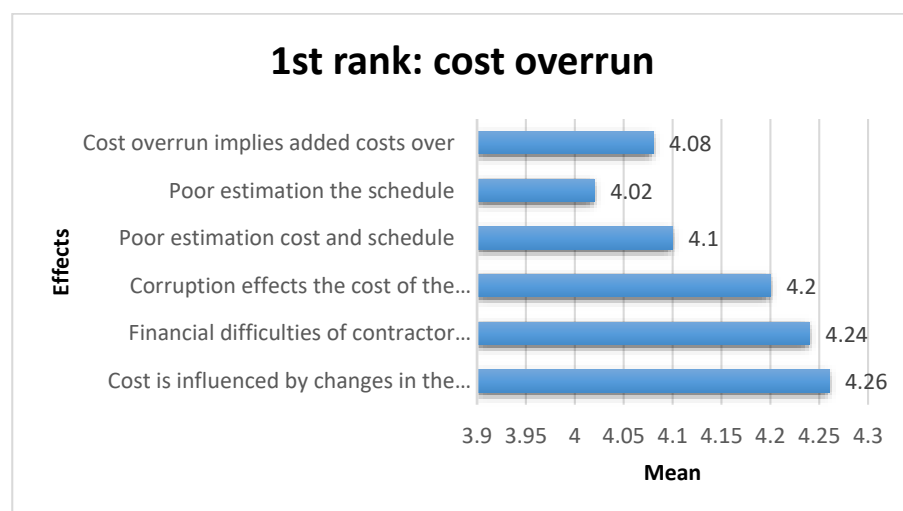
C1.6	Poor estimation the schedule	50	1	5	4.24	2
C2.0	Legal Disputes				4.09	4
C2.1	Delay in payment	50	2	5	4.1	1
C2.2	Undefined responsibilities of the parties involved in the project	50	2	5	4.08	2
C2.3	Unclear planning and instruction and delay in performing inspection and testing	50	2	5	4.08	2
C3.0	Time overrun				4.14	3
C3.1	Poor estimation the schedule of the project planning	50	3	5	4.29	1
C3.2	Delay the material delivery to the site.	50	3	5	4.12	4
C3.3	Lack of knowledge to manage the project	50	2	5	3.92	6
C3.4	Delay payment	50	2	5	4.13	3
C3.5	Shortage of labor	50	2	5	4.12	4
C3.6	Low of required equipment's	50	3	5	4.27	2
C4.0	Lost profit				4.15	1
C4.1	Change orders	50	2	5	3.98	3
C4.2	Disputes between client and contractor	50	3	5	4.18	2
C4.3	Poor estimation the cost of the project	50	3	5	4.29	1
C5.0	Abandonment				4	5
C5.1	Financial difficulties face by owner	50	2	5	4	10
C5.2	Unexpected bad economic conditions	50	2	5	3.98	12
C5.3	Inadequate project feasibility	50	3	5	3.94	14
C5.4	Poor contract administration	50	2	5	4.07	5
C5.5	Incompetent of contractors or subcontractors	50	2	5	4.13	3
C5.6	Project control problems	50	2	5	3.9	15
C5.7	Site acquisition problems	50	2	5	3.71	19
C5.8	Incompetent consultants	50	2	5	4.04	8
C5.9	Unclear lines of responsibility	50	2	5	4.17	1
C5.10	Lack of cooperation from local authorities	50	3	5	3.9	15

**Table 4.9** Continue

C5.11	Faulty tender process	50	2	5	3.83	18
C5.12	Litigation	50	2	5	4.06	6
C5.13	Negative impact of project towards society or environment	50	2	5	3.96	13
C5.14	Lack of motivation of site workers	50	2	5	4	10
C5.15	Poor safety management on site	50	2	5	4.1	4
C5.16	Unexpected location difficulty	50	3	5	4.06	6
C5.17	Unskilled site workers	50	3	5	3.86	17
C.18	Involvement of large number of participants of project	50	2	5	4.04	8
C5.19	Unavailability of materials	50	2	5	4.14	2

The scale used ranges from 1 to 5, with 5 meaning "strongly agree," 4 meaning "agree," 3 meaning "neutral," 2 meaning "disagree," and 1 meaning "strongly disagree." Interpreting the mean values of the Likert scale: scores between 1 and 1.8 indicate "strongly disagree," 1.81 to 2.60 indicate "disagree," 2.61 to 3.40 indicate "neutral," 3.41 to 4.20 indicate "agree," and 4.21 to 5 indicate "strongly agree."

#### 4.7.1 Cost overrun

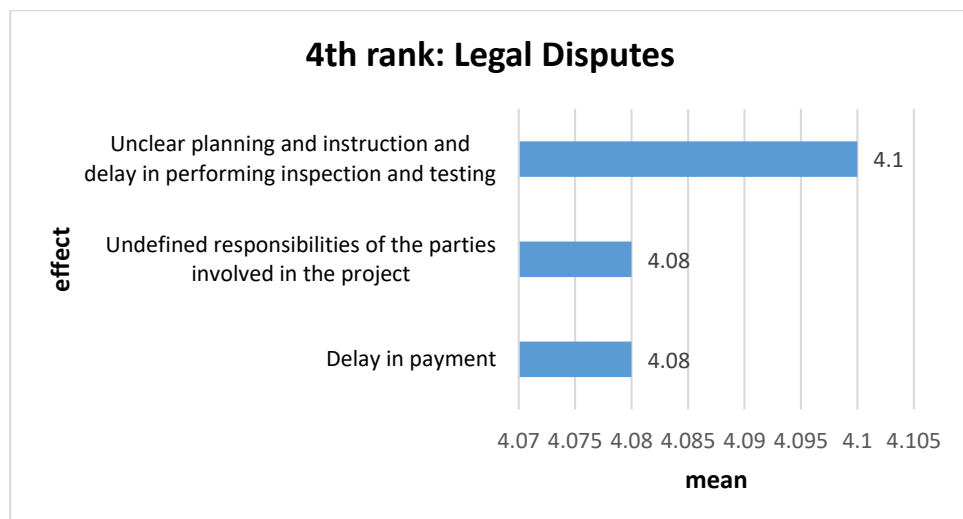


**Figure 4. 12** cost overrun

According to the ranking of the impacts of construction project delays, cost overruns hold the top position with an average score of 4.15. The first statement under the effects of delay is that cost overruns imply additional costs, with a mean score of 4.08. This suggests that most of the respondents concur that this constitutes a significant effect of construction project delays in Somalia.

The statement "Cost is affected by changes in the scope of work" has a mean score of 4.26 and is ranked first, showing strong agreement among respondents that this is a major effect of delays. The third statement, "Financial difficulties of the contractor influence cost overruns," has a mean score of 4.20 and is ranked third, confirming it as an agreed-upon effect of delays. The fourth statement, "Corruption affects the cost of the project," has a mean score of 4.10 and is ranked fourth, indicating agreement on its impact. The fifth statement, "Poor estimation of cost and schedule," has a mean score of 4.02 and is ranked sixth, with respondents agreeing on its significance. The sixth statement, "Poor estimation of the schedule," has a mean score of 4.24 and is ranked second, indicating strong agreement that this is a significant effect of delays in construction projects in Somalia.

