KARADENİZ TECHNICAL UNIVERSITY
THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES

DEPARTMENT OF CIVIL ENGINEERING

AN INVESTIGATION INTO DELAY FACTORS IN BUILDING CONSTRUCTION PROJECTS; CASE OF HARGEISA, SOMALILAND

MASTER THESIS

Ahmed ABDI MOHAMOUD

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STATEMENT OF ETHICS IN THESES

I hereby frankly declare that this study titled “An Investigation into Delay Factors in Building Construction Projects; Case of Hargeisa, Somaliland’’, to which I submitted my master’s degree, I ended up under the supervision of my Supervisor Prof. Dr. Vedat TOĞAN, I certify that I cited the sources of all the data and information that could be obtained within the scope of this study; that I have acted in accordance with the scientific ethical principles and rules throughout the stages of data collection, analysis, and presentation, and that I accept all the ethical and legal consequences involved 04/02/ 2022.

Ahmed Abdi Mohamoud

TABLE OF CONTENTS

Page No

Master Thesis

ABSTRACT

AN INVESTIGATION INTO DELAY FACTORS IN BUILDING CONSTRUCTION PROJECTS; CASE OF HARGEISA, SOMALILAND

Ahmed Abdi Mohamoud

Karadeniz Technical University
The Graduate School of Natural and Applied Science
Civil Engineering Graduate Program
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Since the construction industry contributes to the development and growth of the country's economy, it is indicated as one of the crucial sectors. However, this industry frequently faces delay problems, which have an impact on the progress of industry-related projects and their performance. Identifying the reasons for the delay in building construction projects can save money also time. It also improves the project's performance and ensures its successful completion. Therefore, this study was carried out to investigate the reasons for building construction project delays in Hargeisa through an extensive literature review together with pre-questionnaire conducted interviews. A total of 78 delay factors was documented and then classified into eight different groups. Subsequently, a structured questionnaire survey was created and distributed to the contractors, clients, engineers, consultants, and architectures through face to face and/or via e-mail. Following that, the acquired data was examined utilizing statistical techniques as well as the relative important index method (RII) to rank the factors based on their significance.

The most ten important factors were ineffective project planning and scheduling, inexperienced/unqualified labors, poor site management and supervision, shortage of construction material, late delivery of material to the site, design changes by the owner or his agent during construction, delay in progress payment by the owner, legal disputes and claims between project stakeholders, inaccurate time estimation, and currency/price fluctuation.

Keywords: Delay, Delay factors, Delays in construction project, Construction Industry, Hargeisa.

Yüksek Lisans

ÖZET

BİNA İNŞAAT PROJELERİNDE GECİKME FAKTÖRLERİNİN ARAŞTIRILMASI; HARGEİSA, SOMALİLAND ÖRNEĞİ

Ahmed Abdı Mohamoud

Karadeniz Teknik Üniversitesi
Fen Bilimleri Enstitüsü
İnşaat Mühendisliği Anabilim Dalı
Danışman: Prof. Dr. Vedat TOĞAN
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İnşaat sektörü ülke ekonomisinin gelişmesine ve büyümesine katkı sağladığı için önemli sektörlerden biri olarak gösterilmektedir. Ancak, bu sektör sıklıkla, ilgili projelerin ilerlemesini ve performanslarını etkileyen gecikme sorunlarıyla karşı karşıyadır. İnşaat projelerinde gecikmenin nedenlerinin tespiti hem zamandan hem de maliyetten tasarruf sağlayabilir. Ayrıca bu nedenlerin belirlenebilmesi projenin performansını iyileştirir ve başarılı bir şekilde tamamlanmasını sağlar. Bu nedenle, bu çalışma, Hargeisa'daki bina inşaat projelerindeki gecikme nedenlerini belirlemek amacıyla gerçekleştirlmiştir. Bu maksatla, kapsamlı bir literatür taraması ve ön anket ile yapılan görüşmeler yoluyla toplam 78 gecikme faktörü belirlenmiş ve sekiz farklı grupa sınıflandırılmıştır. Daha sonra, bir anket hazırlanarak müteahhitler, müşteriler, mühendisler, ve danışmanlardan oluşan gruba yüzyüze ve/veya e-posta aracılığı ile uygulanmıştır. Bu yolla elde edilen veriler hem istatistiksel teknikler hem göreceli önemli indeks (RII) yöntemi kullanılarak değerlendirilmiş ve önem gecikme faktörleri önem derecelerine göre sıralanmıştır.

Sonuç olarak, etkisiz proje planlama ve çizegeleme, deneyimsiz/ vasıfsız işçiler, etkisiz saha yönetimi ve denetimi, inşaat malzemeleri eksikliği, malzemenin sahaya geç teslimi, yapım sırasında mal sahibi veya onun yetkilisi tarafından tasarım değişiklikleri, ödeme gecikmeleri, proje paydaşları arasındaki yasal uyuşmazlık ve anlaşmazlıklar, yanlış zaman tahmini, ve fiyat dalgalanması olarak sırlananan faktörler diğerleri arasından en önemli on gecikme faktörü olarak belirlenmiştir.

Anahtar Kelimeler: Gecikme, Gecikme faktörleri, Yapım projelerinde gecikmeler, İnşaat sektörü, Hargeisa.

LIST OF FIGURES

Page No

LIST OF TABLES

Page No

LIST OF ABBREVIATIONS

ILO	International Labor Organization
MoHPW	Ministry of Housing and Public Works
UKAID	United Kingdom Agency for International Development
RFA	Road Fund Administration
RoSAB	Road Sector Administration Board
SRA	Somaliland Road Development

1. BACKGROUND

1.1. Introduction

The construction industry is one of the primary sources that give significant fixing for the upgrading of an economy and contributes support for the economic growth of a country. Also, it contributes to economic development by supporting the essential targets of progress, including productivity, job creation, and revenue creation. It additionally assumes a significant function in fulfilling fundamental physical and social necessities, including housing production and infrastructure. Moreover, it contributes to the development and transmission of technology, offers many possibilities for business, also it directly enhances the quality of life of its customers.

Somaliland is one of the under developing countries in the Horn of Africa, which is on the Gulf of Aden's southern coastline. Although most of Somaliland's construction industry is still in its early stages of growth, it plays a significant role in the country's rebuilding. The local construction production has enabled a significant social and economic change in the community by providing a conducive environment for living and contributing to the development of the community as a whole. In recent years, the construction industry in Somaliland is deemed as one of the primary sources that contribute to the country's economic development (Omar et al, 2020). Most construction projects presently being implemented in Somaliland are building construction projects. This response to the devastating consequence of the 1988 civil war that destroyed the buildings and national infrastructure (Ali, 2012; Sheikh et al, 2020). Despite the long stretches of civil war and financial downturn, Somaliland has been encountering a rapid economic recovery because of various factors.The rise of private sectors in 1991 and the high progression of remittance from the enormous local area Somalilanders live in abroad are the two main principles behind the striking of economic recuperation (Ahmed, 2000). As a result, the economy of the country is dominated by private sectors, which enabled the establishment of many private construction companies in the country that carry out various constructionprojects.

Moreover, the establishment of these companies was accompanied by changes in building styles. Although the construction industry in Somaliland seems the core of the development of the country, the complexity of the problems arises in the industry due to many reasons. Delays are considered one of the frequent challenges seen in the construction industry (Fashina et al, 2020). In many countries, many of the construction projects do not meet the three principles that are measured the success of the project, which are cost, time, and quality, and these are affected by delay problems (Odeh and Battaineh, 2002). Similarly, delays have affected the construction projects in Hargeisa, Somaliland's most populous and capital city, and many projects are less likely to be completed on time. According to a study undertaken in Somaliland (Fashina et al, 2020) to determine the effects of delay in construction projects, it was revealed that delays have led to many projects an adverse effects, including disputes between project partners, court cases (lawsuit), cost overrun, and total termination of the project. Terminating a project due to a dispute over delay can have several consequences, including lessening employment chances, revenue losses, undermining economic growth, giving a negative image to the foreign investors, and damaging the contractor's reputation.

As many studies have shown, delays counted as one of the most common challenges in the construction industries that undermine to completion of the project successfully (Ruqaishi, and Bashir, 2015; Abdul-Rahman et al, 2008; Wanjari and Dobariya, 2016). Any construction project might have delays, and the severity of these delays differs from project to project. A few projects are finished in the scheduled time, and some are extended over extra time. Consequently, it is vital to define and recognize these delays to lessen and evade delays in any construction project (Ahmed et al, 2002). Various studies have been undertaken across the world to determine the factors that cause delays in construction projects and their effects. Some of these studies focused only on factors that cause construction project delays, while others concentrated on both causes and their effects. However, in Somaliland, a previous study has not yet been conducted to find out the potential reasons for building construction project delays.

So, to prevent and lessen the delays in Somaliland building construction projects, this study was carried out. This research will look at the major reasons that create delays in Somaliland's building construction projects.

Also, it will present recommendations for all construction companies, government agencies, and all other contractor agencies to avoid and minimize delays in construction projects.

1.2. Problem Statement

Globally, the issue of delay has become one of the most repeating challenges in construction, resulting in projects being implemented at a higher cost than the allotted and over a longer duration than intended and with low performance. When the construction projects get delayed, the impacts are detrimental to the stakeholders. The delay means loss of owner's income because of the inaccessibility of manufacture and other business services as expected. Meanwhile, contractors face immense costs due to the increase in the price of building materials and equipment in the market, long-length of work, and increased labor expenses. Moreover, delays have several effects on the project, including disputes, late completion, additional expenses, litigation, and project termination (Aibinu and Jagboro, 2002).

Despite that Somaliland's construction sector is still in its initial stage of progress, it plays a noteworthy part in the country's reconstruction. It seems to be the basis of a country's development, but the industry faces numerous obstacles for various reasons, with delays being one of the frequent challenges seen in construction projects. Also, it is one of the significant challenges affecting building construction in Somaliland. Furthermore, Lawsuits (Court cases) due to disputes between project partners, cost-overruns, and complete termination of the projects are the three significant effects that result from Somaliland construction project delays (Fashina et al, 2020). Therefore, this study will point out the potential factors that cause delays in building construction projects. Additionally, it will propose ways to minimize it to achieve good performance projects.

1.3. Justification of the Study

Completing the projects on the planned schedule under the assigned financial plan with the highest caliber is the shared objective for all the construction industry stakeholders.

However, delays influence the performance of the project as well as generate adverse impacts on the project partners. Therefore, the outcomes of this study will assist all construction companies, government agencies, and other contractor agencies that are willing to know potential delay factors that undermine building projects in Hargeisa. Furthermore, the findings of this research will benefit the various parties involved in construction projects to be aware of the sources that can cause projects to get delayed. Additionally, this study will support national companies working in Hargeisa as well as foreign companies that are willing to invest in the Somaliland construction sector by giving them a great understanding of the current problems and allowing them to develop their prevention strategies. Also, this study will generate a list of delay factors that will benefit other researchers who are willing to study in this area in the future.

1.4. Objectives of the Study

Various construction projects have been implemented in Hargeisa, Somaliland in the last fifteen years, like buildings, bridges, culverts, and roads. Among these construction projects, the most common projects implemented in Hargeisa are building construction projects such as commercial, residential, schools, hospitals, governmental projects. This is because the government is in charge of the majority of infrastructure projects, which are mostly funded by foreign donors. This increased the possibilities of executing other types of construction projects, such as those that do not need foreign financing and whose primary customers are Somalilanders living in the country and in out of the country.

Figure 1.1 depicts the various types of projects that have been implemented in Hargeisa over the last 15 years. Buildings are the most projects executed in this time with 86,000 building projects, followed by 30 road projects, 25 culverts, and 5 projects of bridges (Ministry of planning and national development, Somaliland & Hargeisa municipality).

Figure 1.1. Project types implemented in Hargeisa last 15 years

Therefore, the goal of this research is to evaluate the potential causes of delay that currently exist in the Hargeisa building construction projects. Also, the study proposes helpful ways to eliminate or minimize these delay factors to enhance the performance of construction projects and curb the effects of these delays. The following are the primary research goals:

- Investigate the causes of delays that presently exist in Hargeisa building construction projects by determining the most frequent causes affecting project performance.
- Identifying the potential causes of delays that currently exist in the Hargeisa building projects from the viewpoint of various stakeholders.
- Indicating the most significant (Top-ten) delays in building construction projects.
- To suggest ways to eradicate or alleviate these delay causes to improve the performance of building projects and mitigate the impacts of these delays.

1.5. The Research Question

The study questions will be as follows, based on the facts stated above:

- What are the general causes that contribute to the current delays in Hargeisa building construction projects?

- What are the most significant causes of delay in the Hargeisa building construction project?
- What are the proposed ways for eliminating or minimizing delays in building construction projects?

1.6. The Scope of the Study

The scope of the research is confined to the construction industry in Somaliland, notably in Hargeisa, which is the most populous and the capital city in the country. Moreover, it focuses on the primary reasons for the delay in Hargeisa building construction projects, such as commercial buildings, residential buildings, schools, institutional and hospital building projects. A structured questionnaire was developed for data collection in this research work, and the targeted respondents were included the professionals and experts working in private and public construction projects in Hargeisa, such as engineers, consultants, clients, architectures, and contractors.

1.7. Theoretical and Literature Review

This section provides a thorough review of the literature on the studies carried out in a range of places around the world to determine the causes of delays in building construction projects. These studies include those conducted in African countries, Gulf of Arab countries, Asian countries, European countries, and other international countries such as the USA. Moreover, this section covers the various categories of construction project delays, also provides a complete image and review of Somaliland's construction traditions, history, and progress.

1.7.1. General Overview of Somaliland

Somaliland (Figure 1.2) is a country in the Horn of Africa that is on the Gulf of Aden's southern coastline. Somaliland is bordered on the northwest by Djibouti, on the south and west by Ethiopia, and on the east by Somalia. It has a territory area of 176,120 km^2 with a coastline of 850 km^2 (Development, 2015).

The population of Somaliland is 4.5 million, and Hargeisa is the largest city also the capital city of the country as well as the most populous city with a 1.2 million population (Kilcullen, 2019). Further, it contains six main provinces (Figure 1.3): Hargeisa, Boorama, Burao, Erigavo, Las Anod, and Berbera which has the biggest coastline as well as the largest port in the country. Somaliland is semi-arid; the average daily temperature is between 25 and 35 degrees Celsius, also the sun passes directly above twice a year, on 22^{nd} of March and 23^{rd} of September.

On June 26, 1960, Somaliland gained its independence from the United Kingdom (Britain). After four days, on July 01, 1960, Somaliland merged with Somalia, which earned its independence from Italian, thereby forming the Somali Republic. Nevertheless, the republic of Somaliland regained its sovereignty after Somalia's final collapse on May 18, 1991, as a consequence of the late-eighties and early-nineties civil war (Development, 2015).

Figure 1.2. Somaliland Map Location and Boundaries (Somaliandpost.net).

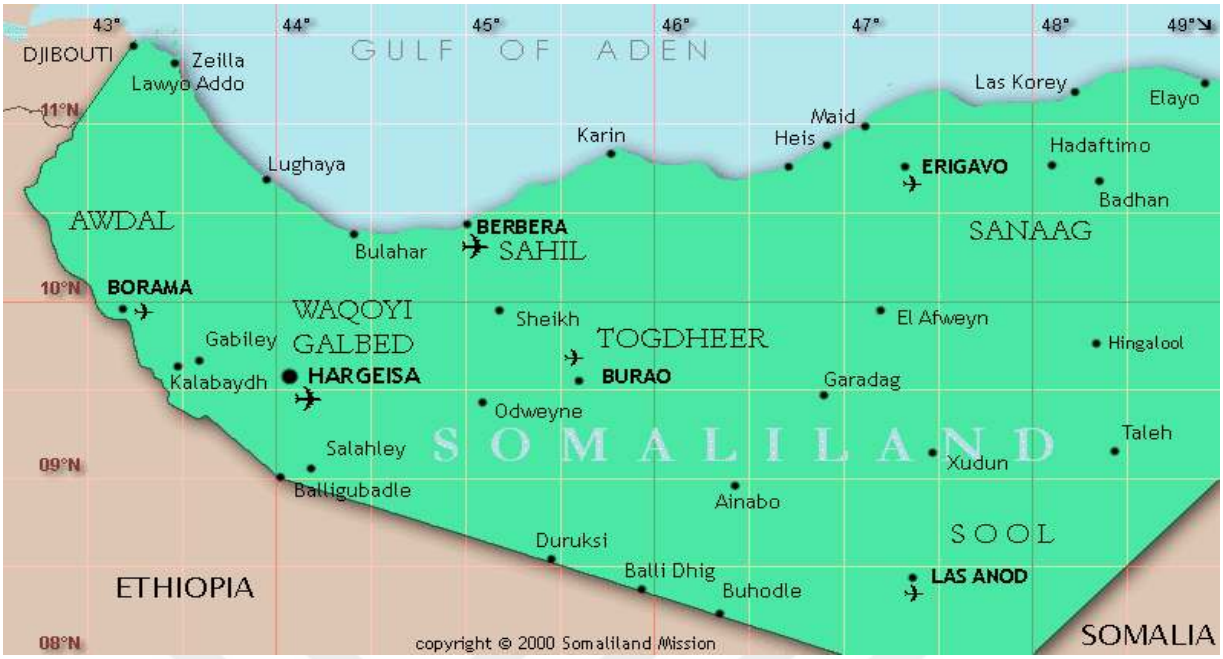

Figure 1.3. Somaliland Provinces (Somaliland. Map. PopulationData.net).

1.7.1.1. Somaliland Construction Industry

Before the colonial era, most Somalilanders who resided in rural areas traditionally lived in huts known as “Buul or Aqal-Somali” (as shown in Figure 1.4), which were the only type of accommodation readily accessible at the time. Meanwhile, people who lived in the urban used to live in limestone and wood buildings. Following British colonialism, the colonists brought their contractors to build brick and mortar buildings (Figure 1.5), according to their standards (Hoehne and Ibrahim, 2014).

After Somaliland declared its independence in 1991, there has been tremendous economic growth due to the high progression of remittance and investments from the Somalilanders live in abroad. This has facilitated the establishment of many companies along with changes and developments in building forms (Figure 1.6), also this has led to the construction of many infrastructure and building projects including, roads, commercial buildings, schools, health centers (Ahmed, 2000).

Figure 1.4. Buul or Aqal-Somali

Figure 1.5. Old Building Forms in Urban Cities (Picfair.com).

Figure 1.6. Modern Building Forms Recently Implemented in Hargeisa, Somaliland (maamuushotelhargeisa.com, Soo Booking, crownhotelhargeisasomaliland.com)

Recently, the role of the construction industry has gradually increased in the Somaliland economy and became one of the most significant billers contributing to the country's growth. The registration for the construction companies was started in 1993 for the first time. In 2010, the number of construction companies registered was 371, which increased after ten years up to 1200 companies (Ministry of Housing and Public Works, 2020). Most construction projects presently being implemented in Somaliland are building construction projects including various types such as residential, commercial, hospitals, schools, governmental buildings, etc. In Somaliland, the construction industry is organized into two main sectors: Private construction companies and public construction companies.

1.7.1.2. Private Construction Sector

Somaliland's security status, political structure, technological development, and socioeconomic progress have all changed significantly in the last twenty years.

Moreover, despite the long periods of civil war and economic hardship, Somaliland has experienced a fast economic recovery because of several factors. The increase of the private sectors in 1991 as well as the rapid growth of remittances from the wide local area of Somalilanders living abroad are the two key drivers of economic recovery. Consequently, the country's economy was controlled by private segments, which in turn led to the founding of private construction companies in the country with a wide range of specialties from construction to consultancy. The advent of these private construction companies has aided in the evolution of building forms by implementing modern building styles that are compatible with current existing buildings.

1.7.1.3. Public Construction Sector

Road development and infrastructure construction projects are the common projects implemented by the Ministry of Housing and Public Works (MoHPW). Somaliland Development Fund (SDF) is primarily responsible for funding these projects, with assistance from international donors. The Danish ministry of foreign affairs, the Kingdom of the Netherlands, and UKAID are among the contributors (Authority, 2012). Besides, the Road Fund is financed through road tax, fuel levy, transportation fees, and other sources. Furthermore, Presidential Decree established the Somaliland Road Authority (SRA), the Road Sector Administration Board (RoSAB), and Road Fund Administration (RFA) in March 2000 (Authority, 2012). The SRA is founded to create an operational entity in Somaliland that will be responsible for road maintenance and building. Additionally, the Road Fund Administration (RFA) will be supervising the financing of road and maintenance operations, while Road Sector Administration Board (RoSAB) is accountable for what happened inside both SRA and RFA. Moreover, local and international consulting and contracting firms are the SRA's key customers, while the European Union, International Labor Organization (ILO), and Ethiopian Road Authority are SRA's primary partners.

1.7.2. Types of Delay in Construction Projects

Globally, delays are one of the most prevalent problems that prevent construction projects from being completed successfully (Shebob et al, 2011; Sambasivan and Soon, 2007; Bagaya and Song, 2016). Delay is described as a time overrun that is outside the date specified in the contract or outside the date agreed by the client/owner and contractor for the delivery of the project (Assaf and Al-Hejji, 2006). Delays can be caused by internal causes such as delays arising from the project partners or external-related issues such as government, earthquake, natural disasters, epidemics, etc. Furthermore, delay in construction projects leads to several changes to the projects such as late completion, project's hastening, cost increase, the dispute among project partners, court cases (lawsuit), breach of contract, and abandonment of the project (Aibinu and Jagboro, 2002; Tilahun, 2016; Mohamed, 2015; Haq et al., 2017; Alfakhri et al, 2018; Sambasivan and Soon, 2007; Owolabi and Amusan, 2014).

The scholars have categorized delays into different types, but most of them have intrinsic interdependency. The majority of academics have classified the delay problems into four main types (Figure 1.7), which are as follows:

a) Critical and non-critical delays; this is dependent on the criticality activities in the project schedule-timeline.
b) Concurrent and Non-concurrent delays.
c) Excusable delays, which may be further categorized into compensable and non-compensable delays that based on who is responsible for the delay problem.
d) Non-excusable delays (Trauner et al, 2009).