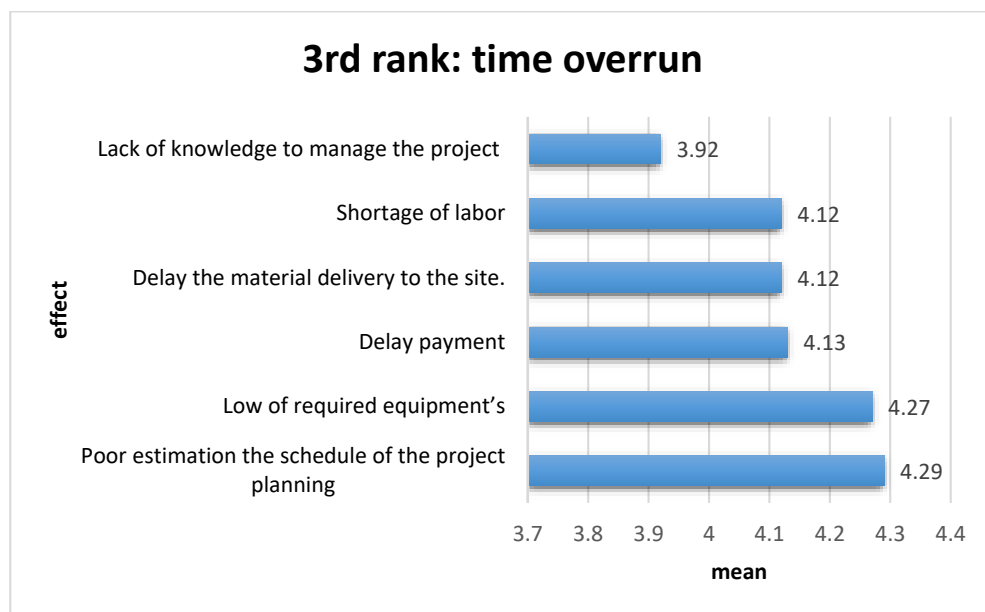
#### 4.7.2 Legal Disputes



**Figure 4. 13** Legal Disputes

According to the ranking of the effects of construction project delays, legal disputes are ranked fourth with a mean score of 4.09. The first statement under legal disputes is "Delay in payment," with a mean score of 4.10, ranked first. The majority of respondents agreeing to this indicates that it is indeed considered a significant effect of construction project delays in Somalia. The statement, "Undefined responsibilities of the parties involved in the project," has a mean score of 4.08 and is ranked second, showing that respondents agree this is a notable effect. The third statement, "Unclear planning and instruction and delays in performing inspection and testing," also has a mean score of 4.08 and shares the second rank, confirming that most respondents recognize this as a significant effect of delays in construction projects in Somalia.

#### 4.7.3 Time overrun

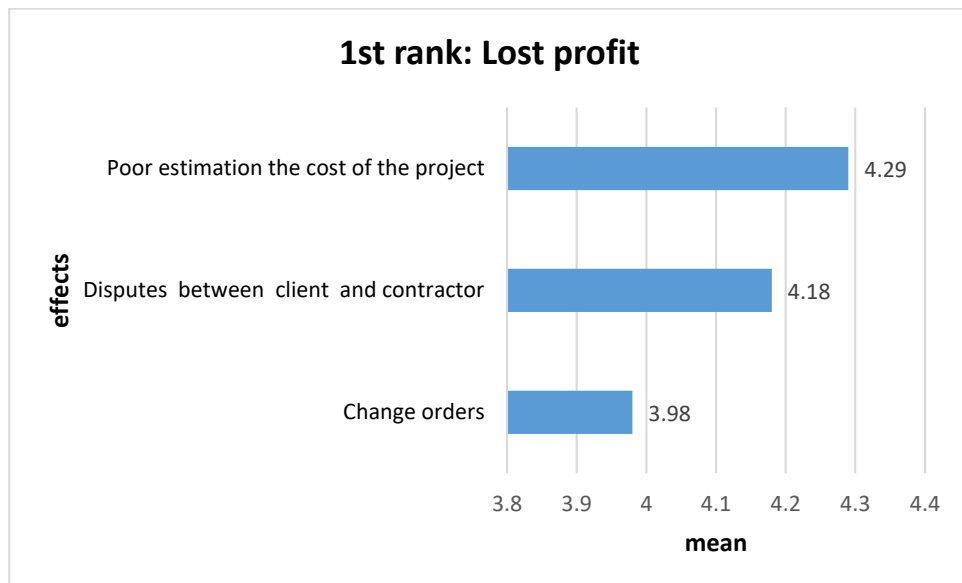


**Figure 4. 14** time overrun

in the assessment of the impacts of construction project delays, time overruns are ranked third, with an average score of 4.14. The first statement is "Poor estimation of the schedule of project planning," with a mean score of 4.29, ranked first. This suggests that most of the respondents strongly agree that this

is a significant effect of construction projects delays in Somalia. The second statement, "Delay in material delivery to the site," has a mean score of 4.12 and is ranked fourth, showing that most respondents agree this is a notable effect. The third statement, "Lack of knowledge to manage the project," has a mean score of 3.92 and is ranked sixth, indicating that respondents recognize this as an effect of delays. The fourth statement, "Delay in payment," has a mean score of 4.13 and is ranked third, confirming agreement among respondents that this is a significant effect. The fifth statement, "Shortage of labor," also has a mean score of 4.12 and shares the fourth rank, highlighting it as an agreed-upon effect. The sixth statement, "Lack of required equipment," has a mean score of 4.27 and is ranked second, showing strong agreement that this is a major effect of delays in construction projects in Somalia

### 4.7.3 Lost profit

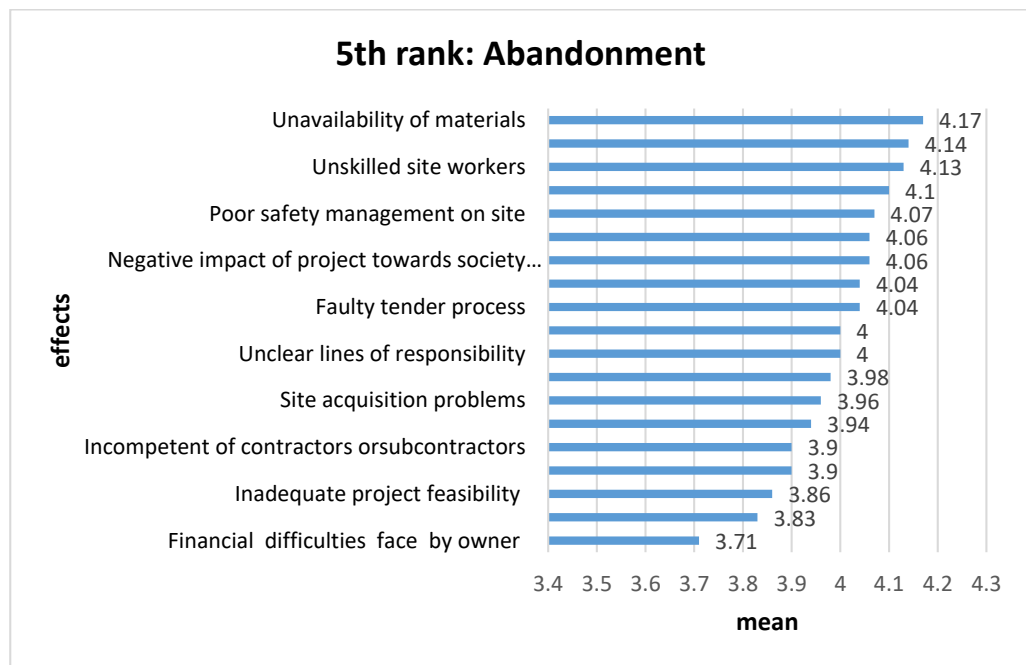


**Figure 4. 15** Lost profit

According to the ranking of the effects of construction projects delays, lost profit is ranked first with an average score of 4.15. The first statement under the effects of delay is "Change orders," with a mean score of 3.98, ranked third. This

suggests that most respondents agree this is a serious effect of construction projects delays in Somalia. The second statement, "Disputes between client and contractor," has a mean score of 4.18 and is ranked second, showing that respondents agree this is a notable effect. The third statement, "Poor estimation of the cost of the project," has a mean score of 4.29 and is ranked first, indicating that most of the participants strongly agree this is a major effect of construction project delays in Somalia.

#### 4.7.4 Abandonment



**Figure 4. 16** Abandonment

According to the ranking of the effects of construction project delays, project abandonment is positioned fifth with an average score of 4.00. The first statement under this category is "Financial difficulties faced by the owner," with a mean score of 4.00 and ranked eleventh, indicating that most respondents agree this is a significant effect of delays. The second statement, "Unexpected bad economic conditions," has a mean score of 3.98 and is ranked thirteenth, showing general agreement on its impact. The third statement, "Inadequate

project feasibility," with a mean score of 3.94 and ranked fifteenth, confirms it as a recognized effect. The fourth statement, "Poor contract administration," has a mean score of 4.07 and is ranked fifth, indicating agreement among respondents. The fifth statement, "Incompetent contractors or subcontractors," scored 4.13 and is ranked third, showing consensus on its significance. The sixth statement, "Project control problems," has a mean score of 3.90 and is ranked sixteenth, confirming it as an acknowledged effect. The seventh statement, "Site acquisition problems," with a mean score of 3.71 and ranked seventh, shows agreement among respondents. The eighth statement, "Incompetent consultants," has a mean score of 4.04 and is ranked eighth, indicating it as a notable effect. The ninth statement, "Unclear lines of responsibility," scored 4.17 and is ranked first, showing strong agreement on its impact. The tenth statement, "Lack of cooperation from local authorities," with a mean score of 3.90 and ranked sixteenth, confirms its significance. The eleventh statement, "Faulty tender process," scored 3.83 and is ranked nineteenth, showing general agreement. The twelfth statement, "Litigation," with a mean score of 4.06 and ranked sixth, indicates it as a recognized effect. The thirteenth statement, "Negative impact of the project on society or the environment," has a mean score of 3.96 and is ranked fourteenth, confirming its significance. The fourteenth statement, "Lack of motivation of site workers," with a mean score of 4.00 and ranked eleventh, indicates agreement among respondents. The fifteenth statement, "Poor safety management on site," scored 4.10 and is ranked fourth, confirming its impact. The sixteenth statement, "Unexpected location difficulty," with a mean score of 4.06 and ranked sixth, shows agreement among respondents. The seventeenth statement, "Unskilled site workers," scored 3.86 and is ranked eighteenth, confirming its recognition. The eighteenth statement, "Involvement of a large number of participants in the project," has a mean score of 4.04 and is ranked eighth, indicating it as a notable effect. The nineteenth statement, "Unavailability of materials," with a mean score of 4.14 and ranked second, shows strong agreement on its impact.

#### 4.8 OBJECTIVE 3: THE MITIGATION OF THE FACTORS THAT CAUSE CONSTRUCTION PROJECT DELAYS IN SOMALIA.

The third objective of the study involves analyzing methods for mitigating construction project delays in Somalia. Participants were requested to express their agreement level regarding various statements pertaining to mitigating construction delays in Somalia. The summarized data from the respondents are presented in Table 4.10.

**Table 4. 10** Ranking the Mitigation for the Factors that Causes Construction Project delays in Somalia.

Ranking the Mitigation for the Factors that Causes Construction Project delays in Somalia.						
Descriptive Statistics						
No.	Questions	N	Minimum	Maximum	Mean	Ranking
D.0					3	1
D1	Accurate initial cost estimates	50	3	5	4.18	3
D2	Perform a preconstruction planning of project tasks	50	3	5	4.06	7
D3	Adopting a new approach to contract award procedure by giving less weight	50	2	5	3.94	16
D4	Allocation of sufficient time	50	3	5	3.83	24
D5	Availability of resources	50	2	5	4.04	8
D6	Commitment to projects	50	2	5	4.12	5
D7	Competent project manager	50	2	5	4.04	8
D8	Comprehensive contract documentation	50	2	5	3.88	19
D9	Ensure adequate and available source of finance until project completion	50	2	5	3.84	23
D10	Available source of finance until project completion	50	2	5	4	12
D11	Frequent progress meeting	50	3	5	4.27	2
D12	Enforcing liquidated damage clauses	50	3	5	3.96	14
D13	Hire an independent supervising engineer to monitor the progress of the work	50	2	5	4.02	10

**Table 4.10** Continue

D14	Multidisciplinary/competent project team	50	3	5	3.92	18
D15	Use up-to-date technology utilization	50	3	5	3.88	19
D16	Accurate initial time estimates	50	2	5	4.02	10
D17	Construction management (CM) type of contracts	50	2	5	3.86	22
D18	Frequent coordination between the parties involved	50	2	5	3.96	14
D19	Use modern construction equipment	50	2	5	3.69	27
D20	Use appropriate construction methods	50	2	5	3.72	26
D21	Proper material procurement	50	2	5	3.94	16
D22	Proper project scheduling	50	2	5	3.87	21
D23	Complete the design at the right Time	50	2	5	3.78	25
D24	Develop construction manufacturing	50	2	5	4.11	6
D25	Provide construction equipments	50	3	5	4.15	4
D26	Develop the construction companies' system	50	3	5	4	12
D27	Awarding bids to the right/experience consultant and contractor	50	3	5	4.32	1

The Likert scale, consisting of five points, functions similar to an interval scale, where the mean holds importance. Scores from 1 to 1.8 represent strong disagreement, 1.81 to 2.60 indicate disagreement, 2.61 to 3.40 denote neutrality, 3.41 to 4.20 signify agreement, and 4.21 to 5 suggest strong agreement.