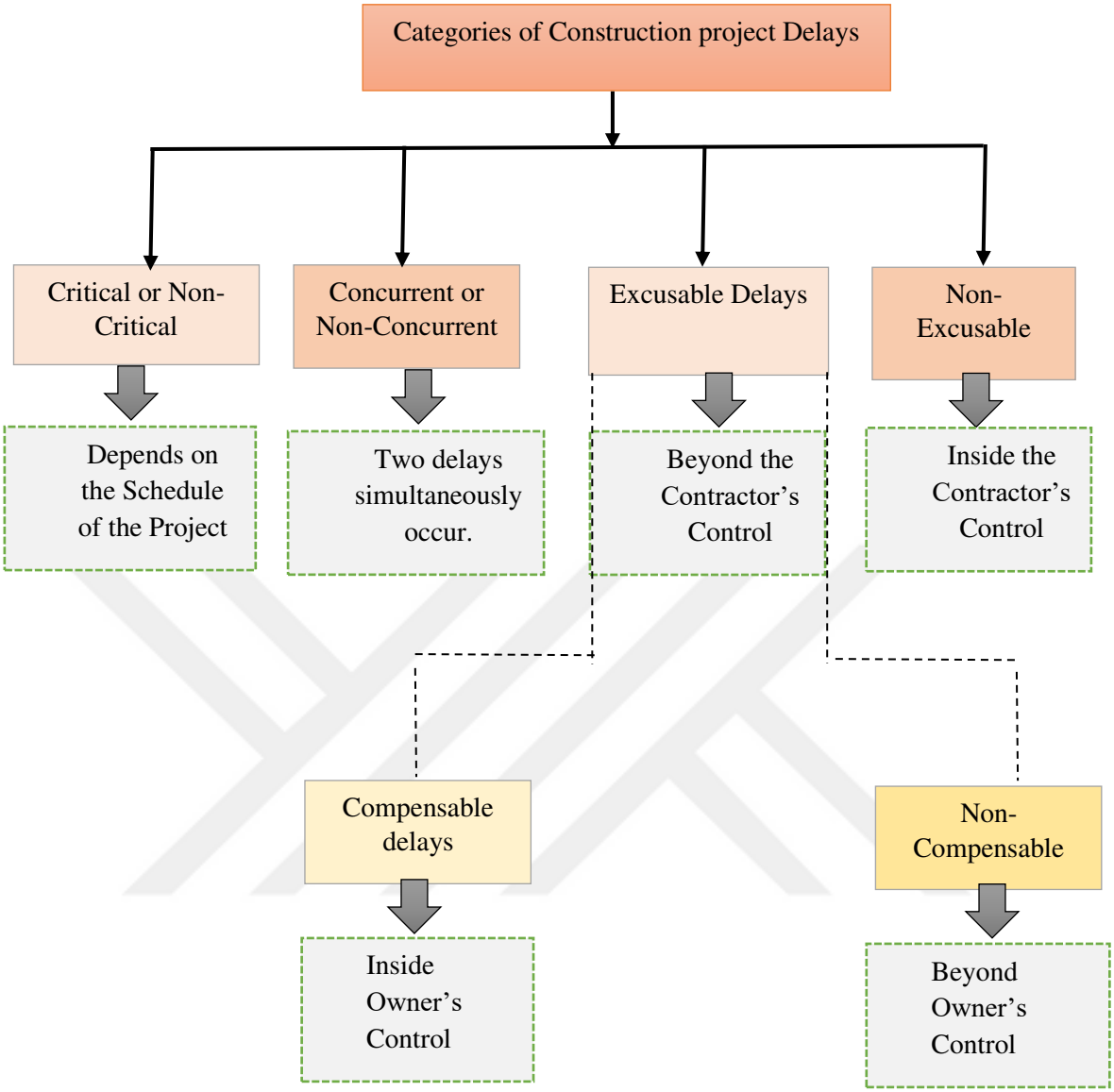

Figure 1.7. Categories of Construction Project Delays

1.7.2.1. Critical or Non-critical Delays

Generally, when determining how long it will take to implement a project, such as construction projects, it is necessary to set a schedule that includes activities to be implemented to achieve the end of the project. Moreover, every project has critical activities, that if delayed, will affect the schedule and the project as a whole. Hence, the delays that keep the contractor from completing the work within the specified time frame in the contract are deemed as critical delays.

Meanwhile, non-critical are those that do not prevent the project from being completed within the allotted time frame but do impede the project's progress (Trauner et al, 2009).

1.7.2.2. Concurrent or Non-concurrent Delays

Concurrent delays are described as two or more delays induced at the same time by separate parties that will influence the project's completion date. Moreover, concurrent delays can be explained when two or more delays occur simultaneously and caused a time extension of the overall schedule, must be occurring in the same time frame, and must be able to impact the total project timeline independently of one another (Arditi and Robinson, 1995). This type of delay is the most challenging one because both owner and contractor will use it against the other. Owners often use concurrent delays as a justification for granting a time extension without further compensation. Meanwhile, contractors use concurrent delays by the owner as a justification why liquidated damages should not be considered for their delays (Trauner et al, 2009).

1.7.2.3. Excusable compensable or Non-compensable Delays

Excusable delays are unavoidable delays that do not result in faults from the contractor, subcontractor, or any other party who is inside the control of the contractor. These delays from unexpected incidents and are commonly referred to as "Acts of God" when the excusable delays occur, most contracts permit the contractor to get more time to complete the project, yet no extra costs (Alaghbari et al, 2007). Events like unexpected site conditions, natural disasters, strikes between workers, etc. are an example of excusable delays. Excusable delays can be further categorized into two groups that are compensable and non-compensable delays. Compensable delays are the result of mistakes and faults made by the owner or his agent (Ibironke et al, 2013). When the projects encounter delays like this type, the owner will take the responsibility for these delays, and the contractor is entitled to extra time and cost to complete the work. The factors like the owner's change order, delay in design approval by the owner and his agent, etc. are an example of compensable delays.

Non-compensable are caused by factors and incidents outside the client's and the contractor's control. These delays can result from events like natural disasters, welfare, Acts of God, etc. However, excusable non-compensable delays contractor has the right to get extra time to finish the project, but no expenses are awarded to the contractor (Ibironke et al, 2013).

1.7.2.4. Non-excusable Delays

The delays that are caused by the contractor, sub-contractor, or any other group under the contractor's authority are considered non-excusable delays. The contractor takes responsibility for these delays and will not receive any relief related to these delay issues, neither extra expenses nor additional time if this delay problem has affected the entire project (Ibironke et al, 2013). The factors like the late performance of subcontractors, faulty workmanship by the subcontractor or contractor, a failure to manage the project activities as outlined in the contract schedule, etc. are an example of non-excusable delays.

1.7.3. Related Studies on the Causes of Construction Projects Delays

Numerous studies have been conducted around the world to determine the key causes of delays as well as their impacts on the construction project. Some of these studies have concentrated merely on reasons for construction project delays, while others looked at the causes as well as the effects. However, the findings of these studies vary due to geographic differences as well as the variation of time conducted on these studies. A depth of literature review was conducted, and the following results were presented according to geographical location.

1.7.3.1. Studies Conducted in African Regions

Tilahun (2016) conducted a study at Addis Ababa University to explore the causes and effects of delays in educational building projects. The researcher has documented 51 factors of delay and classified them into seven categories.

The results showed delays in the delivery of material, differences, and mistakes in design documents, as well as inadequate and unclear details in drawings. Besides, a shortage in construction material in the market, slow response and inspection, frequent change, and variation orders are the most delay problems. Another study in Ethiopia Koshe and Jha (2016) assessed the causes of delays in the Ethiopian construction industry. The results revealed that financial problems of the contractor, material price escalation, ineffective planning of the project, delay in progress payment for finalized work, a lack of contractor's skilled professionals, and resource/scheduling management are the main causes of the Ethiopian construction project's delays.

Kog (2018) reviewed thirteen research on significant delay causes in construction projects that were carried out in Kenyan construction projects. The researcher has summarized that finance and payment completed work, shortage and late delivery of construction material, ineffective schedule, and planning, change scope and order by the owner, inadequate experience of the contractor, failure and equipment availability, poor site supervision and management, and inclement weather were the major sources of construction project delays.

Apolot and Tindiwensi (2013) performed research into the causes of cost overruns and delays in Ugandan public-sector building projects. According to their research results revealed that late payments, changes in the scope of work, inadequate control and monitoring, high cost of capital, and instability of politics and insecurity were found to be the key causes of delay. Similarly, Muhwezi et al (2014) conducted questionnaire surveys with different stakeholders engaged in the construction, such as clients, contractors, and consultants, to study the causes of delay in Ugandan building construction projects. The findings revealed that delays were caused by consultants due to the late revising changes in the scope of work, contractor's financial dishonesty/discipline, contractor's experience, design mistakes caused by designers, and consultant's inadequate site investigation are the main causes of delay.

Mohamed (2015) investigated the Sudanese construction industry's project delays. According to the findings, the top major causes were outlined fluctuation of prices, material shortage, inaccurate time estimation, and errors/mistakes during construction.

In Kigali, Rwanda, Amandin and Kule (2016) carried out research studying project delays on cost overruns, focusing on construction projects in the Gasabo district.

The findings of the study indicated that delayed payments, financial deficits for both contractor and client, and problems related to material procurement are the main causes. Similarly, In Rwanda, Umuhoza et al. (2019) have examined factors that cause delays in building construction projects. Their research results showed cash flow problems, delays in approving design documents, the secrecy of the physical plan, fluctuation of price, and late approval for the major changes are the main five factors of delay in Rwandan building construction projects.

Fugar and Agyakwah-Baah (2010) conducted a study in Ghana to determine the causes of building construction project delays. According to the study findings, honoring payment certificates, underestimating project expense, underestimating project complexity, difficulties in obtaining bank credit, and inadequate supervision are the five common causes of delay. Another study by Amoatey et al. (2014) showed that the primary causes of delay in Ghanaian state housing construction projects include delay payments to the contractor, change orders, price fluctuation, material price increase, and inadequate funds from the client. Moreover, Shah (2016) has conducted a study comparing the causes of construction project delays in Ghana, Australia, and Malaysia. The results revealed that the factors that cause construction project delays vary in significance depending on the region.

Delays in construction projects in Ghana are mostly caused by delays in payment certification, underestimating project costs, and underestimating project complexity. Meanwhile, the most major causes of Australian construction projects delays are planning and schedule deficiencies, Construction methods, and effective ways of monitoring and feedback. Whereas in Malaysia, project delays are caused by lack of contractor expertise, contractor's inadequate planning, and poor site supervision and management.

Aziz (2013) revealed that the critical delay causes in Egyptian construction projects are delays in progress payment, shortages of equipment, inadequate planning and scheduling of the project, different tactics patterns for bribes, and poor site supervision and management. In similar research done by Marzouk and El-rasas (2014) surveyed the causes of construction project delays in Egypt from the view of contractors, clients, and consultants.

According to the outcomes the main reasons for the delay were include financial and payment of finalized work by the owner, Owner's change order and scope, subsurface related problems, poor labor productivity, and inadequate scheduling and planning.

On the other hand, Shebob et al (2011) performed research to explore the causes of delay in Libyan building construction projects. Low-skilled manpower, slowness in providing instruction, change project's scope, absence of qualified consultants, and late site delivery to the contractor were shown as the top five reasons for delays in building construction projects.

Bajjou and Chafi (2020) conducted a question survey based on views obtained from the contractors and consultants working in private and public construction sectors to determine the causes of delay in Moroccan construction projects. There was a total of 49 reasons of delay in all, which were classified into nine groups. Delay of the progress payment, unrealistic contract duration imposed by owner, excessive subcontracting, unskilled workforce, deficiency of training for employers, ineffective planning and scheduling, deficiency of west management, delay in obtaining government permits, lack of collective planning, rework due to the construction faults were indicated as the most significant causes of delay.

1.7.3.2. Studies Conducted in the Gulf of Arab Countries

Wael Alaghbari et al. (2018) investigated delay factors affecting construction projects in Sana'a, Yemen. The results indicated that receiving progress payment by contractor, financial difficulties by the client, inadequate experience by contractors and consultants, poor site supervision and management, and lack of sufficient cash for project implementation are significant causes of construction project delays.

Motaleb and Kishk (2016) examined the significant causes of delay as well as their effects in UAE construction projects. A questionnaire survey was distributed to 50 construction companies in UAE, covering 42 attributes of delay identified from literature analysis. Change orders, owner's slow decision making, absence of capability of the owner representative, absence of client experience in construction, poor site supervision and management, inflation of price, and incompetent project team were revealed as the most significant delay causes. Moreover, Mpofu et al. (2017) worked on research to determine the key factors of delays in the construction industry in UAE. The top five reasons for the delay, according to the study, include unrealistic contract duration, incomplete design,

various change orders and scope, contractor's poor project planning, and scheduling, also project manager's poor project planning and control.

Albogamy et al. (2011) researched Saudi Arabia to examine the most significant causes of delay in public building projects. A questionnaire survey containing 63 delay attributes was distributed to construction project partners. Contractor's poor performance in the government bidding procedure (Lowest bidding), subcontractor's delays, poor experience and skill of contractor's technical staff, poor project planning and scheduling, delay in client's progress payment, scarcity of skilled engineers, delay in preparing shop drawings, contractor's cash flow issues, insufficient early project planning, and non-use of skillful construction management. Furthermore, Hammadi and Nawab (2017) studied delay factors in Saudi Arabia's construction projects by using a questionnaire survey conducted with consultants, engineers, and project managers engaged in construction projects. Their research findings highlighted that owner's slow decision making, delay in the client's progress payment, owner's change order, and uncooperative owners are the main factors of delay Saudi Arabian construction industry.

Samarah and Bekr (2016) identified 55 causes of a delay from literature to explore the causes and impacts of delay in Jordanian public construction projects. These 55 causes were classified into four main categories: contractors, consultants, clients, and external related factors. Their research results showed that contractor's poor management and supervision, owner's design changes, contractor's inadequate planning and control, using lowest bid, change in the extent of the project, design errors and contract document, delay in progress payment in time, rework due to the construction mistakes, modification in the original design, and poor labor performance were the top-ten factors for project delays.

Jahanger (2013) conducted a study in Bagdad city, Iraq, to specify the most common causes of construction project delays. In this research 58 causes of delay were discovered and classified into ten categories including the contractor, client, consultant, design, project, workforce, material, equipment, environment, and external related causes.

Using a questionnaire survey and interviews with 78 construction professions including contractors, owners, and consultants were found out that poor project planning and scheduling, errors and differences in design documents, poor site supervision and management, poor qualification of contractor's staff, and indistinct and inadequate details in the drawing are the top five causes of construction project delays in Bagdad city.

Almutairi (2016) reported that using the lowest price bidding and tending system, insufficient qualifications/experience of contractor's staff, the poor performance of the main contractor, delay in payment from the client to the other parties, shortage in the supply of general labor, subcontractor's poor performance, subcontractor's frequent change, poor management of subcontractor, delay in owner's decision making, and conflict among the primary contracting parties are among the primary causes of construction project delays in Kuwait.

1.7.3.3. Studies conducted in Asian Regions

Gündüz et al (2013) documented 83 attributes of a delay from literature and classified them into nine groups. The outcome of this research showed that insufficient contractor experience, ineffective planning and scheduling of the project, poor supervision and site management, design changes by the owner and his agent in the construction phase, late material delivery are the top five reasons for construction project delays in Turkey. Similarly, Culfik et al. (2014) researched Turkey using a questionnaire survey to evaluate the reasons for construction project delays. The outcomes of this study revealed that project suspension by the owner, contractor's late payment by the owner, unrealistic project duration, owner's slow decision making, insufficient early project planning, contractor's inadequate financing during construction, shortage of labor, slow material delivery, design changes by the owner or his agent, and obtaining permits from the municipality were among the top ten causes of construction project delays in Turkey.

Pourrostam and Ismail (2012) studied the factors that cause delays and their effects on Iranian construction projects. According to their results, delays in the client's progress payment, change orders by the client in the construction phase, inadequate site management, owner's slow decision making, contractor's financial difficulties, subcontractors related problems, client's late reviewing and approving design documents, inadequate planning and scheduling of the project, errors, and differences in design documents, and bad weather are highlighted as the main factors that causing delays in the construction project.

Afridi (2016) explored the most important factors of construction project delays in Afghanistan. The most common factors were Ineffective project planning and scheduling, delays in the client's progress payment, poor supervision, and site management of contractors by client and consultant, and contractor's financial difficulties.

Hussain et al. (2018) examined the critical delay factors in public sector building projects in Gilgit-Baltistan-Pakistan. A total of fifty-two delay factors were identified from the literature and then grouped into eight groups. According to the study results, difficulties in financing projects by contractors, delays in progress payment, inadequate contractor experience, dispute on land usage, award project to the lowest, improper project feasibility studies, inadequate data collection and survey before design, and extreme weather circumstances were ranked as the leading causes of construction project delays.

Durdyev et al. (2017) investigated the reasons for residential construction project delays in Cambodia. They highlighted that the foremost causes are shortage of material on-site, late material delivery, the project's complexity, unrealistic project scheduling, shortage of skilled manpower, labor absenteeism, poor site management, late payment by the client, subcontractor's delay, and accidents due to the poor safety.

Islam et al. (2015) conducted a questionnaire survey obtaining views from consultants, contractors, and clients involved in large building construction buildings in Bangladesh. It was concluded that the lowest bidder selection, lack of experienced construction managers, lack of proper managers, owners funding problem, and inadequate planning and scheduling are the most significant reasons for the delay.

Furthermore, Akogbe et al. (2013) investigated the factors that cause delays for development construction projects in Benin. According to their results, contractor's financial capability, client's financial difficulties, poor performance by subcontractors, problems related to material procurement, and change drawings are highlighted as the most prevalent causes of delay.

Additionally, Wang et al. (2018) performed a study to determine the causes of building construction project delays in China. Delays in progress payment, causes of variation, subcontractor's poor performance, and communication issues, and exceptionally low bids were indicated as the most common causes.

In Malaysia, Yap et al. (2021) revealed that change orders from the owner, absence of appropriate planning and scheduling, absence of competent site management and supervisions, contractor's financial problems, and lack of competent sub-contractors are the top five factors of construction project delays in Malaysia.

1.7.3.4. Studies conducted in Australia and New Zealand Regions

Wong and Vimonsatit (2012) have identified the most significant 10 reasons affecting construction time in Western Australia across a questionnaire survey conducted with the clients, consultants, and contractors. According to their study findings, financial difficulties, unrealistic deadlines for project duration, shortage of skill, poor communication, labor shortage, unforeseen ground conditions, underestimation of project time completion, design mistakes made by designers, slow decision-making, and poor contractor/consultant organization are revealed as the most important causes.

On the other side, Auckland, New Zealand, Durdyev (2018) worked out research examining the key causes of large construction project delays. After identifying a total of 40 factors of delay, a questionnaire survey was conducted with 28 experts working in 4 different construction companies, including site engineers and construction managers. The outcome of this study showed that delays in producing design documents, clients' late reviewing and approval of design documents, late issuing of instructions, unforeseen ground conditions, and unclear and inadequate details on drawings are among the most frequent causes.

1.7.3.5. Studies conducted in European Regions and the USA

Zidane and Andersen (2018) carried out a survey of different parties engaged in the construction process, including engineers, contractors, subcontractors, clients, consultants, and suppliers, to find out the key causes of delays in the Norwegian construction sector. The study revealed that a slow decision-making process, poor coordination, and communication among the different parties involved in the project, poor project planning and scheduling, internal administrative procedures and bureaucracy within projects organizations, slow quality inspection process in finished work, resource shortage, lack of

commitment team, slow/improper design, design errors/change orders during the construction phase, and office related issues are the most prevalent delay causes.

Arantes et al. (2015) studied the reasons for delays in the construction industry in Portugal. They found out that the change order, contractor's financial difficulties, slow decision making, unrealistic timescale, and poor contract specification, and bidding award type or contract award procedure are the common factors of delays in the Portuguese construction industry.

Larsen et al. (2016) have conducted a questionnaire survey in Denmark that included 26 factors of delay to analyze the factors that affect schedule delay, cost overrun, and quality level in public construction projects. It was outlined that unsettled or lack of project funding, lack of project planning, errors or omission in construction work, delay or long process times caused by authorities, and lack of identification needs are the major top five factors of delay in public construction projects.

Tafazzoli and Shrestha (2017) performed a survey in the United States to investigate the potential delay factors in construction projects. The research findings highlighted that excessive change orders, time-consuming decision-making process of the owner, design errors, delay in approving design documents by the owner, errors in contract documents, unrealistic schedule, delay in getting permits and acquisitions, complexities and ambiguities of project design, poor communication and coordination of owner with other parties, and delay in providing the design documents by designer are notable ten delay factors in the United States.

Zidane and Andersen (2018) have published research that identified the top ten universal delays in construction projects. They provided a collection of several studies undertaken in various regions of the globe. Furthermore, the top-ten universal delays were chosen from the top-ten delay factors for each of the 46 nations in the global using an overall ranking index. They indicated in their study that delays in payments to the contractors, contractor's financial difficulties, inadequate contractor's experience/construction approaches and methods, change orders and design during construction, improper or incomplete design, poor planning and scheduling of the project, poor supervision and site management, clients/owner/sponsor's financial difficulties, shortage of resource, shortage of skills, and poor labor productivity are the top 10 significant factors of construction project delays the in global.

Following the findings mentioned in the above studies, a brief comparison was conducted. The common delay causes shared by these regions also the specific delay factors in each region were documented throughout the comparative process (as Table 1.1 presents).