In assessing strategies to mitigate factors contributing to construction project delays in Somalia, the following findings emerge: The first suggestion, regarding accurate initial cost estimates, garnered a mean score of 4.18 and was ranked third, indicating widespread agreement among respondents regarding its significance in addressing project delays. Similarly, the second proposal, emphasizing preconstruction planning of project tasks, attained a mean score of 4.06 and was ranked seventh, indicating consensus among respondents on its relevance to mitigating delays. The third recommendation, advocating for a new approach to contract award procedures with reduced weight, achieved a mean score of 3.94 and was ranked sixteenth, reflecting a prevailing agreement among

respondents regarding its impact on project delays. The fourth proposition, advocating for the allocation of sufficient time, received a mean score of 3.83 and was ranked twenty-fourth, signaling concurrence among respondents regarding its importance in addressing delays. Lastly, the fifth statement, focusing on the availability of resources, obtained a mean score of 4.04 and was ranked eighth.

Based on both the mean scores and the ranking, it's clear that most respondents see these statements as contributing factors to construction project delays in Somalia. Statement six, which focuses on commitment to projects, received a mean score of 4.12 and was ranked fifth, indicating widespread agreement among respondents regarding its impact on delays. Similarly, statement seven, highlighting the importance of having competent project managers, scored an average of 4.04 and ranked eighth, suggesting broad consensus on its significance. Statement eight, advocating for comprehensive contract documentation, received a mean score of 3.88 and was ranked nineteenth, indicating that most respondents agree it plays a role in project delays. Statement nine, emphasizing the need for proper and available sources of finance until project finished, scored an average of 3.84 and ranked twenty-third, further underscoring its perceived importance in delaying projects. Statement ten, echoing the importance of available finance throughout the project, received an average score of 4.00 and was ranked twelfth, indicating widespread agreement among respondents. Statement eleven, promoting frequent progress meetings, scored the highest with a mean of 4.27 and a ranking of second, suggesting strong consensus among respondents that this is a significant factor in project delays. Statement twelve, about enforcing liquidated damage clauses, received a mean score of 3.96 and ranked fourteenth, indicating agreement among respondents regarding its impact. Finally, statement thirteen, advocating for the employment of an independent supervising engineer to oversee progress, scored an average of 4.02 and ranked tenth, further highlighting its perceived importance in mitigating delays.

Based on the average scores and rankings, it's evident that most respondents believe these statements contribute to delays in construction projects in Somalia. Statement fourteen, which emphasizes the need for a multidisciplinary/competent project team, received a mean score of 3.92 and ranked eighteenth, indicating widespread agreement among respondents regarding its role in project delays. Similarly, statement fifteen, advocating for the use of up-to-date technology, scored an average of 3.88 and ranked nineteenth, suggesting broad consensus on its importance in mitigating delays. Statement sixteen, stressing the necessity of accurate initial time estimates, obtained a mean score of 4.02 and ranked tenth, indicating agreement among respondents regarding its impact. Statement seventeen, focusing on the use of Construction Management (CM) contracts, received a mean score of 3.86 and ranked twenty-second, suggesting agreement among respondents on its significance. Statement eighteen, promoting frequent coordination between involved parties, achieved a mean score of 3.96 and ranked fourteenth, further highlighting its perceived importance in addressing delays. Statement nineteen, advocating for the use of modern construction equipment, received a mean score of 3.69 and ranked twenty-seventh, indicating agreement among respondents regarding its role in project delays. Statement twenty, emphasizing the use of appropriate construction methods, obtained a mean score of 3.72 and ranked twenty-sixth, indicating consensus among respondents on its significance. Statement twenty-one, highlighting proper material procurement, achieved a mean score of 3.94 and ranked sixteenth, further indicating its perceived importance in mitigating delays. Statement twenty-two, stressing proper project scheduling, obtained a mean score of 3.87, indicating agreement among respondents on its impact. Statement twenty-three, focusing on completing design tasks in a timely manner, received a mean score of 3.78 and ranked twenty-first, further highlighting its perceived importance in addressing delays. Statement twenty-four, advocating for the development of construction manufacturing, achieved a mean score of 4.11 and ranked sixth, indicating agreement among respondents on its significance. Statement twenty-five,

emphasizing the provision of construction equipment, received a mean score of 4.15 and ranked fourth, suggesting strong consensus among respondents on its importance. Statement twenty-six, promoting the development of construction companies' systems, obtained a mean score of 4.00 and ranked twelfth, indicating agreement among respondents on its impact. The final statement, advocating for awarding bids to experienced consultants and contractors, achieved a mean score of 4.32 and ranked first, suggesting strong agreement among respondents regarding its significance in addressing delays.

#### **4.8.1 Discussion Of The Mitigation Of Construction Project Delays In Somalia.**

A successful construction project is typically defined by achieving its intended goals within predetermined targets, including timely completion, adherence to budget, and meeting specified standards. Delays pose significant challenges in construction, with their impact varying depending on the project. Recognizing their negative consequences on project objectives, and addressing threats to project goals becomes paramount in mitigating delays. The focus of mitigation strategies in construction projects is to avert these adverse effects, ensuring progress aligns with project objectives, namely timely completion within budget and acceptable quality.

Most of the respondents in this study endorse the mitigation strategies for addressing construction project delays in Somalia, emphasizing the importance of preventing these factors from occurring in projects. The success of construction projects is considered essential for all parties involved, as highlighted in the questionnaire distributed to construction companies in Somalia. The respondents largely agree with the 96 statements outlined in the study's objectives.

This section delves into the findings of the questionnaire and presents the research results, encompassing four main areas:

- Discussion on The reasons behind construction project delays in Somalia

- Examination of the consequences of construction project delays in Somalia
- Analysis of mitigation measures for addressing The reasons behind construction project delays in Somalia

#### **4.8.2 Discussion Factors That Cause Of Construction Project Delays In Somalia**

In this section, 32 statements addressed factors contributing to construction projects delays, with mean scores ranging from 4.42 to 3.76. These means suggest that the majority of respondents agree on these factors as causes of delays. The study identified consultant, material, client, equipment, labor, and contractor factors as primary contributors to delays in construction projects both generally and specifically in Somalia. Notably, poor communication and coordination emerged as the foremost factor leading to delays in Somali construction projects. It emphasizes the need for contractors to prioritize effective coordination among subcontractors to facilitate smoother workflow and prevent unnecessary disruptions.