Table 1.1. Comparison of delay attributes between the regions

Delay factors	African Regions	Golf of Arab Regions	Asian Regions	European Regions & USA	New-Zealand and Australia	Common Delay Attributes
Delays in delivery of material	✓					
A shortage in construction material in the market	✓					
Slow response and inspection	✓					
Material price escalation	✓					
Resource/scheduling management	✓					
Frequent change scope, and variation orders						✓
Failure and equipment availability	✓					
Inclement weather	✓					
Inadequate control and monitoring	✓					
High cost of capital	✓					
Instability of politics and insecurity	✓					
Late revising changes in the scope of work	✓					
Contractor's financial dishonesty/discipline	✓					
Consultant's inadequate site investigation	✓					
Fluctuation of prices	✓					
Errors/mistakes during construction	✓					
Financial deficits for both contractor and client	✓					
Problems related to material procurement	✓					
Honoring payment certificates	✓					
Underestimating project expense	✓					
Underestimating project complexity	✓					
Difficulties in obtaining bank credit	✓					
Inadequate funds from the client.	✓					
Shortages of equipment	✓					
Different tactics patterns for bribes	✓					
Subsurface related problems	✓					
Poor labor productivity	✓					
Absence of qualified consultants	✓					
Late site delivery to the contractor	✓					
Unrealistic contract duration imposed by the owner	✓					

Table 1.1 continue

Excessive subcontracting	✓					
Deficiency of training for employers	✓					
Deficiency of west management	✓					
Delay in obtaining government permits	✓			✓		
Rework due to the construction faults	✓					
Lack of sufficient cash for project implementation		✓		✓		
Insufficient early project planning			✓			
Shortage of labor				✓		
Internal administrative procedures and bureaucracy within projects organizations					✓	
Differences, and mistakes in design documents						✓
Poor project planning and scheduling						✓
Late issuing of Instructions				✓		
Dispute on land usage			✓			
Poor experience and skill of contractor's technical staff		✓				
Absence of client experience in construction		✓				
Absence of capability of the owner representative		✓				
Obtaining permits from the municipality			✓			
Ineffective schedule, and planning						✓
Office-related issues				✓	✓	
Delays in approving design documents						✓
Extreme weather circumstances			✓			
Non-use of skillful construction management		✓				
Inadequate data collection and survey before the design			✓			
The project's complexity			✓			
Owner's slow decision making						✓
Lowest price bidding and tending system						✓
Labor absenteeism			✓			
Uncooperative owners		✓				
Errors in the contract document		✓				
Subsurface related problems						✓
Lack of experienced construction managers			✓			
Owner's funding problem			✓			
Shortage in the supply of general labor		✓				
Problems related to material procurement			✓			
Communication and coordination issues						✓
Shortage of skill						✓
Errors in contract documents				✓		
Unforeseen ground conditions				✓		
Slow quality inspection process in finished work					✓	

Table 1.1 continue

Financial problems of the contractor					✓
Poor contract specification				✓	
Inadequate experience of the contractor					✓
Poor site supervision and management					✓
Slow/improper design				✓	
Underestimation of project time completion					✓
Resource shortage				✓	
Design changes by the owner or his agent		✓			
Late material delivery		✓			
Incomplete design	✓				
Subcontractor's delays	✓				
Inflation of price	✓				
Improper project feasibility studies		✓			
Accidents due to the poor safety		✓			
Incompetent project team					✓
Lack of identification needs	✓			✓	
Poor labor performance	✓				
Poor performance of the main contractor	✓				
Insufficient early project planning	✓				
Subcontractor's frequent change	✓				
Lack of competent sub-contractors		✓			
Delay in progress payment for finalized work					✓
Contractor's cash flow issues					✓
Poor management of the subcontractor	✓				
Conflict among the primary contracting parties	✓				
Design errors			✓		
Unrealistic schedule			✓		
Complexities and ambiguities of project design			✓		

1.7.3.6. Overview Summary

Delays are a common issue that exists and occur in every construction industry, as shown by the above literature studies; besides, the extent of these delays differs per project. According to the studies conducted on construction delays, findings of these studies vary due to geographic differences also the economic situation in that country. Payment related problems like delays in the client's progress payment, cash flow problems for contractors, order variation and change scope, contractors improper project planning, scheduling, and monitoring, shortage of skilled professionals including manpower, and fluctuation of price

problems are the most critical reasons for delays in the countries mentioned in the first category which is mostly African countries. Meanwhile, change scope and variation order, contractor's ineffective project planning, scheduling, controlling, and monitoring also, delays in client's progress payment to contractors, and late in reviewing and approving design documents are major causes of the delays in the countries mentioned in the second and third group which are the combination of Asian and some European countries. Table 1.1 revealed financial problems like payments for finalized work, ineffective project planning/scheduling/managing and monitoring, shortage of skilled manpower, and variation of design/scope of the project are major common attributes of delay shared in these different regions.

Nevertheless, construction project delays cannot be completely prevented or eliminated, but by implementing suitable procedures, some of the variables that cause construction delays can be alleviated or reduced.

2. RESEARCH WORKS AND METHODOLOGY

2.1. General

Various research works were undertaken to gather information and accomplish the study's primary objectives. To begin, a thorough study of the literature was performed on many studies conducted throughout the world, including those conducted in African countries, the Gulf of Arab countries, Asian countries, European countries, and others. Second a thorough comparison of these studies was conducted, and a list of 90 factors was compiled to conduct a pre-questionnaire with Somaliland construction professionals and experts to determine whether the data obtained from the literature was compatible with the situation of building construction projects in Somaliland, as well as to identify if there were any new or missing factors. Finally, when the pre-questionnaire respondents were received, a final questionnaire was constructed and produced, and then the data was analyzed using different statical techniques as well as SPSS software.

Figure 2.1 briefly shows the works executed in this research which contains three main phases:

a. Survey design covered the process that followed to obtain data from the literature review.
b. Data collection firstly used a pre-questionnaire and interview with construction experts, followed by the distribution of the final questionnaire to a wide range of professionals involved in construction projects.
c. Upon completion of the final questionnaire, data analysis was performed using different statical techniques. These comprise the Relative Important Index method to rank the factors according to their given weights by the respondents. Additionally, a reliability test was also applied during the data analysis by utilizing Cronbach's test to ensure the reliability of the data.

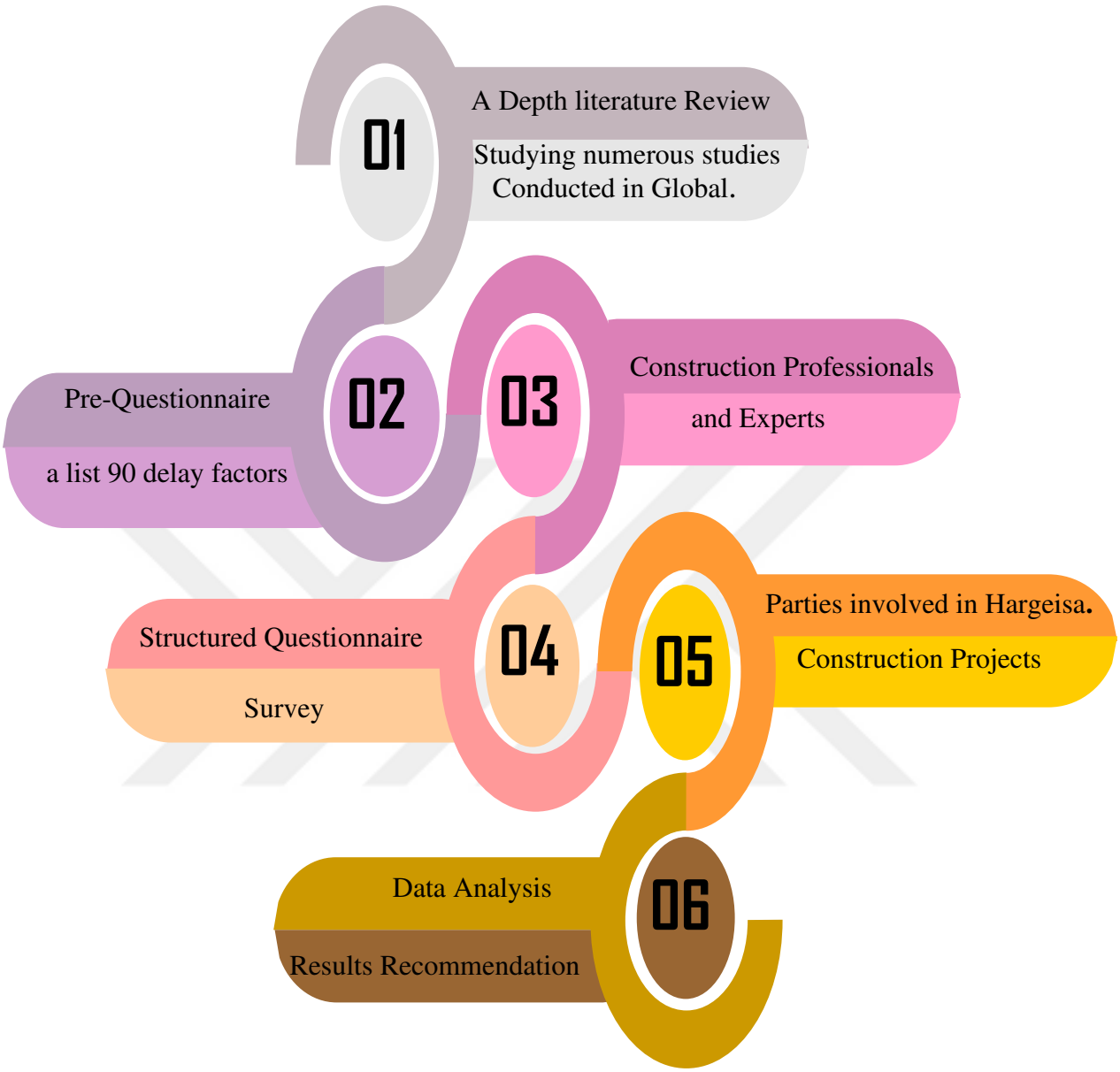

Figure 2.1. Methodology Covered in this Research

2.2. Survey Design

Similar to many research papers and publications, the survey design procedure was followed in this study. An extensive literature review was done to determine the causes of construction project delays through analogous studies, published technical reports, journals, books, etc.

After an in-depth literature review, as well as performing a brief comparison process between numerous studies conducted in the global, a list of 90 factors was documented. Subsequently, a pre-questionnaire was prepared and face-to-face interviews with 14 professionals/experts in the construction sectors in Somaliland were carried out to evaluate the relevance of acquired data to the situation in Somaliland also to explore new delay causes if they are locally available. Finally, after obtaining a view from the construction experts, a structured questionnaire survey was designed and sent for the process of data collection.

2.2.1. Collecting Data From the Literature Review

In this research, to acquire information, two techniques of data collection were employed primary and secondary data. The primary required data was achieved by a questionnaire survey of construction participants including, engineers, consultants, contractors, architectures, and clients. Meanwhile, the secondary data was gathered through a depth literature review. There have already been many studies done on the causes of construction project delays, and the literature has a well-documented and peer-reviewed collection of delay attributes. Hence, in the first, a collection of studies conducted from international and neighboring countries were thoroughly reviewed, and then a list of 127 factors of construction project delays was compiled. Secondly, a brief comparison was performed by considering the most significant delay factors documented in international as well as the most significant factors documented in studies conducted in neighboring countries. Additionally, in the comparison process, identical delay factors mentioned in these various studies with a higher frequency were added to the list. Furthermore, the common delay attributes shared in the studies conducted in neighboring countries were included in the list. Following that, the general factors, or in other words, the factors documented in each study separately (Neighboring conducted studies) were also included in the list. Finally, the list of 127 factors was reduced to 90 factors. Figure 2.2 illustrates the process of data collection from literature.

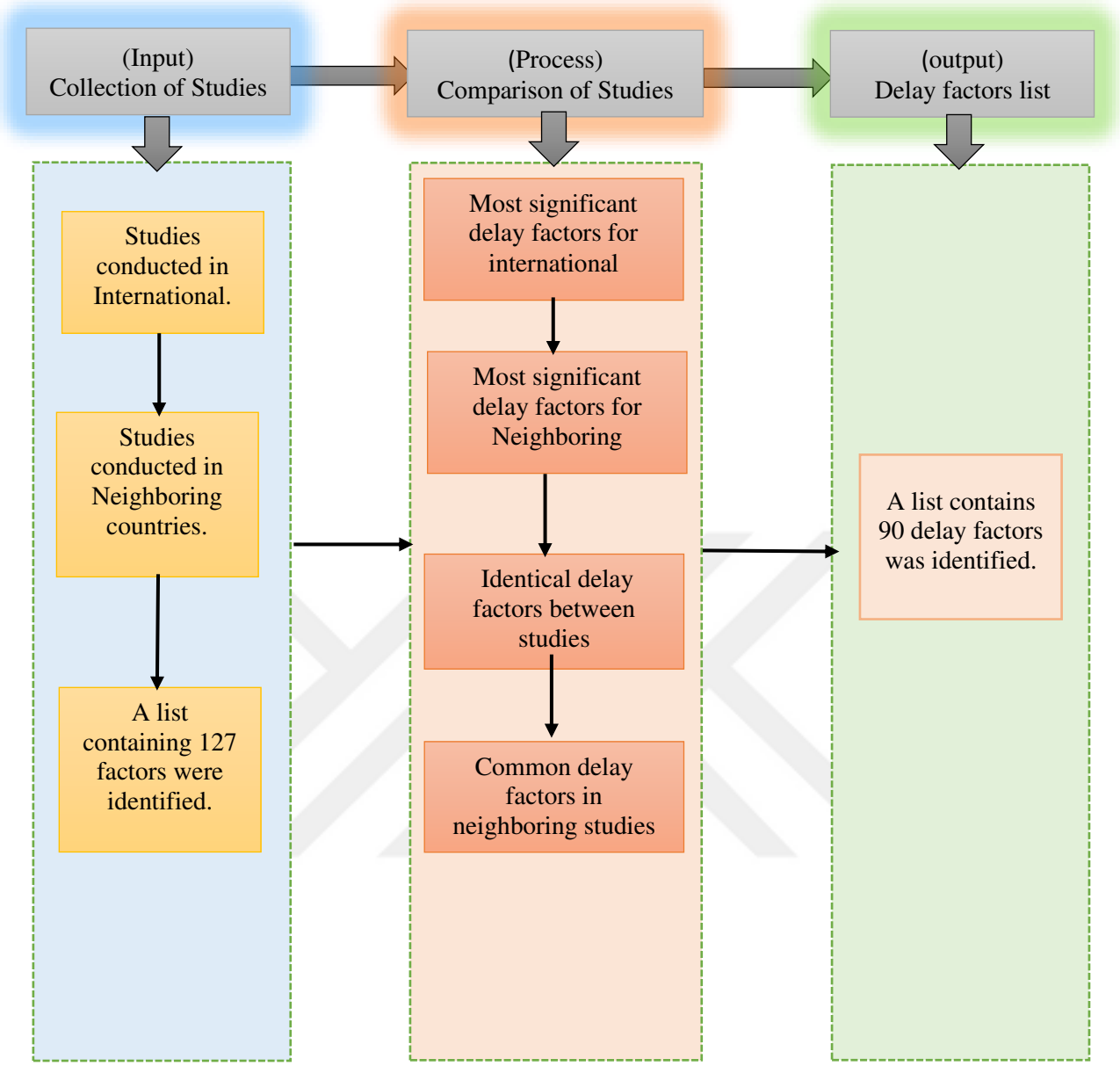

Figure 2.2. Data Collection Process from Literature

After the comparison procedure was completed, a new list of delay attributes with 90 factors was documented. Table 2.1 shows the list of 90 factors that were analyzed via various studies to document the most frequent factors that would be utilized in the study's subsequent steps.

Table 2.1. Identified delay factors through a thorough literature review

No	Identified Delay Factors
1	Insufficient experience of the contractor
2	Inappropriate construction method
3	Incompetent construction team
4	Ineffective project planning and scheduling
5	Obsolete technology
6	Contractor's poor coordination and communication with other parties
7	Poor supervision and site management
8	Rework due to the errors during construction
9	Contractor's financial difficulties
10	Delays related to Sub-contractor's work
11	Inaccurate time estimation
12	Regular change of sub-contractors
13	Unreliable sub-contractors
14	Incompetent contractors
15	Contractor's Cash flow management
16	Poor qualification of contractor's technical staff
17	Inaccurate cost estimation
18	Poor project management
19	Delay in site mobilization
20	Change order
21	Delay in progress
22	Delay in site delivery
23	Owner's lack of experience in construction projects
24	Owner's poor coordination and communication with other parties
25	Owner's slow decision making
26	Owner's financial difficulties
27	Conflicts and disputes in the Sub-contractor's schedule in the project execution
28	Excessive bureaucracy by the owner's administration
29	Lack of incentives from the owner for the contractor to complete ahead of schedule
30	Delay in the settlement of contractor claims and non-payment of compensation by the owner

Table 2.1 continue

31	Interference and suspension of work by the owner
32	Owner’s partial payment during construction
33	Lack of experienced consultants in the construction
34	Consultant’s delay in approving a major change in the scope of work
35	Consultant’s delay in performing testing and inspection
36	Consultant’s poor communication and coordination with other parties
37	Inaccurate site investigation
38	Ineffective quality control
39	Conflicts between consultant and designer
40	Inflexibility of consultant
41	Design change by the owner or his agent during construction
42	Design errors and mistakes by designer
43	Delays in producing design documents
44	Designer’s misunderstanding of the owner’s requirements
45	Unclear and inadequate details in the drawing
46	Insufficient data collecting and surveying before the design
47	Absence of experience of the design team
48	Poor use of advanced engineering design software
49	Changes in material types and specifications in the construction phase
50	Material prices escalation
51	Late material delivery to the site
52	Poor and delay in procurement of construction materials
53	Poor quality of material construction
54	Damage of stored material
55	Shortage of construction materials
56	Delay in manufacturing materials
57	Unreliable suppliers
58	Failure and frequent equipment breakdown
59	Shortage of equipment
60	Improper equipment used for the work
61	Poor efficiency of the equipment
62	Poor level of equipment operator's skill
62	Poor level of equipment operator's skill
63	Absence of modern Tools/equipment
64	Labor Absenteeism

Table 2.1 continue

65	Low labor productivity
66	Personal conflict among labor
67	Shortage of labor
68	Inexperienced/unqualified labors
69	Shortage of skilled labor
70	Strike
71	Low workers motivation and morale
72	Slow mobilization of lobar
73	Type of the project bidding and award (lowest bidder)
74	Project's improper feasibility study
75	Unrealistic contract duration imposed by the owner
76	Lack of coordination and communication among parties
77	Poor contract management
78	Change to the project's scope
79	Legal disputes and claims between project stakeholders
80	Shortness of original contract duration
81	Accidents during construction
82	Change in government laws and regulations
83	Delay in obtaining permits from the municipality
84	Currency and price fluctuation
85	Unforeseen surface and subsurface condition
86	Inclement weather condition
87	Natural disasters (Such as epidemics, floods, earthquakes, etc.)
88	Loss of time due to traffic restriction and control at work site
89	Problems with neighbors
90	Government interference

2.2.2. Pre-questionnaire Design

Pre-questionnaire interviews were designed and conducted as part of this study to ensure that the data gained from literature was well-matched with the situation of building construction projects in Somaliland, also to determine whether there are new or missing factors causing construction delays.

Following an extensive literature study, the pre-questionnaire was prepared. Professionals and experts in the construction industry from different organizations were selected for interviews. The responders were targeted based on their competence in the construction sector (Table 2.2). The pre-questionnaire was broken down into three sections: a) Personal Information; b) a list containing 90 factors of delay that previously identified via comprehensive literature review, from which the experts were requested to select the most imperative causes of delay in Somaliland building construction projects by using the Likert Scale 1: Non-significant to 5: Very High Significant; c) open-ended questions.

Table 2.2. Details of interviewed professionals and experts

No	Education Level	Experience Years	Occupation/Organization
1	MSc	51	Private Sector
2	BSc	40	University Lecture
3	PhD	9	Dean of Civil Engineering Department in Hargeisa University
4	PhD	16	Private Sector
5	PhD	5	Dean of Civil Engineering Burao University
6	MSc	11	Private sector
7	MSc	4	University Lecture
8	MSc	7	Private Sector
9	MSc	7	Private Sector
10	BSc	13	Private Sector
11	BSc	10	Private Sector
12	BSc	8	Private Sector
13	BSc	9	Private Sector
14	BSc	11	Private Sector

2.2.2.1. Pre-questionnaire Interview Results

A list containing 90 delay attributes was compiled based on a thorough literature review, and experts were demanded to choose the most significant delay factors (Table 2.1).

Following analysis of the expert's views based on the most frequent factors, a total of 72 factors have remained. In other words, eighteen factors were eliminated (Table 2.3) since they all have a minimal scale (non-significant). Furthermore, the experts and professionals have pinpointed six new causes of delays that should be considered in the final questionnaire design. Therefore, 78 attributes of delay were taken into account for further steps. Table 2.4 shows the six delay causes newly identified by the interview.

Table 2.3. Eliminated delay factors during pre-questionnaire analysis

No	Eliminated delay factors
1	Contractor's financial difficulties
2	Delay in site delivery by owner
3	Excessive bureaucracy by the owner's administration
4	Consultant's poor coordination and communication with the others
5	Conflicts between consultant and designer
6	Inflexibility of consultant
7	Insufficient data collecting and survey before the design
8	Poor and delay procurement of construction material
9	Damage of stored material
10	Delay in manufacturing materials
11	Labor strikes
12	Shortage of labor
13	Change in government laws and regulation
14	Unforeseen surface and subsurface conditions
15	Inclement weather condition
16	Loss of time due to traffic restriction and control at work site
17	Problems with neighbors
18	Government interference

Table 2.4. The six delay causes newly identified by the experts.

No	Newly identified delay causes
1	Lack of building codes
2	Increase of tax in building material
3	Corruption

Table 2.4 continue

4	Labor's chewing Khat during construction
5	Ineffective delay penalties
6	Poor government judicial system for construction projects

2.2.3. Questionnaire Design and Categorizing Delays into Groups

Following the identification of 72 delay factors that were confirmed to be compatible with the situation of building construction projects in Somaliland, as well as six newly identified causes through an interview conducted with various construction experts, a total of 78 delay factors were considered to apply to the final questionnaire. Furthermore, similar to earlier research, delay attributes have been classified into eight groups: contractors-related, consultants-related, owner/client-related, design-related, Material and Tools/equipment-related, labor-related, project and contract-related, and external-related (Durdyev, 2018; Chan and Kumaraswamy, 1998). Additionally, IDs were assigned to each cause based on their group names to prepare them for the analysis phase. The IDs CF1 to CF19 were named for the factors under the contractors-related group (Table 2.5), OF1 to OF10 were assigned for the factors under the owners-related group (Table 2.6), CSF1 to CSF6 were designated for the factors under the consultant-related group (Table 2.7), DF1 to DF7 were appointed for the factors under design-related group (Table 2.8), MEF1 to MEF13 were allocated for the factors under material and Equipment-related group (Table 2.9), LF1 to LF8 were assigned for the factors under labor-related group (Table 2.10), PCF1 to PCF11 were named for the factors under Project and Contract-related group (Table 2.11), and finally, EF1 to EF4 were allotted for the factors under external-related group (Table 2.12).