The research underscores the significant impact of inappropriate construction methods on project delays in Somalia, particularly due to the demoralizing effects on labor caused by redoing work. To mitigate this, the study suggests employing quality materials to enhance sustainability and avoid delays.

To address these factors effectively, the study recommends proactive measures to prevent their occurrence in construction projects. For instance, to mitigate consultant-related delays, focus should be placed on addressing poor management at construction sites. Similarly, avoiding material shortages emerges as a crucial strategy among the various material factors contributing to delays. Client-related delays can be mitigated by ensuring timely payments and fostering better decision-making processes.

Equipment factors, such as unskilled operation and the lack of advanced machinery, also need to be addressed proactively to prevent delays. Additionally, addressing labor-related issues, such as shortages of skilled

workers and unskilled labor, is vital for avoiding delays. Finally, contractors need to prioritize proper planning to prevent delays attributed to their actions.

#### **4.8.3 Discussion Effects of Delay in Construction Projects in Somalia**

In this section of the study examined the impacts of delays on construction projects in Somalia. With mean scores ranging from 4.29 to 3.83, it's evident that the majority of respondents agree on these effects of delays. The research identified several effects of construction project delays, both generally and specifically in Somalia, including cost overruns, legal disputes, time overruns, lost profits, and project abandonment. To address these effects effectively, the study emphasizes the importance of proactive measures to prevent their occurrence in construction projects. Cost overrun is one of the effects happen delays in construction projects, to avoid these taking place be aware of the statements listed under the cost overrun in objective 2 and these are the important cost overruns that imply added costs over and changing the scope of the work. The second effect is legal disputes, to avoid this, three statements were listed and the important ones are change orders and unclear planning and instruction. Time overrun is also one of the effects of construction project delays in Somalia, to avoid were six statements under the time overrun effects and some of these are, poor estimation of the schedule of the project planning and delay of the payment. Lost profit, to avoid this effect, three statements under that effect were listed and some of these are change orders and poor estimation of the cost of the project. Last but not least, after six months there was not a single activity at the construction site assuming this project was abandoned. To avoid this, nineteen statements under that effect have been listed under the abandonment and some of these are poor contract administration, project control problems, incompetent consultants, and poor safety management at the site. The best mitigation for these effects is to avoid them before they take place in the construction.

#### **4.8.4 Discussion of strategies to mitigate the factors contributing to construction project delays in Somalia.**

The majority of participants in this study concurred with the statements regarding the mitigation of factors causing construction projects delays in Somalia. The most effective mitigation strategy is to prevent these factors from occurring in construction projects altogether. This research highlights the critical significance of construction project success for all involved stakeholders. The study involved sending a questionnaire via Google to construction companies in Somalia, with the majority of respondents agreeing with the 27 statements listed to mitigate factors causing construction project delays. Among these, the top five most crucial factors were identified as follows: availability of materials, competent project management, proper initial cost estimates, and proper initial time estimates. It was noted that having a competent project manager, equipped with decision-making and critical thinking skills, is crucial for project success, as the lack thereof was identified as a main factor contributing to construction project delays. Furthermore, accurate cost estimation was found to be essential for projects to adhere to budgetary constraints, as improper estimation was identified as a leading reason of project delays. The majority of the respondents agree improper estimation of cost causes delays in construction projects in Somalia. Accurate time estimation also helps to avoid the delay to take place. So, the construction manager needs to estimate the time after having more knowledge of the project activities at the site. The available source of finance until the project is finished, the majority of the respondents agree with this statement, and helps to avoid delay to take place. Proper material procurement also helps to avoid delays to take place in construction projects. Developing construction manufacturing will help to get the construction material easily without any delay, most respondents concur that importing construction materials from China contributes to delays in construction projects in Somalia. Providing heavy construction equipment can mitigate these delays by ensuring efficient and timely transportation and handling of materials.

The study revealed that implementing specific strategies could effectively mitigate delays in construction projects, as supported by the respondents' feedback. These strategies include ensuring the presence of competent project managers, accurate estimation of time and cost, effective cash flow management, quality assurance, healthy and safety protocols, efficient staff management, environmental sustainability measures, meticulous material handling, adept contractor oversight, efficient site office operations, proactive stakeholder engagement, effective labor management, strategic tendering processes, and seamless project handover management. The majority of respondents in the research endorsed these mitigation strategies for addressing construction project delays in Somalia. It was emphasized that the best approach to mitigate delays is to prevent these factors from occurring in construction projects altogether.

#### **4.9 CONCLUSION**

This chapter entails a thorough analysis and discussion of the data gathered from the questionnaire survey, primarily focusing on identifying a mitigation plan for construction project delays in Somalia. The research successfully achieved its objectives, This involved examining the factors contributing to construction project delays in Somalia, exploring the effects of these delays, and proposing a mitigation plan to address these factors.

To ensure the consistency of the variables employed in the analysis, a reliability test was executed. Additionally, the results garnered from the analysis were ranked utilizing the mean for Descriptive Statistics to determine the most effective mitigation strategies for delaying construction projects in Somalia.

Moving forward, Chapter 5 will provide a summary of the three objectives accomplished in the study, discuss the implications of the findings, outline the limitations of the research, and offer recommendations to construction companies and future researchers. Finally, the chapter will conclude by synthesizing the key insights gleaned from the study

## **CONCLUSION AND RECOMMENDATION**

### **INTRODUCTION**

A discussion of the outcomes of the research is given in this chapter. The chapter starts with a short study overview and summarizes how the goals and priorities have been accomplished. The specific findings of the research questions outlined in Chapter One are discussed. Additionally, this chapter highlights several key conclusions drawn from the study's findings. It encompasses the primary limitations of the research and concludes with recommendations for future investigation.

Finally, the contributions made by the thesis and the conclusion are presented.

### **ACHIEVEMENTS OF RESEARCH OBJECTIVES**

This research aimed to investigate the mitigation strategies for factors causing construction project delays in Somalia. This objective was pursued through three main goals:

- Identifying the factors contributing to construction project delays in Somalia.
- Examining the effects of these delays on construction projects in Somalia.
- Proposing mitigation measures to address the factors causing construction projects delays in Somalia.

#### **Objective 1: The Factors That Causes The Construction Project Delays In Somalia**

Objective 1 of this research has been successfully accomplished, as demonstrated in Table 4.9 of Chapter 4. The table presents the factors causing

construction project delays in Somalia, listed in descending order of their mean scores. This study identified various factors contributing to construction project delays, both generally and specifically in Somalia, including consultant, material, client, equipment, labor, and contractor factors. Overall, the research findings highlight poor communication and coordination as the primary factors driving construction project delays in Somalia. To address this, contractors should prioritize effective coordination among subcontractors to facilitate smoother workflow and prevent unnecessary delays. The most effective way to mitigate these factors is to prevent them from occurring in the first place. Construction companies must adopt new approaches to project management to ensure projects are completed within estimated timeframes and budgets.

### **Objective 2: The Effects Of Construction Project Delay In Somalia**

Objective 2 of this research has been successfully attained, as evidenced in Table 4.10 of Chapter 4. The table presents the effects of construction project delays in Somalia, listed in descending order of their mean scores. The majority of respondents agree on these effects of construction project delays in Somalia. This study identified several effects of construction project Delay, both generally and specifically in Somalia, including cost overrun, legal disputes, time overrun, lost profit, and abandonment. Further discussion on the effects of construction project delays in Somalia can be found in Chapter 4. The most effective mitigation strategy for these effects is to prevent them from occurring in construction projects altogether.

### **Objective 3: The Mitigation Of The Factors That Cause Construction Project Delays In Somalia.**

Objective 3 of this research has been achieved, as evidenced by the findings presented in Table 4.11 of Chapter 4. This table illustrates the mitigation strategies for factors causing construction project delays in Somalia, ranked by their mean values from highest to lowest. Most of the respondents in

this study agreed with the statements regarding the mitigation of these delay-causing factors. The most effective mitigation strategy identified is the prevention of these factors in construction projects.

The study highlighted the critical importance of successful construction projects for all participants involved. Data was collected through questionnaires distributed via Google to construction companies in Somalia. The respondents largely agreed on 27 strategies to mitigate delay factors, with the five most significant being: resource availability, having a capable project manager, precise initial cost estimates, and accurate initial time estimates.

The findings support that these factors can help mitigate delays if construction companies implement strategies involving competent project managers, accurate cost and time estimations, and effective management of cash flow, quality, safety and health, staff, environment, materials, contractors, site office, stakeholders, labor, tendering, and handover processes. Prevention remains the most effective approach to mitigate construction project delays.

## **IMPLICATIONS**

The effects of construction project delays in Somalia highlight the need for construction companies to adopt mitigation strategies. Currently, many construction projects face delays due to the absence of skilled construction managers to address these challenges. Key implications of the study's results include:

- Construction companies need to adopt strategies that include having skilled project managers, precise cost and time estimates, effective cash flow management, quality control, safety and health protocols, efficient staff management, environmental oversight, material handling, contractor supervision, site office administration, stakeholder engagement, labor coordination, tendering processes, and smooth project handover procedures.

- Sufficient investment is necessary for the successful implementation of projects.
- Utilizing modern construction equipment and proper material procurement can help resolve issues related to equipment availability and failure.
- Proper initial cost estimates and effective planning can help construction companies manage price fluctuations and prevent mistakes during construction.
- To address communication issues that cause project delays, establishing clear channels of information and communication, and ensuring regular coordination among all project stakeholders, is crucial.

## **LIMITATIONS OF RESEARCH**

This section shows the difficulties of this research that occur during this study. The limitations of this research are below:

(i) Obtaining accurate data about construction companies in Mogadishu is challenging.

(ii) The research is only focused in Mogadishu, Somalia. If the research covers many areas in Somalia the result could be included to a wider scope.

(iii) The research instrument employed in this study exclusively comprised a questionnaire, without incorporating any interviews. The purpose of the study was to address and mitigate the factors contributing to delays in construction projects in Somalia..

## **RECOMMENDATION FOR FUTURE RESEARCH**

The recommendation serves as a step forward to enhance the research findings and address the limitations previously mentioned. According to the

findings of the study and the discussions above and taking into consideration that continuous improvements will require more fundamental changes than the adoption of the recommendations statements. This research has managed to discover the mitigation plan and the factors that cause construction project delays in Somalia through well-structured questionnaires.

Further research is recommended to explore the factors causing construction project delays as listed in Chapter Four. Finally, mitigation methods for the root of the factors that cause delays can be carried out and this could be valuable for the field professionals to avoid delays to take place.

## **CONTRIBUTION**

This study represents a significant effort in investigating the mitigation of factors contributing to delays in construction projects in Somalia. It is intended to serve as a valuable reference for addressing and mitigating delays in construction projects within the Somali context. Other researchers may find these findings valuable for future studies aimed at developing robust mitigation strategies for each factor contributing to delays in construction projects. Consequently, this research is expected to garner significant interest, not only among construction companies but also within the general public.

## **CONCLUSION**

This study is a significant effort to explore the mitigation of factors causing construction project delays in Somalia. This chapter emphasizes the main constraints of the research and wraps up with suggestions for future investigation. The objectives of this research have been achieved. The study identified several factors causing construction project delays, both generally and specifically in Somalia: consultant factors, material factors, client factors, equipment factors, labor factors, and contractor factors. Overall, the findings reveal that poor communication and coordination are the most critical factors

contributing to delays in Somali construction projects. Additionally, the study highlighted the effects of delays, such as cost overruns, legal disputes, time overruns, lost profit, and project abandonment. Most respondents agreed with the statements regarding the mitigation of delay-causing factors.

The study suggests that delays in Somali construction projects can be minimized if construction companies adopt the following strategies: employing competent project managers, ensuring accurate cost and time estimation, managing cash flow effectively, implementing quality management practices, prioritizing safety and health management, efficiently managing staff, addressing environmental concerns, managing materials properly, overseeing contractors effectively, maintaining well-organized site offices, engaging stakeholders appropriately, managing labor efficiently, conducting thorough tendering processes, and handling project handovers carefully.

Further research is recommended to delve deeper into the factors causing delays in construction projects. Additionally, exploring mitigation methods for these root causes could be valuable for professionals in the field to prevent delays.

## REFERENCE

- Abdul-Rahman, H., Berawi, M., Mohamed, Othman, & Yahya, I. (2006). Delay mitigation in the Malaysian construction industry. *journal of construction engineering and management*, 125-133.
- Abedi, M., Fathi, M., & Mirasa, A. (2011). *establishment and development of ibs in malaysia.*: Penerbit UTM Press.
- Alade, K. T., Alade, K., Lawal, A., Omonori, A., & Olowokere, E. (2016). Causes and effects of delays in construction projects in Akure, Ondo State, Nigeria. *FUTA Journal of Management and Technology*, 29-38.
- Alsendi, M. A. (2015). *Studying the effect of decision making on delayed construction projects.* unpublished Doctoral ,The George Washington University.
- Al-Tmeemy, Samiaah M, Hassen M., Abdul-Rahman, H., & Harun, Z. (2011). Future criteria for success of building projects in Malaysia. *International journal of project management*, 337-348.
- Bekker, M., & Baloyi, L. (2011). Causes of construction cost and time overruns: The 2010 FIFA World Cup stadia in South Africa. *Journal for the Physical and Development Science*, 51-67.
- Bin Johan, A. (2013). *Delay factors in green building development projects in Malaysia: a phenomenological study* . Unpublished Doctoral dissertation, Open University Malaysia (OUM).
- CHAI, C., Yusof, A., & Habil, H. (2015). Delay mitigation in the Malaysian housing industry: A structural equation modelling approach. *Journal of Construction in Developing Countrie*,20(1), 65.