Table 2.5. Contractors related factors

No	ID	Delay Factors
1	CF1	Insufficient experience of contractor
2	CF2	Inappropriate construction methods
3	CF3	The unqualified construction project team

Table 2.5 continue

4	CF4	Ineffective project planning and scheduling
5	CF5	Using old technology
6	CF6	Poor site management and supervision
7	CF7	Rework due to the errors during construction
8	CF8	Delay related in sub-contractors' work
9	CF9	Inaccurate time estimation
10	CF10	Regular change of sub-contractors
11	CF11	Unreliable sub-contractors
12	CF12	Unqualified contractors
13	CF13	Cash flow management
14	CF14	Poor qualification of contractor's staff
15	CF15	Inaccurate cost estimation
16	CF16	Poor project management
17	CF17	Delay in site mobilization
18	CF18	Poor communication and coordination
19	CF19	Conflicts in subcontractor's schedules in the project execution

Table 2.6. Owner/Client's related factors

No	ID	Delay Factors
1	OF1	Change order
2	OF2	Delay in progress payment
3	OF3	Owner's lack of experience of the owner in construction projects
4	OF4	Owner's poor coordination and communication with other parties
5	OF5	Owner's slow decision making
6	OF6	Owner's financial difficulties
7	OF7	Lack of incentives from the owner for the contractor to complete ahead of schedule
8	OF8	Delay in the settlement of contractor claims and non-payment of compensation by the owner
9	OF9	Interference and suspension of work by the owner
10	OF10	Partial payment during construction

Table 2.7. Consultant's related factors

No	ID	Delay Factors
1	CSF1	Lack of experienced consultants in construction projects
2	CSF2	Consultant's delays in approving major changes in the scope of work
3	CSF3	Consultant's delays in performing inspection and testing
4	CSF4	Consultant's poor coordination and communication with other parties
5	CSF5	Inaccurate site investigation
6	CSF6	Ineffective quality control

Table 2.8. Design related factors

No	ID	Delay factors
1	DF1	Design changes by the owner or his agent during construction
2	DF2	Design errors and mistakes made by designer
3	DF3	Delays in producing design documents
4	DF4	Designer's misunderstanding of owner's requirements
5	DF5	Unclear and insufficient details in drawings
6	DF6	Absence of experience in the design team
7	DF7	Poor use of advanced engineering design software

Table 2.9. Material and Tools/Equipment related factors

No	ID	Delay factors
1	MEF1	Change in material specification and types in the construction phase
2	MEF2	Escalation of material price
3	MEF3	Late delivery of material to the site
4	MEF4	Poor quality of construction materials
5	MEF5	shortage of construction material
6	MEF6	Unreliable suppliers
7	MEF7	Failure and frequent equipment breakdown
8	MEF8	shortage of equipment
9	MEF9	improper equipment used for the work
10	MEF10	Poor efficiency of the equipment
11	MEF11	Poor level of equipment operator's skill
12	MEF12	Absence of modern equipment
13	MEF13	Increase of tax in building material

Table 2.10. Labor-related factors

No	ID	Delay factors
1	LF1	Labor absenteeism
2	LF2	Low labor productivity
3	LF3	Personal conflicts among workers
4	LF4	Inexperienced/unqualified labors
5	LF5	Shortage of skilled labor
6	LF6	Low worker motivation and morale
7	LF7	Slow mobilization of labor
8	LF8	Labor's chewing Khat during construction

Table 2.11. Project and contract related factors

No	ID	Delay factors
1	PCF1	Type of project bidding and award (lowest bidder)
2	PCF2	Project's improper feasibility study
3	PCF3	Unrealistic contract duration imposed by the owner
4	PCF4	Poor contract management
5	PCF5	Change in scope of the project
6	PCF6	Legal disputes and claims between project stakeholders
7	PCF7	Shortness of original contract duration
8	PCF8	Lack of building codes
9	PCF9	Corruption
10	PCF10	Ineffective delay penalties
11	PCF11	Poor government judicial system for construction projects

Table 2.12. External related factors

No	ID	Delay factors
1	EF1	Accidents during construction
2	EF2	Delay in obtaining permits from the municipality
3	EF3	Currency and price fluctuation
4	EF4	Natural disasters (Such as epidemics, floods, earthquakes, etc.)

2.2.3.1. Questionnaire

As shown in Appendix (A), a questionnaire survey was prepared based on the study's main aims to obtain respondents' opinions and learn about their experience with building construction project delays. The questionnaire was structured into three main sections. The first section dealt with the respondent's personal information and background including, organization, education level, experience years working in the construction, and organization type (public/governmental organization or private organization). In the second section, 78 delay factors were identified by an extensive literature study and pre-questionnaire interview. As mentioned in the preceding sections, these causes were allocated IDs and categorized into eight groups. Respondents were requested to rate the importance of each cause using the Likert Scale with a varied measure between 1 to 5, with 1 being non-significant and 5 being Very high significant (Table 2.13). The Likert Scale approach was employed by many other similar studies.

Table 2.13. Likert Scale Measures

Scale	Degree of influence
1	Non-significant
2	Slightly Significant
3	Significant
4	Very Significant
5	Very High Significant

The final section of the questionnaire was open-ended questions, which was requested the participant to write any other causes of delay, or any comment related to building construction project delays, and any suggestions/ideas for how might be minimized or eliminated for the delays in building projects. This type of question allows the respondent to provide comments and opinions on their terms.

2.3. The population and Sample Size

Several formulas in the literature were applied to determine the sample size of the target population, such as Cochran's formula and modified Yamane's formula given by Adam (2020). Firstly, it is necessary to specify the amount or number of the targeting population to define the required sample size from these populations. The targeting population in this study are construction professionals and workers involved in the Hargeisa construction sectors. Nonetheless, in Somaliland, there is no registration or record for the professionals engaging in the construction sector. Hence, to compute the sample size of the targeted population in this study Cochran (1963) formula (2.1) was applied.

$$n_0 = \frac{z^2 pq}{e^2} \tag{2.1}$$

Where:

n_0 = the required sample size e = margin of error (3% -5%) $q = 1\text{-}p$

z^2 = the critical value of desired confidence level (Interval).

p = the estimated proportion of attribute that present in the population (it is generally taken 50%, or 0.5). According to this study, the minimum required sample size was calculated as following: z^2 = 90% (1.64 from the Z table). e = 5% or 0.05 p = 0.5 q= 1-0.5 = 0.5

$$n_0 = \frac{(1.64)^2 * (0.5) * (0.5)}{(0.05)^2} = 269.$$

To confirm the required number of complete was achieved, the sample size in this research was taken to 270 participants.

2.4. Data Collection Method

To acquire the primary required data for this study, first, a pre-questionnaire was prepared, and then a face-to-face interview was conducted by a diverse group consisting of 14 engineers and experts who work in public and private construction sectors in

Somaliland, particularly in Hargeisa. Following the completion of the pre-questionnaire, the final questionnaire was prepared and distributed. The target respondents received a total of 270 questionnaires, 120 of which were given as hard copies and 150 which were distributed as soft copies via email. This was due to the pandemic (Cov19), which made the distribution of the whole questionnaire as hard copies problematic. A total of 233 questionnaires were gathered out of 270. This data collecting procedure took place between March and May 2021.

2.5. Data Analysis Method

Breaking down the data into understandable themes and patterns is the best approach to analyze it. The factors that contribute to delays in building construction projects are divided into eight broad groups, and each cause was given an ID based on its group name. Several distinct data analysis approaches were applied by different researchers, according to an extensive literature evaluation.

In this study, the data is evaluated utilizing a variety of procedures and statistical tests to arrive at a more accurate and acceptable outcome. The data obtained from diverse respondents via questionnaire survey were analyzed and computed by using the Relative Important Index (RII) method to determine individual factors' significance and to rank the factors according to their significance. The RII approach is one of the most widely used and has a high level of reliability when ranking attributes through a structured questionnaire survey (Dixit et al., 2019). Moreover, the value generated by this approach is always positive and ranges from 0 to 1. The highest index value represents the most significant factor, while the lowest index value signifies the least relevance. The RII formula (2.2) was computed as follows:

$$\text{RII} = \frac{1n_1 + 2n_1 + 3n_1 + 4n_1 + 5n_1}{A\,N} \tag{2.2}$$

Where:

n_1, n_2, n_3, n_4, n_5 = The number of respondents of each factor.

Subscript 1 to 5 is the rate given for each factor according to the Likert Scale, which 1 is represented non-Significant; 2 Slightly significant; 3 Significant; 4 Very significant; and 5 Very high significant.

A = the highest rate; in this case (i.e., 5). N = the total number of respondents.

Furthermore, reliability analysis was performed using Cronbach's alpha to verify the consistency of the data acquired for this research. Besides, descriptive analysis was done in this study.

3. ANALYZING AND FINDINGS

This section presents the data analyzed by research tools, as well as the interpretation of the findings achieved during the analyzing phase. In the initial step of the data analysis, the demographic profiles of the respondents were examined. Following that, set statistical techniques and analysis were performed using IBM SPSS statistics software to assess the reliability of the acquired data, then the relative important index method was applied to rank the delay attributes according to their significance based on the weights given by various participants perceptions.

3.1. Respondent Rate

A total of 270 questionnaires was distributed to the construction professionals working on both public and private projects. Moreover, the questionnaire survey distribution was primarily targeted at project engineers, contractors, architectures, clients, and consultants.

233 (86.33%) out of the 270-questionnaire distributed were returned. Babbie (2007) stated that a response rate of more than 50% is sufficient to represent the entire population statistically, 60% is good, and above 70% is perfect. Furthermore, Mugenda (2003) has a similar viewpoint, claiming that a response rate of 50% is acceptable for analyzing and reporting when conducting a survey. Mugenda (2003) also claimed that a response of 60% is considered good, while a response of 70% or higher is excellent. Thus, the response rate of the survey 86.30%, is sufficient for the data and analysis as presented in Table 3.1. However, 37 (13.70%) of the questionnaires were not returned, and 22 (8.15%) were filled improperly and dismissed. Nonetheless, 211 (78.15%) of the questionnaire (117 through the hard copies and 94 questionnaire surveys through the E-mail) was considered a valid questionnaire survey and selected for further data analysis processes.

Table 3.1. Statistical data on received survey

Subject	No	Percentage %
Targeted Questionnaire Surveys	270	
Received Questionnaire Survey	233	86.30
Non-Returned Survey	37	13.70
Invalid Questionnaire Survey	22	8.15
Selected Questionnaire Survey	211	78.15

3.2. Respondent's Background

The first section of the questionnaire of the building construction projects delays was primarily designed to provide background information on participants' work experience, educational level, and the type of organization with which they are currently employed.

3.2.1. Respondent's Educational Level

Table 3.2 shows, 60.7% of respondents were graduated bachelor's degree, 33.2% were received a master's degree, 2.8% were diploma holders, 2.4% were received a secondary school diploma, and 0.90% were Ph.D. holders.

Table 3.2. Respondent's Educational Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Secondary	5	2.4	2.4	2.4
	Diploma	6	2.8	2.8	5.2
	BSc	128	60.7	60.7	65.9
	MSc	70	33.2	33.2	99.1
	PhD	2	0.9	0.9	100.0
	Total	211	100.0	100.0	

3.2.2. Respondent's Experience Years

Table 3.3 indicates that the respondent's years of work in construction projects 48.8% between 0 to 5 years, 23.2% have worked in construction projects for 5 to 10 years, 19.9% have worked in construction for 10 to 15 years, and the remaining respondents 8.1% have more than 15 years of experience.

Table 3.3. Respondent's Experience Years

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 to 5	103	48.8	48.8	48.8
	5 to 10	49	23.2	23.2	72.0
	10 to 15	42	19.9	19.9	91.9
	above 15	17	8.1	8.1	100.0
	Total	211	100.0	100.0	

3.2.3. Respondent's Organization Profile

Table 3.4 reveals that 65.4% of questionnaire survey participants work on private construction projects, whereas 34.6% of the respondents work on public/Government construction projects.

Table 3.4. Respondent's Organization Profile

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Public/ Government Organization	73	34.6	34.6	34.6
	Private Organization	138	65.4	65.4	100.0
	Total	211	100.0	100.0	

3.3. Checking the Data Reliability

To verify the dependability of gathered data, a reliability test was applied using the most commonly used method (Cronbach's Alpha Test). It is a reliability test that evaluates the questionnaire's internal consistency and shows that they are linked together as a group. Cronbach's alpha measures internal consistency and ranges from 0 to 1, with values near 1 suggesting greater internal consistency and values below 0.5 indicating poorer internal consistency. After applying the Cronbach's test in this study, the findings for seven of them showed that internal consistency was over 0.70, which is an outstanding number. Despite this, external factors show a Cronbach's test results of 0.689, which is also regarded perfect value since it is more than 0.5. However, the overall Cronbach's test shows that the data has greater internal consistency with a value of 0.946. The outcomes were summarized in Table 3.5.

Table 3.5. Results of Data Reliability Testing

No	Groups	Reliability Test (Cronbach's Test)	Item Number
1	Contactor	0.875	19
2	Owner/Client	0.785	10
3	Consultant	0.752	6
4	Design	0.806	7
5	Material and Tools/Equipment	0.805	13
6	Labor	0.722	8
7	Project and Contract	0.752	11
8	External	0.689	4
	Overall Reliability Test (Cronbach's Test)		0.946

3.4. Ten Significant Delay Factors Determined by RII

According to a thorough literature study, many researchers used a variety of data analysis methodologies. Data is analyzed in this study using a range of approaches and statistical tests to get more accurate and acceptable results. Following the primary objective of this research, which was to determine the major factors of building construction project delays, the RII method was applied to rank the factors based on the responses and the weights assigned to the various participants. Based on the results of the analysis, Table 3.6 and Figure 3.1 are presented the most ten significant causes of building construction project delays. According to the outcomes, several factors had the same RII value, but these variables were prioritized based on their means and standard deviations, as similar in several research publications in the literature (M. Baha, 2020).

Table 3.6. Top-ten Factors Contributes to the Building Project Delays

No	ID	Factor Description	Mean	RII	Rank
1	CF4	Ineffective project planning and scheduling	3.54	0.71	1
2	LF4	Inexperienced/unqualified labors	3.49	0.70	2
3	CF6	Poor site management and supervision	3.41	0.68	3
4	MEF5	Shortage of construction material	3.40	0.68	4
5	MEF3	Late delivery of material to the site	3.36	0.67	5
6	DF1	Design change by the owner or his agent during construction	3.35	0.67	6
7	OF2	Delay in progress payment by the owner	3.34	0.67	7
8	PCF6	Legal disputes and claims between project stakeholders	3.33	0.67	8
9	CF9	Inaccurate time estimation	3.31	0.66	9
10	EF3	Currency, and price fluctuation	3.30	0.66	10

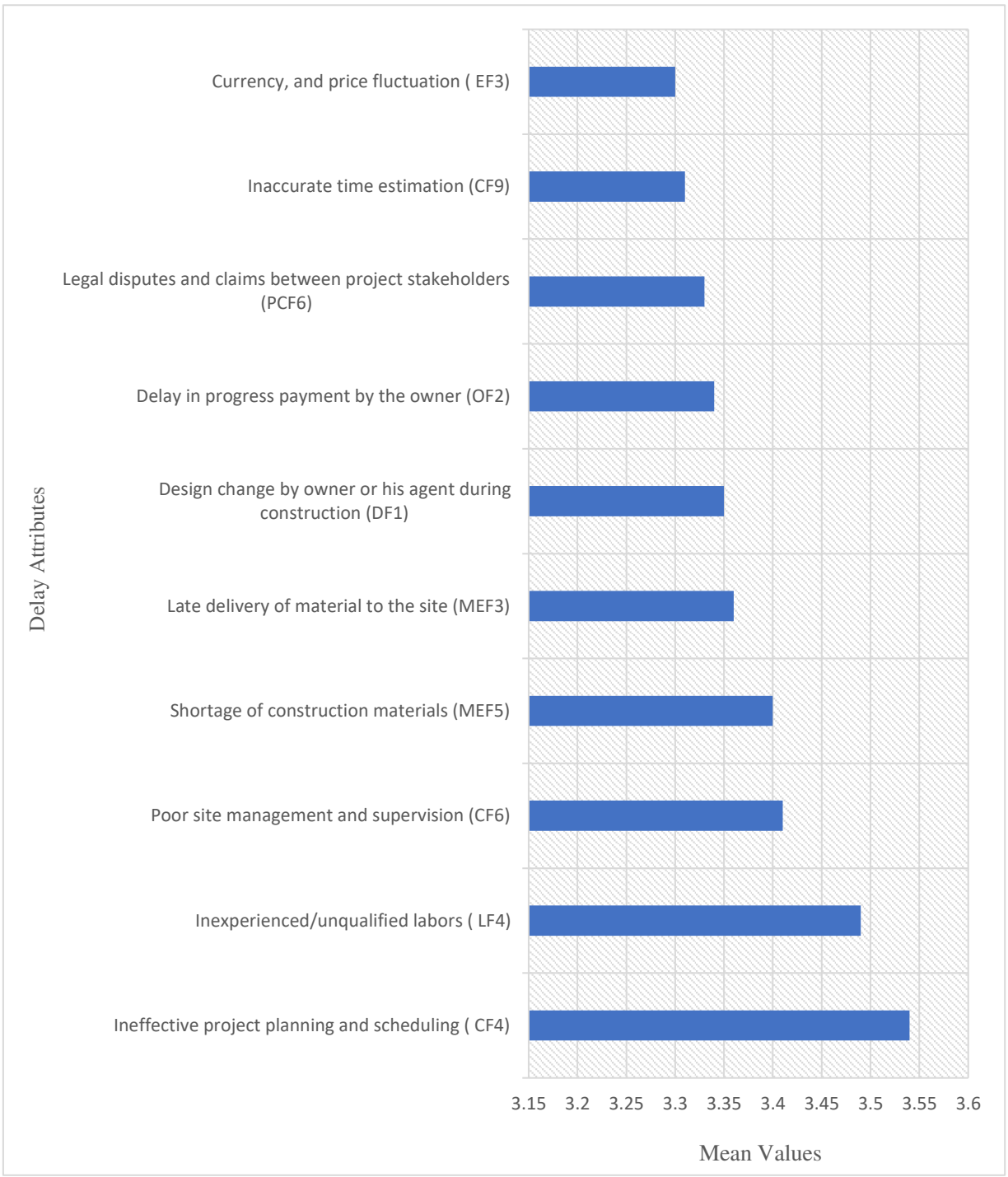

Figure 3.1. Top-ten Factors Contributes to the Building Project Delays.

4. DISCUSSION

4.1. Introduction

This section widely presents the data analysis results. It addresses the most common causes by presenting the key points in a broader discussion. In addition, provides recommendations for minimization of the number of delay factors as the primary objective of this study.

4.2. Factors Causing Delays in Building Construction Projects

Factors causing delays in construction building projects were identified from the previous studies and selected as seventy-eight factors. Further, these factors are summarized and divided into eight groups according to their characteristics to help respondents easily understand. Respondents ranked all factors in order of their importance.

4.2.1. Delay Factors Associated with the Contractors

The respondents selected ineffective project planning and scheduling (CF4) as the main significant attribute of building construction project delays, as shown in Table 4.1 and Figure 4.1, with a 0.71 RII value. Also, with a 0.68 RII value, the respondents ranked Poor site management and supervision (CF6) as the second attribute of delay. These two issues were also among the leading reasons for construction project delays in Ethiopia and Kenya, according to the studies conducted by (Koshe and Jha, 2016; Kong, 2018). Moreover, inaccurate time estimation (CF9) was ranked as the third as well as the ninth of the most important factor for delays in building construction projects. When project partners fail to probably prepare for the project, it will impact the project's completion timeline also it will lead to poor site management and control.

According to the group ranking list, contractors are the third most significant contributor to delays in building construction projects, with an RII score of 0.6157 (Table 4.11).

Table 4.1. Contractor's associated Factors

Descriptive Statistics

Description	ID	Mean		Std. Deviation	RII	Rank
		Statistic	Std. Error	Statistic		
Insufficient experience of the contractor	CF1	3.1374	.08669	1.25928	0.63	10
Inappropriate construction methods	CF2	3.1422	.09306	1.35178	0.63	9
Unqualified construction project team	CF3	3.2986	.08421	1.22317	0.66	4
Ineffective project planning and scheduling	CF4	3.5355	.08714	1.26582	0.71	1
Using old technology	CF5	3.1801	.09467	1.37522	0.64	8
Poor site management and supervision	CF6	3.4123	.08697	1.26327	0.68	2
Rework due to the errors during construction	CF7	3.0474	.08676	1.26025	0.61	11
Delay related in Sub-contractors' work	CF8	2.9526	.08412	1.22188	0.59	13
Inaccurate time estimation	CF9	3.3128	0.08648	1.25614	0.66	3
Regular change of subcontractors	CF10	2.6351	.08848	1.28527	0.53	18
Unreliable subcontractors	CF11	2.6161	.08444	1.22650	0.52	19
Unqualified contractors	CF12	2.9052	.08863	1.28749	0.58	14
Cash flow problems	CF13	3.1991	.09207	1.33745	0.64	7
Poor qualification of contractor's staff	CF14	3.0047	.08772	1.27428	0.6	12
Inaccurate cost estimation	CF15	3.2275	.09077	1.31851	0.65	6
Poor project management	CF16	3.2796	.09020	1.31022	0.66	5
Delay in site mobilization	CF17	2.8626	.08351	1.21305	0.57	16
Poor communication and coordination with other parties	CF18	2.8815	.08913	1.29475	0.58	15
Conflicts in Sub-contractors' schedule in execution of the project	CF19	2.8057	.08538	1.24026	0.56	17

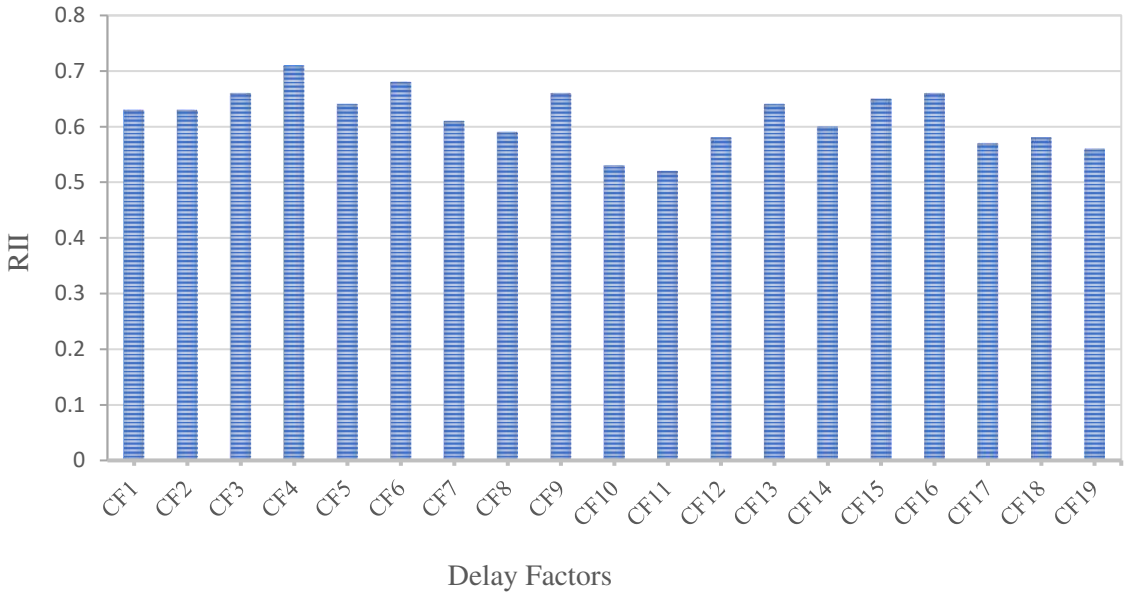

Figure 4.1. Contractor's associated delay factors

Based on the findings in the contractor's group, the top four factors (CF4, CF6, CF3, and CF9) are revealed the inability and failure of contractors in the project planning and scheduling, poor site management and supervising, employing incompetent project team, and inaccurate estimation of project time. These issues are almost certainly preventing the project from being completed successfully because, without effective project planning, poor management, and incompetent project team leads to a project for many ambiguities.