- Divya, R., & Ramya, S. (2015). Causes, effects and minimization of delays in construction projects. *In Proc. Conf. on the Research in Communication, Computation, Electrical Science and Structures* (s. 47-53). NCRACCESS.
- Doloi, H. (2012). Cost overruns and failure in project management:.. *Journal of construction engineering and management*,, 139(3), 267-279.
- Duat, H. Y. (2014). *Causes of time delay in construction Sarawak*. Unpublished doctoral dissertation, University of Malaysia Pahang Al-Sultan Abdullah.
- Durdyev, S., Omarov, M., & Ismail, S. (2017). Causes of delay in residential construction projects in Cambodia. *Cogent Engineering*, 4(1), 1291117.
- Fackroon, M., Pakir, A., & Omran, A. (2008). Causes of Construction Delay: A Case Study in LIBYA. *In 2nd International Conference On Built Environment In Developing Countries (ICBEDC 2008)*, (s. pp. 877-887).
- Farah, A. O. (2009). *Diaspora involvement in the development of Somalia*. Unpublished master's thesis, Aalborg University.
- Fathi, M., & Abedi, M. (2011). Effects of construction delays on construction project objectives. *First Iranian Students Scientific Conference in Malaysia*, (s. 1-8). malaysia.
- Gardezi, S., Manarvi, I., & Gardezi, S. (2014). Time Extension Factors in Construction Industry of Pakistan. *Procedia Engineering*,, 77, 196-204.

- Gunduz, M., Nielsen, Y., & Ozdemir, M. (2015). Fuzzy assessment model to estimate the probability of delay in Turkish construction projects. *Journal of Management in Engineering*, 31(4), 04014055.
- Johnson, M., Christensen, C., & Kagermann, H. (2008). Reinventing your business model. *Harvard business review*, 86(12), 50-59.
- Khatti, T., Agarwal, S., Gupta, V., & Pandey, M. (2016). Causes and effects of delay in construction project. *International Research Journal of Engineering and Technology*, 564-566.
- Kikwasi, G. (2012). Causes and effects of delays and disruptions in construction projects in Tanzania. In *Australasian Journal of Construction Economics and Building-Conference Series*, Vol. 1, No. 2, pp. 52-59.
- Krejcie, R., & Morgan, D. (1970). Determining sample size for research activities. *Educational and psychological measurement*, 30(3), 607-610.
- kulabi Ahmed, A., & Avetisyan, H. (2016). Reducing time and cost of construction projects by improving the properties of precast normal-weight wall panels. *Procedia engineering*, 145, 1066-1073.
- larsen, J., shen, G., lindhard, S., & brunoe, T. (2015). Factors affecting schedule delay, cost overrun, and quality level in public construction projects. *Journal of Management in Engineering*, 32(1), 04015032.
- Mohammed, K., & Isah, A. (2012). Causes of delay in Nigeria construction industry. *Interdisciplinary journal of contemporary research in business*, 4(2), 785-794.

- Motaleb, O., & Kishk, M. (2010). An investigation into causes and effects of construction delays in UAE. *In Procs 26th Annual ARCOM Conference*, (s. 6-8).
- Mukuka, M., J., Aigbavboa, C., & Thwala, W. (2014). A Theoretical Review of the Causes and Effects of Construction Projects Cost and. *In International Conference on Emerging Trends in Computer and Image Processing* (s. 15-16). ICETCIP'204.
- Mydin, M., Sani, N., Taib, M., & Alias, N. (2014). Imperative causes of delays in construction projects from developers. *In MATEC Web of Conferences* (s. Vol. 10, p. 06005). EDP Sciences.
- Najafabadi, E., & Pimplikar, S. (2013). The significant Causes and effects of delays in Ghadir 2206 residential project. *IOSR Journal of Mechanical and Civil Engineering*, 7(4), 75-81.
- Naoum, S. (2012). Dissertation research and writing for construction .
- Obodoh, D., & Chikasi, O. (2016). Causes and Effects of Construction Project Delays in Nigerian Construction Industry. *International Journal of Innovative Science, Engineering & Technology*, 3(5).
- Odeh, A. M., & Battaineh, H. T. (2002). Causes of construction delay: traditional contracts. *International journal of project management*, 20(1), 67-73.
- Olawale, Y., & Sun, M. (2010). Cost and time control of construction projects: inhibiting factors and mitigating measures in practice. Y. A. Olawale, & M. Sun içinde, *Construction management and economics* (s. 28(5), 509-526).
- Omran, A., peter, J., Aziz, A., Hussin, A., & mahmood, a. (2005). Causes of construction delays case studies in Langkawi Island, Malaysia.

*International Conference on Built Environmental*. Kuala Lumpur: University of Malaya.

Pourrostan, T., & Ismail, A. (2012). Causes and effects of delay in Iranian construction projects. *International Journal of Engineering and Technology*, 4(5), 598.

Sepasgozar, S., Razkenari, M., & Barati, K. (2015). The importance of new technology for delay mitigation in construction projects. *American Journal of Civil Engineering and Architecture*, 3(1), 15-20.

Sidawi, B. (2012). Management problems of remote construction projects and potential IT solutions; The case of kingdom of Saudi Arabia. *Journal of Information Technology in Construction(ITcon)*, 17(7), 103-120.

Sunjka, B. P., & Jacob, U. (2013). Significant causes and effects of project delays in the Niger delta region, Nigeria. *Southern African Institute of Industrial Engineering*, 641-14.

Thalheimer, W., & Cook, S. (2002). How to calculate effect sizes from published research: A simplified methodology. *Work-Learning Research*, 1(9), 1-9.

Tumi, S., Omran, A., & Pakir, A. (2009). Causes of delay in construction industry in Libya. *In the International Conference on Economics and Administration*, (s. 265-272).

Van Teijlingen, E., & Hundley, V. (2001). The importance of pilot studies. *Social research update*, (35), 1-4.

Wong, K., & Vimonsatit, V. (2012). A study of the factors affecting construction time in Western Australia. *Scientific Research and Essays*, 7(40),3390-3398.

## APPENDICES

### APPENDEX A



#### **Addressing Delays in Construction Projects in Somalia: Mitigation Of Contributing Factors.**

This research is part of the requirement to complete the program of Master of civil engineering at Faculty of Engineering and Natural Sciences, Isik university (FMV)

The main aim of this research is to identify the Mitigation Plan of Delay on Construction Projects in Somalia. I would like to ask you some time of yours to answer this survey with your knowledge and experience. Your contribution which will be very beneficial to the industry as well as future researchers will be very much appreciated.

The questionnaire contains of four (4) sections:

Part A: Respondent Background

Part B: The Factors that Causes the Delay in Construction Projects in Somalia

Part C: The Effects of Delay in Construction Projects in Somalia

Part D: The Mitigation for the Factors that Causes Delay in Construction Projects in Somalia.

All information given will be keep in confidential and it is education purpose only. Your cooperation and time will be highly appreciated in completing this form.

## Student Information

Name:	Abdelrahman Ahmed Hassan
Phone:	
Email:	
Program:	Master of civil engineering
Supervisor:	Professor Dr. bora aksar
Email:	

## SECTION A: RESPONDENT BACKGROUND

### INSTRUCTION

Please answer the questions by marking (√) in the space provided.

1. Type of your organization.

Contractor.  Sub-contractor.

2. academic Qualification.

Ph.D.  Bachelor Degree  
 Master  Diploma/Certificate  
 other (.....)

3. Work experience in the construction industry.

1-5 years  6-10 years  11-15 years  
 16-20 years  20-25 years  26 years above

4. Position in the organization.

Project man  Architecture  Civil engineer  
 Others (.....)

5. The type of the building projects that you have experience and get involved.

Residential  Non-residential

SECTION B: FACTORS THAT CAUSES DELAY IN  
CONSTRUCTION PROJECTS IN SOMALIA

**INSTRUCTION**

Based on your experience from your previous projects, please rate the following Factors that causes delay in Construction projects in Somalia.

Please answer the question by marking (√) according the likert scale below:

1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly agree

	Description	Strongly Disagree	Disagree	neutral	agree	Strongly Agree
		1	2	3	4	5
B	Consultant Related Factors Causes Delay					
1	Projects					
1	Lack of knowledge by Consultants regarding site conditions					
2	Lack of knowledge methods of construction before designing					
3	Poor site Management					
4	Inefficiency of consultants					
5	Preparation of drawing					

6	Slow response inspection					
7	Others (Please specify.....)					
B	Material Related Factors Causes Delay					
2	Projects					
1	Shortage of Material					
2	Late delivery of material					

3	Ordering estimated material in bulk and changing materials during construction					
4	The management problems for managing materials					
5	Poor procurement of construction materials					
6	Delay in Manufacturing Materials					
7	Accidents during construction					
8	Low quality of material					
9	Others (Please specify.....)					
B3	Client Related Factors Causes Delay Projects					
1	Non-payment to contractors by clients					
2	Change orders by clients					
3	Poor decision making of clients and client approval					
4	Others (Please specify.....)					
B4	Equipment Related Factors Causes Delay Projects					
1	Unskilled equipment operations					
2	Little output and efficiency of equipment					
3	Absence of high- technology mechanical equipment					

4	Low productivity					
5	Efficiency of construction equipment					
6	Others (Please specify.....)					
<b>B5</b>	<b>Labor Related Factors Causes Delay Projects</b>					
1	Shortage of skilled labor					
2	Unskilled labor working in construction projects					
3	Low productivity level of labors					
4	Personal conflict among labors leads delay in construction					
5	Others (Please specify.....)					
<b>B6</b>	<b>Contractor Related Factors Causes Delay Projects</b>					
1	Improper planning by contractor					
2	Inefficient of site management with poor management					
3	Financial difficulties of contractor					
4	Insufficient experience of contractor					
5	Clashes in sub-contractor's schedule during execution of the project					
6	Poor qualification of technical staff					
7	Oth ers (Please specify.....)					

SECTION C: EFFECTS OF DELAY OF CONSTRUCTION PROJECTS  
IN SOMALIA.

**INSTRUCTION**

Based on your experience from your previous projects, please rate the following the effects of delay in construction projects in Somalia.

Please answer the question by marking (√) according the likert scale below:

1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly agree

Items	Description					
		Strongly disagree	disagree	neutral	agree	Strongly agree
		1	2	3	4	5
C1	Cost overrun					
1	Cost overrun implies added costs over					
2	Cost is affected by changes in a scope of work					
3	Financial difficulties of contractor influenced cost overruns					
4	Corruption effects the cost of the project					
5	Poor estimation cost and schedule					
6	Poor estimation the schedule					

7	Others (Please specify .....)					
C2	Legal Disputes					
1	Delay in payment					
2	Undefined responsibilities of the parties involved in the project					
3	Unclear planning and instruction and delay in performance inspection and testing					
4	Others (Please specify.....)					
C3	Time overrun					
1	Poor estimation the schedule of the project planning					
2	Delay the material delivery to the site.					
3	Lack of knowledge to manage the project					
4	Delay payment					
5	Shortage of labor					
6	Low of required equipments					
7	Others (Please specify.....)					
C4	Lost profit					
1	Change orders					
2	Disputes between client with contractor					
3	Poor estimation the cost of the project					
4	Others (Please specify.....)					
C5	Abandonment					
1	Financial difficulties face by owner					
2	Unexpected bad economic conditions					
3	Inadequate project feasibility					
4	Poor contract administration					

5	Incompetent of contractors or subcontractors				
6	Project control problems				
7	Site acquisition problems				
8	Incompetent consultants				
9	Unclear lines of responsibility				
10	Lack of cooperation from local authorities				
11	Faulty tender process				
12	Litigation				
13	Negative impact of project towards society or environment				
14	Lack of motivation of site workers				
15	Poor safety management on site				
16	Unexpected location difficulty				
17	Unskilled site workers				
18	Involvement of large number of participants of project				
19	Unavailability of materials				
20	Others (Please specify.....)				

**SECTION D: THE MITIGATION FACTORS THAT CAUSES DELAY  
IN CONSTRUCTION PROJECTS.**

**INSTRUCTION**

Based on your experience from your previous projects, please rate the following the Mitigation Factors that causes delay of the construction projects in Somalia.

Please answer the question by marking (√) according the likert scale below:

1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly agree

Items	Description	Strongly disagree	disagree	neutral	agree	Strongly agree
		1	2	3	4	5
1	Accurate initial cost estimates					
2	Perform a preconstruction planning of project tasks					
3	Adopting a new approach to contract award procedure by giving less weight					
4	Allocation of sufficient time					
5	Availability of resources					
6	Commitment to projects					
7	Competent project manager					
8	Comprehensive contract documentation					
9	Ensure adequate and available source of finance until project completion					

10	Available source of finance until project completion					
11	Frequent progress meeting					
12	Enforcing liquidated damage clauses					
13	Hire an independent supervising engineer to monitor the progress of the work					
14	Multidisciplinary/competent project team					
15	Use up to date technology utilization					
16	Accurate initial time estimates					
17	Construction management (CM) type of contracts					
18	Frequent coordination between the parties involved					
19	Use modern construction equipment					
20	Use appropriate construction methods					
21	Proper material procurement					
22	Proper project scheduling					
23	Complete the design at the right Time					
24	Develop construction manufacturing					
25	Provide construction equipments					
26	Develop the construction companies' system					
27	Awarding bids to the right/experience consultant and contractor					

## **CURRICULUM VITAE**