4.2.2. Delay Factors Associated with the Owner/Client

The questionnaire survey participants were ranked delay in progress payment by owner (OF2), with an RII value of 0.67 (as shown in Table 4.2 and Figure 4.2), as the main factor of delay regarding the clients. The construction industry relies heavily on payment. When the project faces a delay in payment, it first affects the contractor, who spends a significant of money regularly to cover the construction project process, which may lead to a delay in project completion. Moreover, the views obtained from the respondents and analyzed results have revealed that the owner's lack of finance to complete the work (OF6) was the second attribute of delay.

The inability of the owner to fund the project will put an end to all going work and activities, as there will be no money to manage the purchase of construction materials, nor will there be any funds to pay for the project's various staff. Following the findings, the respondents have rated the lack of experience of the owner in construction projects (OF3) as the third factor contributing to building construction project delays in Somaliland, with an RII value of 0.64.

Table 4.2. Owner/Client's associated Factors

Descriptive Statistics

Description	ID	Mean		Std. Deviation	RII	Rank
		Statistic	Std. Error	Statistic		
Change order	OF1	3.0047	.08976	1.30383	0.60	5
Delay in progress payment	OF2	3.3412	.08437	1.22558	0.67	1
Lack of experience in construction projects	OF3	3.2180	.09405	1.36621	0.64	3
Poor communication and coordination with other parties	OF4	2.8389	.07842	1.13918	0.57	7
Slow decision making by owner	OF5	2.8246	.08478	1.23155	0.56	8
Lack of finance to complete the work	OF6	3.2464	0.09153	1.32949	0.65	2
Lack of incentives for the contractor to finish ahead of schedule	OF7	2.8199	.08078	1.17343	0.56	9
Delay in the settlement of contractor claims and payment of compensation	OF8	2.6114	0.08147	1.18348	0.52	10
Interference and suspension of work	OF9	2.9147	.08041	1.16795	0.58	6
Partial payment during construction	OF10	3.1517	.08513	1.23664	0.63	4

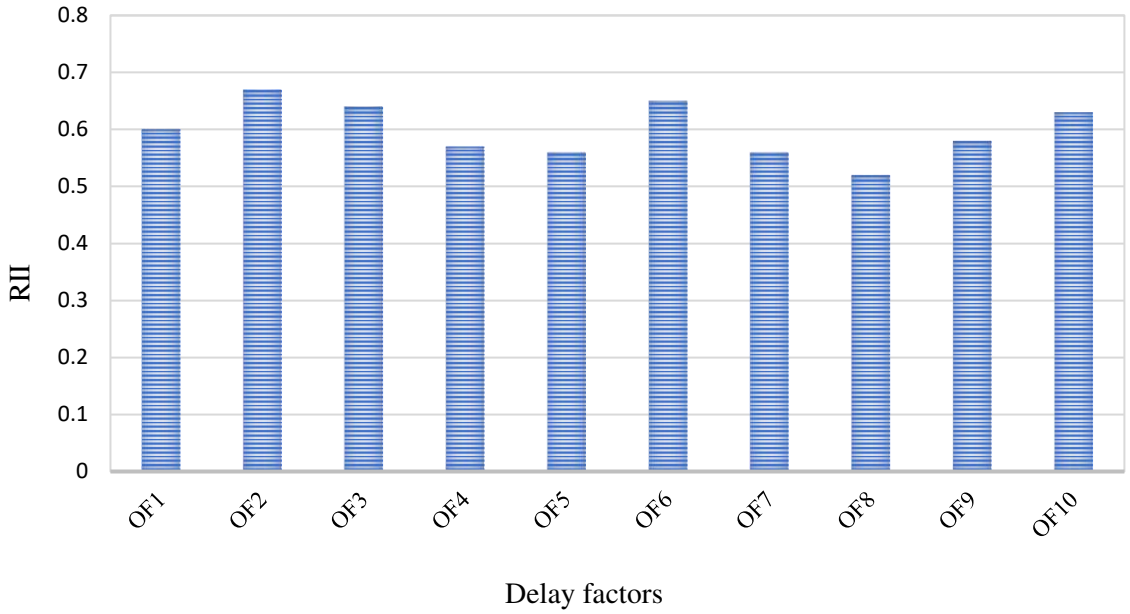

Figure 4.2. Client's associated delay factors

4.2.3. Delay Factors Associated with the Consultants

According to the survey analysis, the most four significant delays associated with the consultants are inaccurate site investigation (with an RII value of 0.65), ineffective quality control (with an RII value 0f 0.64), the lack of experience of consultant in construction projects (with an RII value of 0.61), and poor communication and coordination with other parties with an RII score of 0.59 as shown in Table 4.3 and Figure 4.3. Nevertheless, the first three issues can be connected to the poor experience of the consultants. According to the priority list, consultants are the fourth relevant group that contributes to the delays in building construction projects with a relative important index value of 0.61 (Table 4.11).

Table 4.3. Consultants associated Factors

Descriptive Statistics

Description	ID	Mean		Std. Deviation	RII	Rank
		Statistic	Std. Error	Statistic		
Lack of experience of consultants in construction projects	CSF1	3.0379	.09184	1.33398	0.61	3
delay in approving major changes in scope of work by consultant	CSF2	2.9242	.08561	1.24363	0.58	6
Delay in performing inspection and testing	CSF3	2.9526	.08194	1.19029	0.59	5
Poor communication and coordination with the other parties	CSF4	2.9621	.07973	1.15819	0.59	4
Inaccurate site investigation	CSF5	3.2654	.08978	1.30409	0.65	1
Ineffective quality control	CSF6	3.1848	.08757	1.27203	0.64	2

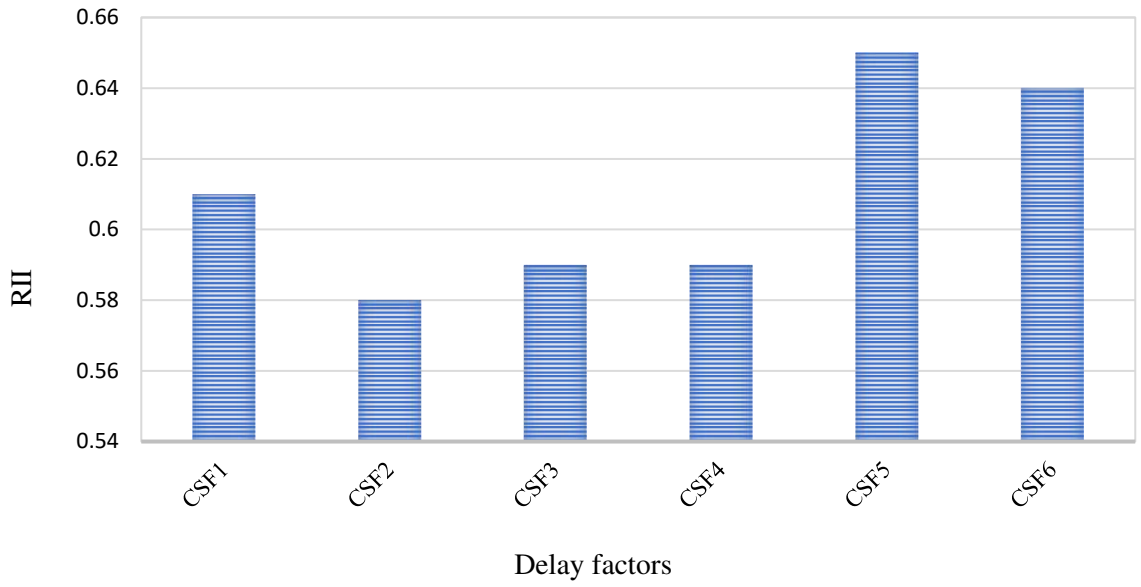

Figure 4.3. Consultant's associated delay factors

4.2.4. Delay factors Associated with the Design

According to 7 attributes of delay in the design group, the first factor became design changes by the owner or his agent during the construction phase (DF1), with an RII value of 0.67. This factor is also on the list of the most 10 important reasons for the delay in building construction projects. As a second factor, the respondents have selected poor use of advanced engineering design software (DF7), with an RII value of 0.64, as was described in Table 4.4 and Figure 4.4. According to the ranking of the groups in terms of their importance, this group ranks sixth, and it is one of the three least influential groups in assessing the reasons for the delay in building construction projects, with an RII value of 0.6071 (Table 4.11).

Table 4.4. Design associated factors

Descriptive Statistics

Description	ID	Mean		Std. Deviation	RII	Rank
		Statistic	Std. Error	Statistic		
Design changes by owner or his agent during construction	DF1	3.3460	.09616	1.39684	0.67	1
Design errors and mistakes made by designer	DF2	3.1517	.07851	1.14048	0.63	3
Delays in producing design documents	DF3	2.8104	.09168	1.33170	0.56	7
Misunderstanding of owner's requirement by designer	DF4	2.9147	.09315	1.35306	0.58	5
Unclear and inadequate details in drawing	DF5	2.8910	.09095	1.32106	0.58	6
Lack of experience of design team in construction projects	DF6	2.9526	.09008	1.30845	0.59	4
Poor use of advanced engineering software's	DF7	3.2227	.09484	1.37759	0.64	2

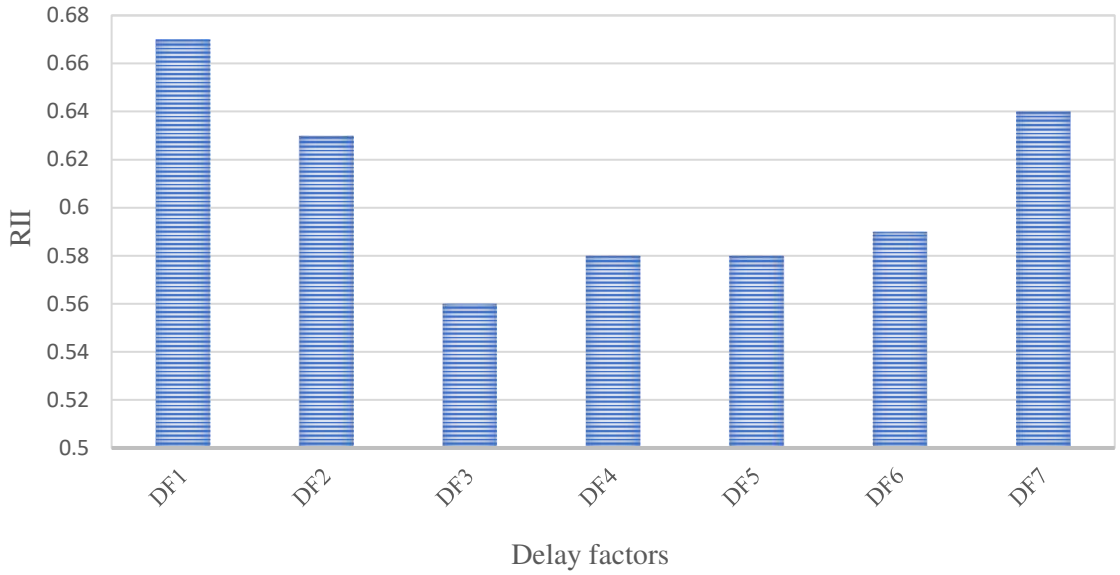

Figure 4.4. Design associated delay factors

4.2.5. Delay Factors Associated with the Material and Tools/Equipment

The analysis of the study shows that the main reasons for the delay in the group of material and tool/equipment are shortage of construction material (MEF5) and late delivery of material (MEF3) to the site (as presented in Table 4.5 and Figure 4.5). Also, these two factors are among the top 10 significant delay factors in building construction projects in Hargeisa, Somaliland.

Table 4.5. Material and Tools/Equipment associated factors

Descriptive Statistics

Description	ID	Mean		Std. Deviation	RII	Rank
		Statistic	Std. Error	Statistic		
Changes in material types and specification during construction	MEF1	2.8199	0.09053	1.31503	0.56	11
Escalation of material price	MEF2	3.1469	0.08289	1.20405	0.63	5
Late delivery of material to the site	MEF3	3.3649	0.09075	1.31819	0.67	2
Poor quality of construction material	MEF4	3.1422	0.09474	1.37622	0.63	6

Table 4.5 continue

Shortage of construction material	MEF5	3.3981	0.09071	1.31757	0.68	1
Unreliable suppliers	MEF6	2.8009	0.08467	1.22987	0.56	12
Failure and frequent equipment breakdown	MEF7	2.8294	0.08116	1.17890	0.57	10
Shortage of equipment	MEF8	3.0569	0.07996	1.16152	0.61	7
Improper equipment used for work	MEF9	2.9716	0.07947	1.15435	0.59	9
Low efficiency of equipment	MEF10	3.0190	0.08336	1.21091	0.60	8
Low level of equipment-operator's skill	MEF11	3.2322	0.08332	1.21031	0.65	4
Lack of modern equipment	MEF12	3.2607	0.08921	1.29590	0.65	3
Increase of tax in building material	MEF13	2.6919	0.08721	1.26675	0.54	13
	Valid N (listwise)	211			Valid N (listwise)	211

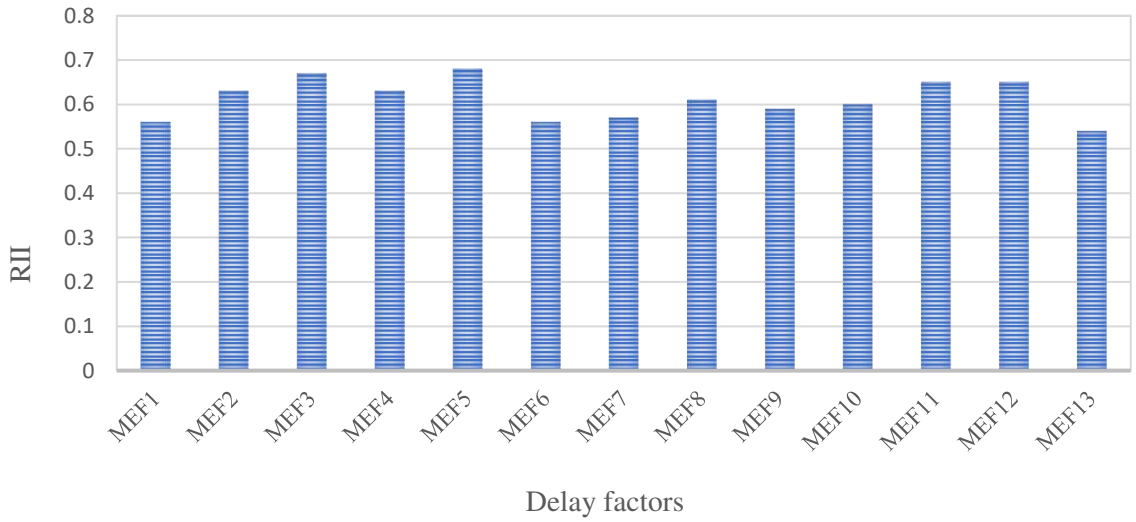

Figure 4.5. Material/equipment associated delay factor

4.2.6. Delay Factors Associated with the Labor

Inexperienced/unqualified labor (LF4) was the most highly ranked factor in the labor group, with an RII score of 0.71, and this factor is also one of the top ten factors

that contribute to delays in building construction projects. Worker's experience is a crucial factor, as it contributes to the increase in employees' knowledge and physical abilities, which enhances and boosts their productivity. If the labor lacks the requisite knowledge, skill, and experience, they may take too long to accomplish certain tasks, causing the project to be delayed. Additionally, the respondents ranked laborers chewing Khat during construction (LF8) as a second delay attribute with an RII score of 0.66 and a mean of 3.389. Khat also called "qaad" or "jaad" in Somaliland is a numbing herp whose leaves and stems are chewed. According to organizations such as the Drug Enforcement Administration (DEA), the effect of Khat is comparable to those of other amphetamines. Users report feelings of well-being, lucidity, excitement, and enthusiasm (Abdilahi, 2018). According to Elmi (1983), the most common side effect after using Khat include insomnia(sleeplessness) and lack of focus. Furthermore, excessive Khat use can lead to serious social health and economic issues. Besides, employees' usage of it while on the job site is frequently time-consuming and distracting, which can reduce labor productivity and cause delays in project completion.

On the other hand, Abdilahi (2018) conducted a study from the perspective of site engineers to assess the factors that affect labor productivity in the building project in Somaliland. He has identified that lack of experience in labor and Khat issues are the significant factors that affect the productivity of the workforce. Table 4.6 and Figure 4.6 reveal the findings of labor factors. According to the priority list of groups in terms of their significance, this group is the second most important group that causes building construction project delays, with an RII score of 0.6225 (Table 4.11).

Table 4.6. Labor associated factors

Descriptive Statistics

Description	ID	Mean		Std. Deviation	RII	Rank
		Statistic	Std. Error	Statistic		
Absenteeism	LF1	2.7583	.08896	1.29224	0.55	7
Low labor productivity	LF2	3.2180	.08418	1.22274	0.64	3

Table 4.6 continue

Personal conflicts among workers	LF3	2.7346	.08106	1.17744	0.55	8
Inexperienced/unqualified labors	LF4	3.4929	.07671	1.11428	0.7	1
Shortage of skilled labor	LF5	3.2180	.08444	1.22663	0.64	4
Low worker motivation and morale	LF6	3.1374	.08721	1.26682	0.63	5
Slow mobilization of labor	LF7	3.0332	.07846	1.13969	0.61	6
Labors chewing Khat during construction	LF8	3.2891	.08410	1.22156	0.66	2

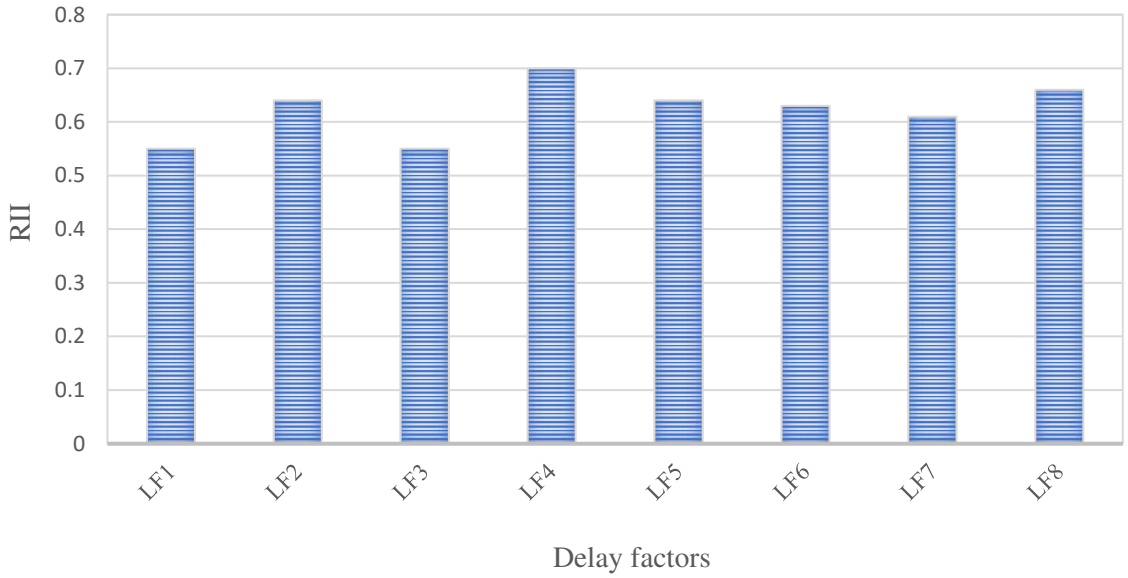

Figure 4.6. labor's associated delay factors

4.2.7. Delay Factors Associated with Project and Contract

As shown in Table 4.7 and Figure 4.7, among the project and contract group, legal dispute and claims between project stakeholders (PCF6) rank the first factor with an RII score of 0.67, at the same time this factor is the 8th factor for the most important factors that have an impact on completing building construction projects in the schedule. The problem of construction industry disputes is a worldwide phenomenon (Ilter, 2012). In Somaliland, most projects do not have official or documented contracts between the contractor and the owner, and mostly the parties prefer oral contracts.

This leads to a dispute that is difficult to settle down, as there are no documented contracts between the owner and contractor (Fashina, 2020). A failure to settle down the disputes negatively affects the project's performance as well as its completion date. In addition, improper project feasibility study (PCF2) is ranked as the second delay factor in this group. Proper feasibility study for the project is the most significant step before beginning the project design and construction. Furthermore, the success of a project is directly influenced by the feasibility study's performance, and fault at this phase can have a substantial impact on the project's performance (Shen et al., 2010). Also, as the findings reveal, poor government judicial systems for the construction project (PCF11) are ranked as the third delay factor related to the project and contract. When there are disputes and claims between the project stakeholders, an arbitration (third party) attempts to settle down the disputes agreeably. Nonetheless, if an outside endeavor is unable to settle or resolve the disputes between partners, the parties use a court case (lawsuit) to settle the disputes and claims. However, Somaliland's law courts are frequently unable to resolve disputes involving the construction industry between project stakeholders. This is due to the lack of building construction norms (regulations) and laws that would have served as a guide for contractors and the courts to back their decisions (Fashina, 2020). Based on the results in Table 4.11 this group is the most significant that influences the completion of building construction projects on time, with an RII value of 0.645.

Table 4.7. Delays associated with project and contract

Descriptive Statistics

Description	ID	Mean		Std. Deviation	RII	Rank
		Statistic	Std. Error	Statistic		
Type of project bidding and award (negotiation, lowest bidder)	PCF1	2.9573	.08716	1.26607	0.59	9
Improper project feasibility study	PCF2	3.2844	.07644	1.11042	0.66	2
Unrealistic contract duration imposed by the owner	PCF3	3.0521	.07927	1.15145	0.61	8
Poor contact management	PCF4	3.1991	.08729	1.26799	0.64	4
Change in the scope of the project	PCF5	3.1706	.08060	1.17079	0.63	5

Table 4.7 continue

Legal disputes and claims between project stakeholders	PCF6	3.3270	.08179	1.18811	0.67	1
Shortness of original contract duration	PCF7	2.9668	.07788	1.13130	0.59	10
Lack of building codes	PCF8	3.1517	.08826	1.28201	0.63	6
Corruption	PCF9	2.8768	.08294	1.20475	0.58	11
Ineffective delay penalties	PCF10	3.1232	.07846	1.13975	0.62	7
Poor government judicial system for construction projects	PCF11	3.2607	.08612	1.25103	0.65	3

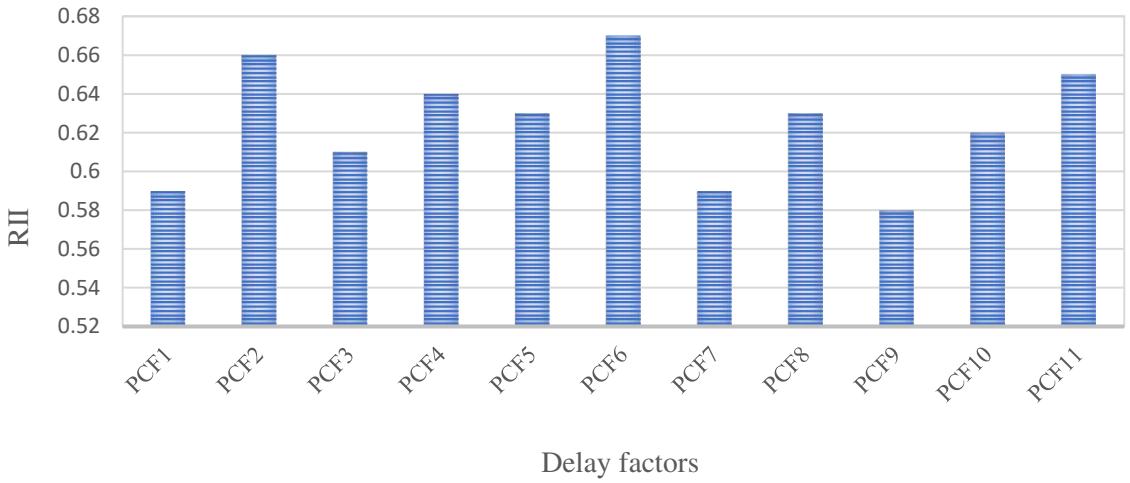

Figure 4.7. Project and contract associated delay factors

4.2.8. Delay Associated with External Factors

Based on the four attributes of delay factors in this group currency, and price fluctuation (EF3) has become the most important factor with an RII score of 0.66. It is normal for responders to select this factor as the most relevant factor in this group because most project budgets are estimated in a dollar (USD), which has no constant or fixed rate. Therefore, when price fluctuations occur, they have an impact on the project's estimated budget, resulting in revisions, project cost overruns, delays to the project schedule.

Although there are not many disaster problems in Somaliland that could disrupt the project process, the questionnaire participants were selected Natural disasters (EF4) as the second relevant factor in this group with an RII value of 0.61. However, it can be said that the main reason why respondents chose this attribute as the second most important factor in this group was that a Cov-19 pandemic was occurring at the time of the questionnaire survey, which disrupted many construction projects. Table 4.8 and Figure 4.8 presents how the factors in this group were ranked by the respondents.

Table 4.8. Delays associated with External Factors

Descriptive Statistics

Description	ID	Mean		Std. Deviation	RII	Rank
		Statistic	Std. Error	Statistic		
Accidents during construction	EF1	2.7109	.08436	1.22545	0.54	4
Delay in obtaining permits from municipality	EF2	2.8578	.07773	1.12913	0.57	3
Currency and price fluctuation	EF3	3.3081	0.08669	1.25921	0.66	1
Natural disasters (Such as epidemic, floods, earthquakes)	EF4	3.0332	.07846	1.13969	0.61	2

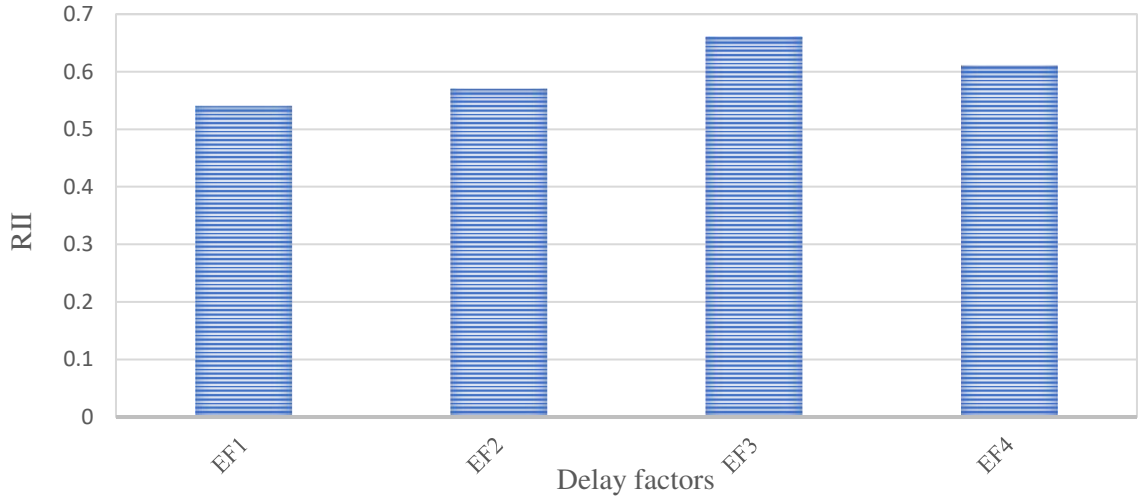

Figure 4.8. External associated delay factors

4.3. General Ranking (Overall Rank)

The overall ranking of the 78 delay attributes in building construction projects was performed in this study, as shown in Table 4.9. The total ranking, means, standard deviations, standard errors, and RII index for the variables in this study were computed using descriptive analysis in IBM SPSS Statistics.

Furthermore, to rank attributes with the same mean and RII, the one with the lowest standard deviation and lowest standard error is sorted first. Finally, the attributes CF4, LF4, CF6, MEF5, MEF3, DF1, OF2, PCF6, OF6, EF3 were listed as the top-ten delay causes of building construction projects in Hargeisa, Somaliland. Besides, based on the results, the variables of DF3, CF19, MEF6, LF1, LF3, EF1, MEF13, CF10, CF11, and OF8 are regarded as the less important delay causes of building construction projects in Hargeisa, Somaliland.

Table 4.9. General Ranking for the delay factors in building construction projects

Descriptive Statistics

ID	Mean		Std. Deviation	RII	Rank
	Statistic	Std. Error	Statistic		
CF4	3.5355	0.08714	1.26582	0.71	1
LF4	3.4929	0.07671	1.11428	0.70	2
CF6	3.4123	0.08697	1.26327	0.68	3
MEF5	3.3981	0.09071	1.31757	0.68	4
MEF3	3.3649	0.09075	1.31819	0.67	5
DF1	3.3460	0.09616	1.39684	0.67	6
OF2	3.3412	0.08437	1.22558	0.67	7
PCF6	3.3270	0.08179	1.18811	0.67	8
CF9	3.3128	0.08648	1.25614	0.66	9
EF3	3.3081	0.08669	1.25921	0.66	10
CF3	3.2986	0.08421	1.22317	0.66	11
LF8	3.2891	0.08410	1.22156	0.66	12
CF16	3.2796	0.09020	1.31022	0.66	13
PCF2	3.2844	0.07644	1.11042	0.66	14
CSF5	3.2654	0.08978	1.30409	0.65	15
PCF11	3.2607	0.08612	1.25103	0.65	16
MEF12	3.2607	0.08921	1.29590	0.65	17
OF6	3.2464	0.09153	1.32949	0.65	18
CF15	3.2275	0.09077	1.31851	0.65	19
MEF11	3.2322	0.08332	1.21031	0.65	20

Table 4.9 continue

OF3	3.2180	0.09405	1.36621	0.64	21
DF7	3.2227	0.09484	1.37759	0.64	22
LF2	3.2180	0.08418	1.22274	0.64	23
LF5	3.2180	0.08444	1.22663	0.64	24
PCF4	3.1991	0.08729	1.26799	0.64	25
CF13	3.1991	0.09207	1.33745	0.64	26
CF5	3.1801	0.09467	1.37522	0.64	27
CSF6	3.1848	0.08757	1.27203	0.64	28
PCF5	3.1706	0.08060	1.17079	0.63	29
DF2	3.1517	0.07851	1.14048	0.63	30
OF10	3.1517	0.08513	1.23664	0.63	31
PCF8	3.1517	0.08826	1.28201	0.63	32
MEF2	3.1469	0.08289	1.20405	0.63	33
CF2	3.1422	0.09306	1.35178	0.63	34
MEF4	3.1422	0.09474	1.37622	0.63	35
CF1	3.1374	0.08669	1.25928	0.63	36
LF6	3.1374	0.08721	1.26682	0.63	37
PCF10	3.1232	0.07846	1.13975	0.62	38
MEF8	3.0569	0.07996	1.16152	0.61	39
PCF3	3.0521	0.07927	1.15145	0.61	40
CF7	3.0474	0.08676	1.26025	0.61	41
CSF1	3.0379	0.09184	1.33398	0.61	42
LF7	3.0332	0.07846	1.13969	0.61	43
EF4	3.0332	0.07846	1.13969	0.61	44
MEF10	3.0190	0.08336	1.21091	0.6	45
CF14	3.0047	0.08772	1.27428	0.6	46
OF1	3.0047	0.08976	1.30383	0.6	47
MEF9	2.9716	0.07947	1.15435	0.59	48
PCF7	2.9668	0.07788	1.13130	0.59	49
CSF4	2.9621	0.07973	1.15819	0.59	50
PCF1	2.9573	0.08716	1.26607	0.59	51
CSF3	2.9526	0.08194	1.19029	0.59	52
CF8	2.9526	0.08412	1.22188	0.59	53
DF6	2.9526	0.09008	1.30845	0.59	54
CSF2	2.9242	0.08561	1.24363	0.58	55
OF9	2.9147	0.08041	1.16795	0.58	56
DF4	2.9147	0.09315	1.35306	0.58	57
CF12	2.9052	0.08863	1.28749	0.58	58
DF5	2.8910	0.09095	1.32106	0.58	59
CF18	2.8815	0.08913	1.29475	0.58	60
PCF9	2.8768	0.08294	1.20475	0.58	61
CF17	2.8626	0.08351	1.21305	0.57	62
EF2	2.8578	0.07773	1.12913	0.57	63
OF4	2.8389	0.07842	1.13918	0.57	64
MEF7	2.8294	0.08116	1.17890	0.57	65

Table 4.9 continue

OF5	2.8246	0.08478	1.23155	0.56	66
OF7	2.8199	0.08078	1.17343	0.56	67
MEF1	2.8199	0.09053	1.31503	0.56	68
DF3	2.8104	0.09168	1.33170	0.56	69
CF19	2.8057	0.08538	1.24026	0.56	70
MEF6	2.8009	0.08467	1.22987	0.56	71
LF1	2.7583	0.08896	1.29224	0.55	72
LF3	2.7346	0.08106	1.17744	0.55	73
EF1	2.7109	0.08436	1.22545	0.54	74
MEF13	2.6919	0.08721	1.26675	0.54	75
CF10	2.6351	0.08848	1.28527	0.53	76
CF11	2.6161	0.08444	1.22650	0.52	77
OF8	2.6114	0.08147	1.18348	0.52	78

4.4. A Comparison of Public and Private Construction Sector

65.4 % of the respondents in this survey worked in the private construction sector, while 34.6 % worked in the public construction sector. Accordingly, a brief comparison was performed during this study based on their perspectives on the delays in building construction projects. As a result, the participants who were engaging in the public construction sector were selected LF4, MEF5, CF4, OF2, MEF3, CF6, EF3, CF16, CF9, and PCF2 as the major ten important delays in building construction projects (Appendix C). Meanwhile, the respondents who were working in the private construction sector were ranked CF4, CF6, DF1, MEF3, LF4, PCF6, OF2, MEF5, CF9, and EF3 as the major ten critical delay factors in building projects (Appendix D). However, the participants from the public sector were selected eight out of the ten significant causes of delay in building projects, whereas the respondents from the private sector were considered that the major ten causes of delay factors which presented in the previous section in this study are the drivers of delays in the building project. Furthermore, an independent sample t-test was used to assess whether or not there is a diversity in viewpoints between these two sectors.

4.4.1. Independent Sample t-Test

Independent sample t-test technique is used when comparing the mean scores of the variables for only two different groups of subjects (Pallant, 2013). It indicates that there is a statistically significant difference between the mean scores of two groups. Moreover, the existence of a significant difference or equality in the mean of the dependent variables is shown by the sig. (2-tailed) score. If the sig. value is equal to or less than 0.05, it means that there is significant difference between the two groups. If the sig. value is greater than 0.05, it indicates that there is no significant difference exists between the two groups (Pallant, 2013). The independent t-test analysis in this study was done with IBM SPSS Statistics. The goal of this technique is to compare the mean scores of 78 identified delay causes based on the perceptions of the experts and engineers working in the public construction sector with respondents working in the private construction sector.

According to the findings of the independent t-test (Appendix E), the perception of these two groups reveals that 75 attributes of delay factors out of 78 have a sig. value greater than 0.05 indicating that they are in agreement and that there is no statistically significant difference between their points of view. With the exception of the variables OF7, OF9, and PCF8, which have a sig. value less than 0.05, which shows that there is a significant difference between the viewpoints. Although these two groups agree that the variables LF4, MEF5, CF4, MEF3, CF6, EF3, CF9, and OF2 are the top 10 reasons causing delays in construction projects, they disagree on the remaining two factors PCF6, and DF1. As a result, an independent-sample t-test was used to statistically evaluate if there is a difference in viewpoints between the public and private sectors. Accordingly, Table 4.10. statistically indicates that both participant groups had considerable agreement on the top-ten ranked factors in the overall means with a sig. value larger than 0.05.

Table 4.10. Independent t-test for the top-ten delay factors

	Delay factors	Means		Sig. (2-tailed)	Rank
IDS		Public	Private		
CF4	Ineffective project planning and scheduling	3.534	3.536	0.991	1

Table 4.10 Continue

Lf4	Inexperienced/unqualified labors	3.630	3.420	0.194	2
CF6	Poor site management and supervision	3.411	3.514	0.577	3
MEF5	Shortage of construction material	3.575	3.369	0.274	4
MEF3	Late delivery of material to the site	3.411	3.434	0.900	5
DF1	Design change by the owner or his agent during construction	3.356	3.456	0.453	6
OF2	Delay in progress payment by the owner	3.493	3.384	0.539	7
PCF6	Legal disputes and claims between project stakeholders	3.342	3.384	0.813	8
CF9	Inaccurate time estimation	3.383	3.326	0.756	9
EF3	Currency, and price fluctuation	3.397	3.304	0.492	10

4.5. Ranking the Groups of Delay Factors by RII

After computing the main important factors that cause delays in building construction projects, an overall rank was performed based on their significance, respectively. In addition, the eight groups were ranked according to their importance. The project and contract-related factors were ranked as the first group (RII= 0.6245), where the labor-related group became the second in the list with an RII score of 0.6225, while the external group was on the last with an RII value of 0.5875, as shown in Table 4.11 and Figure 4.9.

Table 4.11. Group Ranking

No	Description	RII	Percent %	Rank
1	Project and Contract's Group	0.6245	62.45	1
2	Labor's Group	0.6225	62.25	2
3	Contractor's Group	0.6157	61.57	3
4	Consultant's Group	0.610	61	4
5	Material and Equipment/Tool's Group	0.6077	60.77	5
6	Design's Group	0.6071	60.71	6
7	Owner's Group	0.599	59.8	7
8	External' Group	0.5875	58.75	8

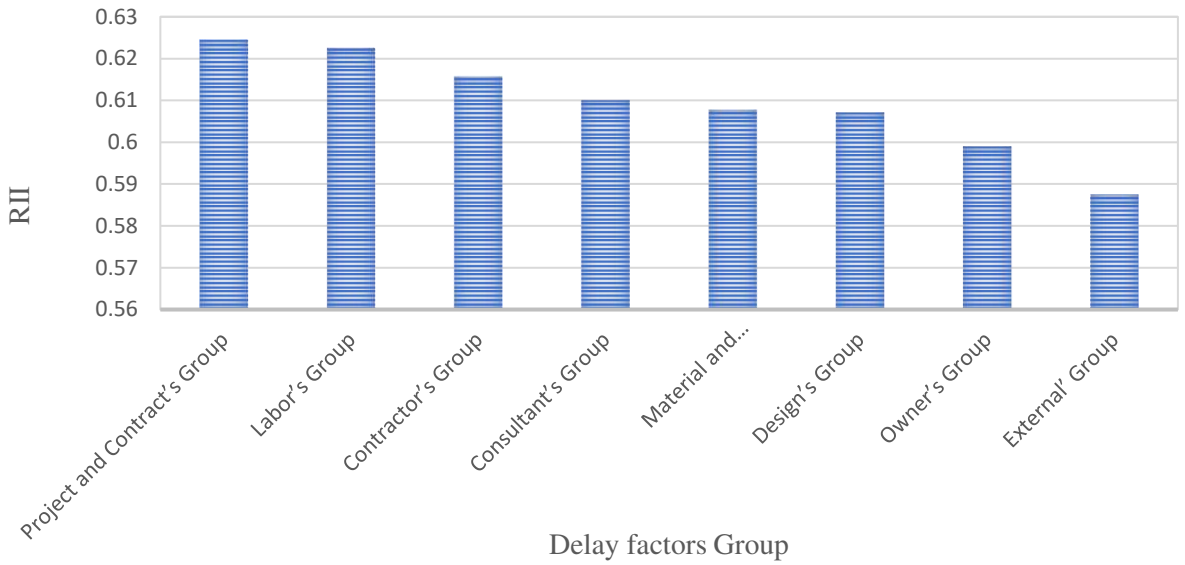

Figure 4.9. Delay factors Group Ranking

4.6. Discussion of the Ten Major Delay Factors

Determining the primary ten critical causes of delay in Hargeisa building construction projects was one of the primary objectives conducted in this research. Following that, the attributes CF4, LF4, CF6, MEF5, MEF6, DF1, OF2, PCF6, OF6, and EF3 were ranked, as the most significant factors as shown in Table 3.6.

4.6.1. Ineffective Project Planning and Scheduling (CF4)

Based on the analysis presented in Table 4.9, ineffective project planning and scheduling (CF4) was ranked the most critical factor among the 78 delay causes in building construction projects. Project planning is described as a collection of procedures for determining which tasks must be completed to meet the project's goals while staying on schedule and within budget (Pierce, 2013). As a result, if planning and scheduling are not done properly, project outputs are likely to fall short. Contractors may not be able to come up with an effective work plan during the earliest stages of the project.

This failure can be caused by a contractor's insufficient experience of the project and a lack of methodical site management (Hasan et al., 2014). In Somaliland, most of the construction sector is still in its early stages of growth, and the majority of the local contractors lack basic project management expertise, as well as sufficient project experience. Moreover, there is a dearth of understanding and information regarding the importance of project planning and scheduling theory applications in construction projects. Therefore, all this contributes to delays in projects at various stages. According to the extensive literature review conducted in this study and summarized in the preceding sections, ineffective project planning and scheduling issue seem a global problem. Many construction projects appear to pay insufficient attention to effective management and project planning definition.

4.6.2. Inexperienced/unqualified Labors (LF4)

In the overall ranking this attribute "Inexperienced/unqualified labors (LF4)" ranked as the second main factor (RII=0.70). In the construction industry, labor is the most valuable resource, and project performance is determined by their skills during project execution (Hussain et al., 2020). Staff's experience is a very important issue because labor's knowledge and physical abilities develop as a result of their experience, which raises their output. If the laborers lack the necessary skills and experience, they will spend more time performing specific duties, perhaps causing the project to fall behind schedule. Moreover, low and faulty outputs, paired with unjustifiable large input, are common characteristics of unskilled and poorly trained staff. Inspectors almost usually reject their outputs, either in whole or in part, resulting in substantial and expensive rework and repairs. Mostly, construction laborers in Somaliland working for the various construction companies lack the necessary experience and training that is appropriate for their professions. Furthermore, in Hargeisa, there are few or no vocational training centers, technical institutes, and workshops aimed at improving workforce skills. As a result, this forced many construction companies have to search even from abroad for technicians who can skillfully perform their works and achieve the desired quality of the projects on time.

4.6.3. Poor Site Management and Supervision (CF6)

The analysis findings show that this factor is the third most likely cause of delays in building construction projects, with an RII score of 0.68. This factor belongs to the responsibility of the contractor. It reveals the possibility that the contractor's site planning implementation and supervision are inadequate. As stated in the interviews with construction professionals in Hargeisa, there is a lack of site management skills in the construction site. This has an influence on the schedule of the project and even the quality of the work. Poor site management can happen when contractors don't have adequate experience and don't know how to manage a project crew (Kadir et al., 2005). Further, Poor site management leads to delays in reacting to issues that arise on the job site, which can stymie overall project development.

Besides, Inadequate site management and supervision by project managers will have an impact on the entire team as well as the progress of the work, potentially causing project delays.

4.6.4. Shortage of Construction Material (MEF5)

This factor was ranked as the fourth factor in the list of most significant factors that cause delays in building construction projects. Similarly, In Ethiopian and Kenyan studies, this factor was also ranked as one of the main factors leading to project delays (Tilahun., 2016; and Kong., 2018). Scarcity of material refers to issues that arise as a result of products being unavailable in the market or taking an excessive amount of time to obtain. Whenever construction materials are not available in the market, many construction projects will be adjourned until such materials are available in the market, which will lead to the project not being implemented on time. Because there are no manufactured firms in Somaliland that produce construction materials, the majority of construction materials (Such as Wood, Cement, Steel, electrical wires, etc.) are imported from abroad and neighboring countries. Therefore, shortages or unavailability of necessary construction material in the market might impede work progress and cause the project to be delayed. On the other hand, a shortage of construction material might result in a contractor's inadequate material planning, especially during the stage of material planning that should be used in the construction phase.

This can result from the materials required for construction may not be available at that time or may not be accessible with a given time limit evidently, this will lead to the project delay.

4.6.5. Late Material Delivery to the Site (MEF3)

Late material delivery to the site (MEF3) was selected as the fifth significant factor that contributes to delays in building construction projects, with a 3.36 mean and an RII of 0.67. The interviewers attributed the responsibility of this factor to the contractors and expressed that contractor do not always deliver construction materials to the site in the planned time. Moreover, construction materials (such as stone masonry) are imported from remote places outside of Hargeisa, which, if not ordered ahead of time, could result in late delivery of construction material to the site. In addition, poor infrastructure in Somaliland, such as bridges, and roads create delays in the delivery of construction material and equipment to the construction sites, especially during rainy seasons when the floods obstruct the trucks carrying the construction material and equipment from arriving on time in the construction sites. This will influence some project activities, which will affect the project's timeline if these activities are in the critical path of the project. Contractors must devise an effective plan to ensure that the material is delivered to the construction site on time.

4.6.6. Design Changes by the Owner or his Agent During Construction (DF1)

This attribute is the sixth most common cause of delay in the building construction project. Design changes happen when modifications and adjustments are made in the project's primary design. Various modifications to the drawings and plans cause delays in the timeline of the project. According to the interviewers (Table 2.2) stated that the owner's design modification may be caused by a variety of reasons, including the owner's failure to properly define their offers and requirements adequately, as well as the owner's lack of attention to the designs throughout the design stage. Also, they remarked that consultants deliver new plans and instructions for some activities even after the task is completed. As a result, this is causing delays in the project's completion.

4.6.7. Delay in Progress Payment (OF2)

In the list of factors that lead to delays in building construction projects, this factor has placed to the seventh position. According to an extensive literature analysis conducted in this study, this factor is one of the key factors that contribute to the delays in construction projects throughout the world. Payment is very important in the construction industry. When a project faces a delay in payment, it first creates a cash flow problem for the contractor, who spends a large amount of money daily to cover construction project activities. Based on the construction professionals' views, most owners pay the payments into phases (Partial payment) such as three phases, but in the second or third phase, the owners often do not complete the payment properly on time. This pushes the contractor to halt all project activities until the project's funding is available. However, this can be caused by the owner's fund problems, or in other words, the owner's lack of finance to complete the work (Rank 18), which is another important factor documented in this study and which the respondents ranked as one of the 20 most important factors of delay in building construction projects in Hargeisa. With the improper progress payment and the inability of the contractor to fund the project, all project operations will be stopped. As a result, the project's completion date will be pushed back.

4.6.8. Legal Disputes and Claims between Project Stakeholders (PCF6)

Table 4.9 shows that legal dispute and claims between project stakeholders (PCF6) are the 8th factors for the most important reasons that have an impact on completing building construction projects in the schedule. It is normal to see disputes and claims between contractor and owner because most construction projects in Somaliland do not have official or documented contracts, and the parties prefer to work on an oral contract. According to the opinions of the experts interviewed, the disputes between the project partners take a long time to resolve, and some cases result in project termination. This can be attributed to the absence of building construction project regulations and rules that may have served as a guide for contractors, as well as the poor government judicial system for construction projects (PCF11 ranked 16th).

4.6.9. Inaccurate Time Estimation (CF9)

The respondents ranked this factor as the ninth important factor which causes delays in building construction projects with an RII score of 0.66 and a mean of 3.312 (Table 4.9). Every construction project has planned time that is allotted to accomplish the project. In most cases, inaccurate time estimation occurs as a result of poor project planning. As mentioned in the interviews, most construction companies underestimate the project's schedule during the bidding stage to win the project bid. Furthermore, most contractors do not make effective project planning after getting the project award (Bid), as well as they do not utilize the applications and software that assist them in creating a customized project schedule that makes it easier to manage the project and track its progress. Consequently, if the project's timeline is underestimated, it will inevitably be postponed. Ineffective project planning (CF4), poor site management and supervision (CF6), and inaccurate time estimation (CF9) these three factors are among the first ten significant reasons for the delay, and all are the contractor's responsibility. These factors are interconnected, or in other words, (CF6) and (CF9) depend on (CF4), because accurate time estimation, as well as efficient site management, are difficult without effective project planning and scheduling.

4.6.10. Currency and Price Fluctuation (EF3)

With an RII value of 0.66 and a mean of 3.30, this factor was likewise ranked as one of the top ten reasons for delay (Table 4.9). Furthermore, in the external group, this attribute was chosen as the first factor (Table 4.8). It is typical for respondents to select this factor as one of the most foremost factors of building construction project delays because most project costs are estimated in dollars (USD), which has no constant or fixed rate. Therefore, pricing swings have an impact on the project's estimated budget, resulting in revisions, project cost overruns, and delays in the project schedule. Moreover, price fluctuation is mostly detrimental to the contractors and construction companies since it impacts the overall budget of the project, particularly the cost of the construction material and equipment as well as labor wages. Additionally, it creates cash flow problems.

4.7. A Comparative Analysis

In this study, a brief comparison was made between the findings of this study and the findings of studies conducted in three different countries, namely Turkey, Norway, and the USA. In addition, the most ten critical delay factor was documented in each country. The comparative results show that design issues, whether due to owner/agent design changes or designer errors, are a widespread and frequent occurrence in all four countries' construction projects, or to put it another way, they are one of the leading causes of construction project delays. Further, ineffective/poor project planning is one of the notable factors of delay in construction projects in three out of four countries compared in this study (Somaliland, Turkey, and Norway).

On the other hand, the slow decision-making process by the owner is one of the prominent drivers of delay in construction projects in Turkey, Norway, and the USA. Meanwhile, in this study, the respondents have placed this factor (OF5) in rank 66^{th}, which reveals that this factor does not play an important role in the delays in Hargeisa building projects. Table 4.12 presents the most ten important reasons for construction project delays in the four different studies conducted in these countries.

Table 4.12. A Comparison between different studies

NO	Current Study (Hargeisa, Somaliland)	Turkey (Culfik et al., 2014)	Norway (Zidane and Andersen., 2018)	USA (Tafazzoli & Shrestha, 2017)
1	Ineffective project planning/schedule	Suspension of the project by the owner	Poor planning and scheduling	Excessive change orders by the owner during construction
2	Inexperienced/unqualified labors	Delays in contractor's progress payment by the owner	Slow decision-making process by owner	Time-consuming decision-making process by the owner
3	Poor site management/supervision	Unrealistic project duration	Internal administrative procedure and bureaucracy within project organizations	Design errors
4	Shortage of construction material	The slowness of the owner decision-making process	Resource shortage	Delay in approving design documents by the owner
5	Late delivery of material to the site	Inadequate early planning of the project	Poor communication and coordination between parties	Errors in contract documents
6	Design change by the owner or his agent	Financing by the contractor during construction	Slow quality inspection process of the completed work	Unrealistic schedule (bid duration is too short)
7	Delay in progress payment	Shortage of labor	Design change during construction/change orders	Delay in getting permits and acquisitions
8	Legal disputes/claims between project stakeholders	Slow delivery of materials	Client's/Owner's lack of commitment and/ or clear demands	Complexities and ambiguities of project design
9	Inaccurate time estimation	Obtaining a permit from the municipality	Office issues	Poor communication and coordination of the owner with other parties
10	Currency/price fluctuation	Design changes by the owner or his agent during construction	Slow/late/incomplete/improper design	Delay in providing design documents by the designer

4.8. Proposed Ways to Minimize Delays in Building Construction Projects

One of the primary goals of this study was to propose ways that can be eliminated or minimized the delay problems in building construction projects. Thus, to achieve this aim, in the third section of the questionnaire, the respondents were asked to indicate ways that can be reduced the building construction project delays.

The following solutions have been proposed by the respondents to minimize or somehow eliminate delays in Hargeisa building projects.

- Contractors should adequately study the project before starting its implementation, and it should have set realistic goals.
- The contractor's project team should properly analyze the projects and prepare an effective plan and schedule.
- Before implementing the project, contractors should have established an effective time frame and cost after ensuring all the possible circumstances. In addition, it should have recruited in terms of availability, quantity, and quality (Skill and Experience).
- The engineers working on the various projects should utilize the applications and software for project planning/ scheduling and management.
- Contractors should hire skillful staff especially in project management sections, who are capable to manage the construction sites in effective ways.
- Contractors should make every effort to deliver construction material to the site as quickly as possible and plan ahead of time before beginning work on the material. Also, contractors should use good and efficient equipment with modern technology.
- To increase and upgrade the skill as well as the knowledge of labors, technical institutions should be established also training should be provided.
- The client should pay the payment at the proper time for the work being carried or finished.
- Make clear bilateral agreement (Contract) assigned by the owner and contractor.

5. RESULTS

Recently construction industry is regarded as one of the important sectors. It contributes to the development and growth of the economy. It's crucial to look at the attributes that influence the project's completion date. Identifying the reasons for the delay in building construction projects improves the project's performance and ensures its successful completion. This study was carried out to investigate the reasons for building construction project delays in Hargeisa using quantitative as well as qualitative techniques. Firstly, to collect the qualitative data, an extensive literature study was performed together with pre-questionnaire conducted interviews. Consequently, a total of 78 delay factors was documented, with 72 of them uncovered following a depth literature study and six additional delay attributes discovered during the pre-questionnaire interview procedure. Further, these 78 factors were categorized into eight different groups: contractor, owner, consultant, design, material and equipment/tools, labor, project and contract, and external associated. Besides, to acquire the quantitative data, a structured questionnaire survey was designed and distributed to the contractors, clients, engineers, architectures, and consultants. A total of 270 questionnaires were distributed in this study, and 233 (86.33%) were returned. However, 211 (78.15%) was considered a valid questionnaire and selected for the further data analysis process. Subsequently, the acquired data was examined utilizing statistical techniques, as well as the relative important index method (RII) to meet the research objectives.

According to the respondents views the most ten important factors were ineffective project planning and scheduling, inexperienced/unqualified labors, poor site management and supervision, shortage of construction material, late delivery of material to the site, design changes by the owner or his agent during construction, delay in progress payment by the owner, legal disputes and claims between project stakeholders, inaccurate time estimation, and currency/price fluctuation. Moreover, the project and contract associated group was ranked as the most significant group that contribute to the delays in building construction projects with an RII score of 0.6245, while the labor and contractor groups were placed in second position and third place with RII values of 0.6225 and 0.6157.

Meanwhile, the owner and external associated group were selected as the slightest significant groups were placed in seven and eight positions with RII scores of 0.59.8 and 0.5875. A comparative analysis on the critical factors causing construction project delay has been examined in three different countries, namely Turkey, Norway, and the USA. According to the findings of the comparative analysis, the design associated factors are among the most common causes of delay in these countries.

To sum up, all parties in the construction sector share the goal of completing projects on time and on budget while maintaining the greatest level of quality. Delays, on the other hand, have an impact on the project's performance as well as the project partners. Therefore, the findings of this study will benefit all construction companies whether, they are local or private construction companies, government agencies, and other contractor agencies in Hargeisa that want to learn about probable construction project delays. Furthermore, the findings of this research will assist the various parties engaged in the construction segments to be aware of the sources that cause the delays in projects. Additionally, this study will support national companies working in Hargeisa also the foreign companies that are willing to invest in this sector by providing a thorough understanding of the current challenges and allowing them to establish prevention strategies and tactics.

6. RECOMMENDATIONS

To figure out and present effective recommendations that can help to lessen or eliminate the causes of delays in building projects, two steps were followed. First, the suggestions that were presented during the pre-questionnaire interview and the final questionnaire procedure were noted, and then these suggestions collaborated with the recommendations recorded in the literature review to generate valuable suggestions. Second, a list containing 16 recommendations was established, and as shown in Appendix (F), a brief survey was sent to ten professionals in construction projects to check the efficiency of these suggestions These ten participants were selected according to their experience in the construction industry. The general demography of these participants was presented in Table 6.1.

Table 6.1. Demographic details for the ten participants

No	Education Level	Experience Years	Occupation/Organization
1	PhD	9	Dean of Civil Engineering Department in Hargeisa University
2	PhD	5	Dean of Civil Engineering Burao University
3	PhD	16	Private sector
4	MSc	8	Private Sector
5	MSc	5	Public sector (Government)
6	MSc	11	Private sector
7	MSc	6	University Lecture
8	BSc	7	Private Sector
9	BSc	8	Public sector (Government)
10	BSc	13	Private / Public Sector

This brief survey was conducted online, and participants were sent via email between 25 November and 15 December 2021.

After the survey returned fully, the results were analyzed using the RII method to present the most effective suggestions that should be considered first. Table 6.2 shows the findings of this brief survey.

Table 6.2. The findings of the survey

NO	ID	RECOMMENDATION TO THE CONTRACTORS	RII
1	RC1	The contractors and project team should properly make a deep analysis for the project and study it adequately before starting its implementation, then should set realistic goals and effective project plan as well as schedule after ensuring all conceivable situations	0.90
2	RC2	To make construction projects more manageable, they have to break down the project activities into sections and restrict the amount of time and cost it take to complete them. To achieve this, they must hire qualified project managers who are familiar with the software that assists project management and makes it easier to track.	0.82
3	RC3	Contractors should establish an effective management strategy to monitor and control construction sites, labors, and resources efficiency. Also, they must engage competent site engineers and supervisors to avoid and prevent delays in building construction projects caused by inadequate site management.	0.88
4	RC4	Contractors must devise an effective plan to ensure that the material is delivered to the construction site on time. Moreover, the contractor's project managers should identify the required construction materials and equipment early especially considering the materials that will take longer to arrive and take action to get them delivered to the construction site on schedule.	0.78
NO		RECOMMENDATIONS TO THE OWNERS/CLIENTS	RII
1	RO1	The clients should confirm that sufficient funds are available before the beginning of the project to make timely payments to the contractor before the work is carried out or finished based on the contract	0.84
2	RO2	The clients should adequately define and articulate their requirements. Also, they should pay close attention to the design documents submitted during the design stage with the assistance of qualified consultants to avoid design errors and modification during construction, which might result in project delays and cost overruns	0.82

Table 6.2 continue

3	RO3	At the time of selecting the contractor that will implement the project, the clients should not choose according to the least cost but should select based on their experience, financial status, capacity, and skill, as well as their time commitments	0.68
NO		RECOMMENDATIONS ASSOCIATED WITH THE PROJECT CONTRACT	RII
1	RPC1	The project's stakeholders should have an official or documented contract and bilateral agreement assigned by the contractor and owner/client	0.80
2	RPC2	The consultancy sector must be included during contract agreements	0.68
3	RPC3	The contractors and clients should prepare together an effective and detailed project contract which must be fulfilling their agreements directly	0.80
4	RPC3	Establishing an effective delay penalty and included to the contract	0.60
NO		RECOMMENDATIONS TO THE GOVERNMENT	RII
1	RG1	The government should develop the rules and regulations for the construction project	0.80
2	RG2	The government of Somaliland should make an effort to set up building and construction codes/standards	0.72
3	RG3	The Government should improve the judicial system for construction projects	0.72
4	RG4	To upgrade the skills and knowledge of the various construction labor, the government and contractors should cooperate on how to establish technical schools and training institutes	.88
5	RG5	The government should take responsibility and grade the construction companies according to their capacity, ability, skill, and experience	0.74

Construction companies (Contractors) are one of the stakeholders who are directly involved in the construction projects, hence the impacts of the delays on construction projects will affect the company, both financially and in terms of reputation. Besides, Clients/Owners are one of the most significant parties that spent their income on the implementation of construction projects, and they play a major role in the project's various stages. As the findings from the brief survey, the experts have chosen the recommendations and suggestions that were presented to these parties (RC1, RC3, RO1, and RO2) to be taken into consideration primarily to minimize and alleviate the delay concerns.

According to the expert views, adequately analyzing for the project before starting and putting in place an effective plan/schedule, as well as establishing an effective management strategy and upgrading the skills and techniques of the various staff involved in the project can all help to reduce and avoid the delays that can occur in building projects.

7. REFERENCE

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8. APPENDIXES

Appendix A: Questionnaire Draft

QUESTIONIARE SURVEY

KARADENIZ TECHNICAL UNIVERSITY

GRADUATE INSTITUTE OF NATURAL AND APPLIED SCIENCES

CIVIL ENGINEERING DEPARTMENT

THESIS TITLE: AN INVESTIGATION INTO DELAY FACTORS IN CONSTRUCTION PROJECTS; CASE OF HARGEISA, SOMALILAND

Dear Sir/Madam

This survey is a part of academic research that aims to investigate delay factors in Somaliland building construction project. Delay defined as an action that cannot be performed on time is one of the important variables that affect the performance of the project in terms of time, cost, and quality.

The main object of this study is to identify the potential delay factors in building construction projects, to alleviate delay problems, and achieve good performance projects that implemented on time, allotted budget, and desired quality. Delay causes have been documented by using a depth literature review. The most significant delay factors in Somaliland building construction projects will be ranked after analyzing the data in this survey.

This questionnaire is categorized into three main sections. The first section is demographic characteristics that are about the respondent information. The second section is multiple-choice questions that are the major causes of delay factors identified in a depth literature review. Please, kindly answer the questions attached questionnaire as objectively as possible. State your answer to each question by filling in the space provided or ticking in the correct answer as appropriate by using the below-mentioned scales.

1. Non-significant 2. Slightly significant 3. Significant 4. Very significant 5. Very high significant.

The final section will be open ended questions, which will request the participant to write about any other causes of delay.

All the information you provided will kept strict confidentiality and will be only used for academic purpose. I value your participation and thank you for your commitment of time and effort. If you have any comments, questions, or concerns with regards to the study, please contact me at the address below.

Sincerely,

Ahmed Abdi Mohamoud

Master Student at Karadeniz Technical University in Trabzon/Turkey.

Tel: +25263-4752550, WhatsApp: +905522495298

Email: a.gaabuush125@gmail.com

Appendix A (continue)

QUESTIONIARE SURVEY

SECTION 1: PERSONAL DATA AND GENERAL INFORMATION

1. Which organization do you represent?

☐ Client/Owner ☐ Consultant ☐ Engineer

☐ Contractor ☐ Others (Please specify) _____

2. Education Level

☐ Secondary School certificate ☐ Diploma ☐ bachelor's degree

☐ Master's degree ☐ PhD ☐ Others (Please specify) _____

3. Please state the years you have been involved and working in construction (Experience years)

☐ 0-5 Years ☐ 6-10 Years ☐ 11-15 Years

☐ 16-20 Years ☐ Above 20 Years

4. Please state, if you are worked as

☐ Public/Government organization ☐ Private organization

SECTION 2: Factors Causing Delays in Somaliland Building Construction Projects

Please state the most significant delay factors in Somaliland building construction projects.

1. Non-significant 2. Slightly significant 3. Significant 4. Very significant 5. Very high significant.

No	ID	Delay factors according groups	Data Measurement				
		Factors related to the Contractor	**1**	**2**	**3**	**4**	**5**
1	CF1	Insufficient experience of the contractor					
2	CF2	Inappropriate construction methods					
3	CF3	Unqualified construction project team					
4	CF4	Ineffective project planning and scheduling					
5	CF5	Using Old technology					
6	CF6	Poor site management and supervision					
7	CF7	Rework due to the errors during construction					
8	CF8	Delay related in Sub-contractors' work					
9	CF9	Inaccurate time estimation					
10	CF10	Regular change of subcontractors					
11	CF11	Unreliable subcontractors					
12	CF12	Unqualified contractors					
13	CF13	Cash flow management					

Appendix A (continue).

QUESTIONIARE SURVEY

No	ID	Delay factors according to groups	1	2	3	4	5
14	CF14	Poor qualification of contractor's technical staff					
15	CF15	Inaccurate cost estimation					
16	CF16	Poor project management					
17	CF17	Delay in site mobilization					
18	CF18	Poor communication and coordination with other parties					
19	CF19	Conflicts in sub-contractors' schedules in execution of the project					
		Factors related to the Owner/Client					
20	OF1	Change order					
21	OF2	Delay in progress payments					
22	OF3	Lack of experience of owner in construction projects					
23	OF4	Poor communication and coordination with other parties					
24	OF5	Slow decision making by owner					
25	OF6	Lack of finance to complete the work					
26	OF7	Lack of incentives for contractor to finish ahead of schedule					
27	OF8	Delay in the settlement of contractor claims and non-payment of compensation by owner					
28	OF9	Interference and Suspension of work by owner					
29	OF10	Partial payment during construction					
		Factors related to the Consultant					
30	CSF1	Lack of experience of consultant in construction projects					
31	CSF2	Delay in approving major changes in scope of work by consultant					
32	CSF3	Delay in performing inspection and testing					
33	CSF4	Poor communication and coordination with other parties					
34	CSF5	Inaccurate site investigation					
35	CSF6	Ineffective quality control					
		Factors related to the Design					
36	DF1	Design changes by owner or his agent during construction					
37	DF2	Design errors and mistakes made by designer					
38	DF3	Delays in producing design documents					
No	**ID**	**Delay factors according to groups**	**1**	**2**	**3**	**4**	**5**

Appendix A (continue)

QUESTIONIARE SURVEY

39	DF4	Misunderstanding of owner's requirements by designers					
40	DF5	Unclear and inadequate details in drawings					
41	DF6	Lack of experience of design team in construction projects					
42	DF7	Poor use of advanced engineering design software					
Material and Tools/Equipment related Factors							
43	MEF1	Changes in material types and specification during construction					
44	MEF2	Escalation of material price					
45	MEF3	Late delivery of material to the site					
46	MEF4	Poor quality of construction materials					
47	MEF5	Shortage of construction materials					
48	MEF6	Unreliable suppliers					
49	MEF7	Failure and frequent equipment breakdown					
50	MEF8	Shortage of equipment					
51	MEF9	Improper equipment used for the work					
52	MEF10	Low efficiency of equipment					
53	MEF12	Low level of equipment-operator's skill					
54	MEF13	Lack of modern equipment					
55	MEF14	Increase of tax in building material					
Factors related to Labor							
56	LF1	Absenteeism					
57	LF2	Low labor productivity					
58	LF3	Personal conflicts among workers					
59	LF4	Inexperienced/unqualified labors					
60	LF5	Shortage of skilled labor					
61	LF6	Low worker motivation and morale					
62	LF7	Slow mobilization of labor					
63	LF8	Labors chewing KAT during construction					
Factors related to Project and contract							
64	PCF1	Type of the project bidding and award (negotiation, lowest bidder)					
65	PCF2	Improper project feasibility study					
No	**ID**	**Delay factors according to groups**	**1**	**2**	**3**	**4**	**5**

Appendix A (continue)

QUESTIONIARE SURVEY

66	PCF3	Unrealistic contract duration imposed by the owner					
67	PCF4	Poor contract management					
68	PCF5	Change in the scope of the project					
69	PCF6	Legal disputes and claims between project stakeholders					
70	PCF7	Shortness of original contract duration					
71	PCF8	Lack of building codes					
72	PCF9	Corruption					
73	PCF10	Ineffective delay penalties					
74	PCF11	Poor Government judicial system for construction projects					
External related factors							
75	EF1	Accidents during construction					
76	EF2	Delay in obtaining permits from municipality					
77	EF3	Currency and price fluctuation					
78	EF4	Natural disasters (Such as epidemic, floods, earthquakes)					

Section 3: SPECIFIC QUESTION OF FACTORS CAUSING DELAYS IN CONSTRUCTION PROJECTS

1) Please specify the other factors that can cause delays in Somaliland building construction projects:
   a) _____
   b) _____
   c) _____
   d) _____

2) Please indicate if you have ways to minimize delays in Somaliland building construction projects:
   a) _____
   b) _____
   c) _____
   d) _____

3) Please indicate if you have any comments regarded delays in Somaliland building construction projects:
   e) _____
   f) _____
   g) _____
   h) _____

Appendix B: Questionnaire Approval for Ethics Committee

22.03.2021 15:48
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KTÜ 1955

T.C.
KARADENİZ TEKNİK ÜNİVERSİTESİ REKTÖRLÜĞÜ
Hukuk Müşavirliği

Sayı : E-82554930-050.02.04-116907-471
Konu : Etik Kurul Onayı (Yüksek Lisans Öğrencisi Ahmed Abdı MOHAMMOUD)

22.03.2021

Sn. Yüksek Lisans Öğrencisi Ahmed Abdı MOHAMMOUD

"Yapım Projelerinde Gecikme Faktörlerinin incelenmesi, Hargeisa Örneği, Somali" adlı tez çalışması için gerekli olan Etik Kurul incelemesi yapılmış ve onay verilmiştir.
Bilgilerinize ve gereğini rica ederim.

Prof. Dr. Cemil RAKICI
Rektör Yardımcısı

Bu belge güvenli elektronik imza ile imzalanmıştır.
Doğrulama Kod: oC4OtrPokrsi-SrDjirG6f2eAF6vDqz_46gjBt1MG_8RhFCfhMp1ig
Doğrulama Adres: http://e-belge.ktu.edu.tr

61080 – Trabzon / TÜRKİYE
Tel: 04623774394
Faks:
www.ktu.edu.tr
Ayrıntılı Bilgi İçin İrtibat
Suzan ALTUNTAŞ SOLAK
hukukmusavirligi@ktu.edu.tr

Appendix C: Public Construction Sector Perspectives

IDs	N	Minimum	Maximum	Mean	Std. Deviation
LF4	73	1.00	5.00	3.6301	1.13660
MEF5	73	1.00	5.00	3.5753	1.26840
CF4	73	1.00	5.00	3.5342	1.25921
OF2	73	1.00	5.00	3.4932	1.28153
MEF3	73	1.00	5.00	3.4110	1.37271
CF6	73	1.00	5.00	3.4110	1.40273
EF3	73	1.00	5.00	3.3973	1.26644
CF16	73	1.00	5.00	3.3973	1.40178
CF9	73	1.00	5.00	3.3836	1.29776
PCF2	73	1.00	5.00	3.3699	1.04757
CSF6	73	1.00	5.00	3.3699	1.27483
DF1	73	1.00	5.00	3.3562	1.30565
CF3	73	1.00	5.00	3.3425	1.18109
PCF6	73	1.00	5.00	3.3425	1.29335
CSF5	73	1.00	5.00	3.3288	1.32345
CF13	73	1.00	5.00	3.3288	1.43425
PCF11	73	1.00	5.00	3.3014	1.33005
LF5	73	1.00	5.00	3.2740	1.26118
OF10	73	1.00	5.00	3.2740	1.30448
CF15	73	1.00	5.00	3.2466	1.40219
PCF5	73	1.00	5.00	3.2466	1.15206
MEF11	73	1.00	5.00	3.2466	1.16405
OF3	73	1.00	5.00	3.2466	1.41206
CSF1	73	1.00	5.00	3.2466	1.40219
PCF10	73	1.00	5.00	3.2329	1.09950
DF2	73	1.00	5.00	3.2329	1.14892
DF7	73	1.00	5.00	3.2329	1.41932
MEF8	73	1.00	5.00	3.2329	1.12448
LF2	73	1.00	5.00	3.2055	1.29055
OF9	73	1.00	5.00	3.1918	1.12617
CF14	73	1.00	5.00	3.1781	1.39784
OF1	73	1.00	5.00	3.1781	1.43703
MEF10	73	1.00	5.00	3.1644	1.26945
MEF12	73	1.00	5.00	3.1644	1.26945
OF6	73	1.00	5.00	3.1507	1.43053
MEF4	73	1.00	5.00	3.1233	1.49949
CSF4	73	1.00	5.00	3.1096	1.21976
CF5	73	1.00	5.00	3.0822	1.38196
PCF4	73	1.00	5.00	3.0822	1.38196
CSF2	73	1.00	5.00	3.0822	1.26659

Appendix C (continue)

CF18	73	1.00	5.00	3.0822	1.38196
OF7	73	1.00	5.00	3.0822	1.22195
DF4	73	1.00	5.00	3.0685	1.41744
CF1	73	1.00	5.00	3.0685	1.41744
CF7	*73*	*1.00*	*5.00*	*3.0548*	*1.31117*
MEF9	73	1.00	5.00	3.0548	1.05265
LF8	73	1.00	5.00	3.0411	1.24095
MEF2	73	1.00	5.00	3.0411	1.25209
PCF7	73	1.00	5.00	3.0274	1.07977
LF6	73	1.00	5.00	3.0274	1.35373
OF4	73	1.00	5.00	3.0274	1.18992
PCF1	73	1.00	5.00	3.0137	1.23032
PCF3	73	1.00	5.00	3.0000	1.26930
CF12	73	1.00	5.00	3.0000	1.44338
PCF9	73	1.00	5.00	2.9863	1.26374
MEF1	73	1.00	5.00	2.9863	1.43849
EF4	73	1.00	5.00	2.9589	1.17187
LF7	73	1.00	5.00	2.9589	1.17187
CF2	73	1.00	5.00	2.9452	1.44232
PCF8	73	1.00	5.00	2.9041	1.21523
DF6	73	1.00	5.00	2.9041	1.37603
EF1	73	1.00	5.00	2.9041	1.31407
CSF3	73	1.00	5.00	2.8904	1.21976
CF8	73	1.00	5.00	2.8767	1.22412
DF3	73	1.00	5.00	2.8630	1.40747
OF5	73	1.00	5.00	2.8356	1.36436
MEF7	73	1.00	5.00	2.8356	1.20201
LF3	73	1.00	5.00	2.8356	1.26945
LF1	73	1.00	5.00	2.8219	1.29467
EF2	73	1.00	5.00	2.8219	1.18254
CF17	73	1.00	5.00	2.8082	1.26554
MEF13	73	1.00	5.00	2.7945	1.24676
DF5	73	1.00	5.00	2.7808	1.34626
CF19	73	1.00	5.00	2.7671	1.45793
MEF6	73	1.00	5.00	2.7123	1.27453
CF10	73	1.00	5.00	2.6986	1.36101
CF11	73	1.00	5.00	2.6301	1.26389
OF8	73	1.00	5.00	2.5890	1.33162

Appendix D: Private Construction Sector Perspectives

IDs	N	Minimum	Maximum	Mean	Std. Deviation
CF4	138	1.00	5.00	3.5362	1.27388
CF6	138	1.00	5.00	3.5145	1.20967
DF1	138	1.00	5.00	3.4565	1.23879
MEF3	138	1.00	5.00	3.4348	1.27844
LF4	138	1.00	5.00	3.4203	1.09951
PCF6	138	1.00	5.00	3.3841	1.16721
OF2	138	1.00	5.00	3.3841	1.19196
MEF5	138	1.00	5.00	3.3696	1.31291
CF9	138	1.00	5.00	3.3261	1.26816
EF3	138	1.00	5.00	3.3043	1.28216
PCF8	138	1.00	5.00	3.2826	1.30126
CF3	138	1.00	5.00	3.2754	1.24846
PCF4	138	1.00	5.00	3.2609	1.20403
LF8	138	1.00	5.00	3.2609	1.19185
OF6	138	1.00	5.00	3.2536	1.24432
CF2	138	1.00	5.00	3.2464	1.29464
PCF2	138	1.00	5.00	3.2391	1.14340
PCF11	138	1.00	5.00	3.2391	1.21159
CF5	138	1.00	5.00	3.2319	1.37384
CSF5	138	1.00	5.00	3.2319	1.29733
LF2	138	1.00	5.00	3.2246	1.19009
CF16	138	1.00	5.00	3.2101	1.45217
OF3	138	1.00	5.00	3.2029	1.34631
MEF2	138	1.00	5.00	3.2029	1.17864
LF6	138	1.00	5.00	3.1957	1.21942
LF5	138	1.00	5.00	3.1884	1.21157
CF1	138	1.00	5.00	3.1739	1.17089
MEF12	138	1.00	5.00	3.1594	1.22174
MEF4	138	1.00	5.00	3.1522	1.31194
CF13	138	1.00	5.00	3.1304	1.28339
PCF5	138	1.00	5.00	3.1304	1.18276
CF15	138	1.00	5.00	3.1159	1.27910
MEF11	138	1.00	5.00	3.1159	1.23260
DF2	138	1.00	5.00	3.1087	1.13783
DF7	138	1.00	5.00	3.0942	1.35025
CSF6	138	1.00	5.00	3.0870	1.26421
OF10	138	1.00	5.00	3.0870	1.19902
PCF3	138	1.00	5.00	3.0797	1.08783
EF4	138	1.00	5.00	3.0725	1.12463
LF7	138	1.00	5.00	3.0725	1.12463

Appendix D (continue)

PCF10	138	1.00	5.00	3.0652	1.16021
CF7	138	1.00	5.00	3.0435	1.23731
CF8	138	1.00	5.00	2.9928	1.22323
CSF3	138	1.00	5.00	2.9855	1.17756
DF6	138	1.00	5.00	2.9783	1.27564
MEF8	138	1.00	5.00	2.9638	1.17398
DF5	138	1.00	5.00	2.9493	1.30872
MEF10	138	1.00	5.00	2.9420	1.17621
PCF7	138	1.00	5.00	2.9348	1.16021
MEF9	138	1.00	5.00	2.9275	1.20605
PCF1	138	1.00	5.00	2.9275	1.28800
CSF1	138	1.00	5.00	2.9275	1.28800
CF14	138	1.00	5.00	2.9130	1.19902
OF1	138	1.00	5.00	2.9130	1.22312
CF17	138	1.00	5.00	2.8913	1.18805
CSF4	138	1.00	5.00	2.8841	1.12095
EF2	138	1.00	5.00	2.8768	1.10376
CF12	138	1.00	5.00	2.8551	1.19946
MEF6	138	1.00	5.00	2.8478	1.20765
CSF2	138	1.00	5.00	2.8406	1.22770
DF4	138	1.00	5.00	2.8333	1.31573
MEF7	138	1.00	5.00	2.8261	1.17089
CF19	138	1.00	5.00	2.8261	1.11338
PCF9	138	1.00	5.00	2.8188	1.17290
OF5	138	1.00	5.00	2.8188	1.16039
DF3	138	1.00	5.00	2.7826	1.29423
CF18	138	1.00	5.00	2.7754	1.23819
OF9	138	1.00	5.00	2.7681	1.16700
OF4	138	1.00	5.00	2.7391	1.10278
MEF1	138	1.00	5.00	2.7319	1.24126
LF1	138	1.00	5.00	2.7246	1.29439
LF3	138	1.00	5.00	2.6812	1.12688
OF7	138	1.00	5.00	2.6812	1.12688
MEF13	138	1.00	5.00	2.6377	1.27835
OF8	138	1.00	5.00	2.6232	1.10211
EF1	138	1.00	5.00	2.6087	1.16791
CF11	138	1.00	5.00	2.6087	1.21087
CF10	138	1.00	5.00	2.6014	1.24713

Appendix E: The Results of an Independent Sample t-test

Independent Samples Test

IDs		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
CF1	Equal variances assumed	5.058	0.026	-0.578	209	0.564	-0.10542	0.18254	-0.46527	0.25443
	Equal variances not assumed			-0.545	124.814	0.587	-0.10542	0.19354	-0.48846	0.27762
CF2	Equal variances assumed	2.687	0.103	-1.545	209	0.124	-0.30117	0.19499	-0.68558	0.08323
	Equal variances not assumed			-1.494	133.689	0.138	-0.30117	0.20160	-0.69991	0.09757
CF3	Equal variances assumed	0.146	0.703	0.378	209	0.706	0.06710	0.17738	-0.28259	0.41679
	Equal variances not assumed			0.385	153.992	0.701	0.06710	0.17437	-0.27736	0.41156
CF4	Equal variances assumed	0.025	0.874	-0.011	209	0.991	-0.00199	0.18363	-0.36399	0.36002
	Equal variances not assumed			-0.011	148.229	0.991	-0.00199	0.18298	-0.36356	0.35959
CF5	Equal variances assumed	0.020	0.888	-0.751	209	0.453	-0.14969	0.19923	-0.54246	0.24307
	Equal variances not assumed			-0.750	145.990	0.454	-0.14969	0.19960	-0.54417	0.24478
CF6	Equal variances assumed	3.173	0.076	-0.559	209	0.577	-0.10353	0.18517	-0.46857	0.26151
	Equal variances not assumed			-0.534	129.277	0.594	-0.10353	0.19380	-0.48696	0.27989
CF7	Equal variances assumed	0.608	0.436	0.062	209	0.951	0.01132	0.18282	-0.34909	0.37173
	Equal variances not assumed			0.061	139.538	0.952	0.01132	0.18613	-0.35668	0.37931
CF8	Equal variances assumed	0.018	0.895	-0.655	209	0.513	-0.11604	0.17708	-0.46512	0.23304
	Equal variances not assumed			-0.655	146.648	0.513	-0.11604	0.17712	-0.46607	0.23399
CF9	Equal variances assumed	0.070	0.792	0.311	209	0.756	0.05747	0.18502	-0.30727	0.42222
	Equal variances not assumed			0.308	143.824	0.758	0.05747	0.18635	-0.31085	0.42580
CF10	Equal variances assumed	1.208	0.273	0.522	209	0.603	0.09718	0.18633	-0.27015	0.46451
	Equal variances not assumed			0.508	136.057	0.613	0.09718	0.19143	-0.28138	0.47574
CF11	Equal variances assumed	0.531	0.467	0.121	209	0.904	0.02144	0.17792	-0.32931	0.37219
	Equal variances not assumed			0.119	141.375	0.906	0.02144	0.18030	-0.33499	0.37787

Appendix E (continue)

CF12	Equal variances assumed	4.744	0.031	0.777	209	0.438	0.14493	0.18651	-0.22275	0.51260
	Equal variances not assumed			0.734	125.416	0.464	0.14493	0.19739	-0.24573	0.53558
CF13	Equal variances assumed	2.690	0.103	1.025	209	0.307	0.19833	0.19354	-0.18320	0.57987
	Equal variances not assumed			0.990	133.338	0.324	0.19833	0.20029	-0.19782	0.59448
CF14	Equal variances assumed	6.193	0.014	1.441	209	0.151	0.26504	0.18395	-0.09759	0.62767
	Equal variances not assumed			1.374	128.706	0.172	0.26504	0.19283	-0.11649	0.64657
CF15	Equal variances assumed	1.933	0.166	0.682	209	0.496	0.13063	0.19144	-0.24677	0.50803
	Equal variances not assumed			0.663	135.536	0.508	0.13063	0.19695	-0.25886	0.52012
CF16	Equal variances assumed	0.564	0.453	0.901	209	0.369	0.18712	0.20768	-0.22230	0.59653
	Equal variances not assumed			0.911	151.323	0.364	0.18712	0.20542	-0.21875	0.59298
CF17	Equal variances assumed	1.458	0.229	-0.472	209	0.637	-0.08309	0.17588	-0.42982	0.26365
	Equal variances not assumed			-0.463	138.912	0.644	-0.08309	0.17935	-0.43770	0.27153
CF18	Equal variances assumed	1.692	0.195	1.644	209	0.102	0.30683	0.18663	-0.06108	0.67474
	Equal variances not assumed			1.589	133.482	0.114	0.30683	0.19306	-0.07502	0.68868
CF19	Equal variances assumed	11.517	0.001	-0.328	209	0.743	-0.05896	0.17988	-0.41357	0.29564
	Equal variances not assumed			-0.302	117.404	0.763	-0.05896	0.19519	-0.44552	0.32759
CSF1	Equal variances assumed	3.089	0.080	1.659	209	0.099	0.31904	0.19226	-0.05997	0.69805
	Equal variances not assumed			1.616	136.341	0.108	0.31904	0.19737	-0.07126	0.70934
CSF2	Equal variances assumed	0.016	0.900	1.345	209	0.180	0.24161	0.17964	-0.11252	0.59574
	Equal variances not assumed			1.332	142.813	0.185	0.24161	0.18138	-0.11692	0.60015
CSF3	Equal variances assumed	0.141	0.707	-0.551	209	0.582	-0.09510	0.17255	-0.43526	0.24506
	Equal variances not assumed			-0.545	142.315	0.587	-0.09510	0.17444	-0.43992	0.24973
CSF4	Equal variances assumed	0.883	0.349	1.348	209	0.179	0.22553	0.16729	-0.10427	0.55533
	Equal variances not assumed			1.313	136.396	0.191	0.22553	0.17172	-0.11404	0.56510
CSF5	Equal variances assumed	0.211	0.646	0.512	209	0.609	0.09688	0.18907	-0.27584	0.46960
	Equal variances not assumed			0.509	144.217	0.611	0.09688	0.19024	-0.27913	0.47289
CSF6	Equal variances assumed	0.470	0.494	1.542	209	0.125	0.28291	0.18349	-.07883	0.64464
	Equal variances not assumed			1.538	145.676	0.126	0.28291	0.18397	-0.08068	0.64650
OF1	Equal variances assumed	8.296	0.004	1.408	209	0.161	0.26504	0.18826	-0.10609	0.63616
	Equal variances not assumed			1.340	127.887	0.183	0.26504	0.19781	-0.12637	0.65645

Appendix E (continue)

OF2	Equal variances assumed	0.289	0.592	0.616	209	0.539	0.10909	0.17708	-0.23999	0.45818
	Equal variances not assumed			0.602	137.809	0.548	0.10909	0.18109	-0.24898	0.46716
OF3	Equal variances assumed	0.624	0.430	0.220	209	0.826	0.04368	0.19817	-0.34700	0.43435
	Equal variances not assumed			0.217	140.785	0.828	0.04368	0.20112	-0.35392	0.44128
OF4	Equal variances assumed	0.012	0.912	1.757	209	0.080	0.28827	0.16405	-0.03514	0.61168
	Equal variances not assumed			1.716	137.384	0.088	0.28827	0.16795	-0.04384	0.62038
OF5	Equal variances assumed	3.469	0.064	0.094	209	0.925	0.01678	0.17866	-0.33543	0.36898
	Equal variances not assumed			0.089	127.807	0.929	0.01678	0.18777	-0.35476	0.38831
OF6	Equal variances assumed	2.796	0.096	-0.542	209	0.588	-0.10294	0.18980	-0.47711	0.27123
	Equal variances not assumed			-0.520	130.206	0.604	-0.10294	0.19812	-0.49490	0.28902
OF7	Equal variances assumed	0.147	0.702	2.388	209	0.018	0.40103	0.16795	0.06993	0.73213
	Equal variances not assumed			2.329	136.804	0.021	0.40103	0.17221	0.06050	0.74157
OF8	Equal variances assumed	5.981	0.015	-0.199	209	0.843	-0.03415	0.17167	-0.37258	0.30428
	Equal variances not assumed			-0.188	125.006	0.851	-0.03415	0.18191	-0.39418	0.32588
OF9	Equal variances assumed	0.406	0.524	2.539	209	0.012	0.42366	0.16688	0.09468	0.75265
	Equal variances not assumed			2.567	151.362	0.011	0.42366	0.16505	0.09756	0.74977
OF10	Equal variances assumed	2.119	0.147	1.045	209	0.297	0.18702	0.17893	-0.16573	0.53976
	Equal variances not assumed			1.018	136.416	0.310	0.18702	0.18365	-0.17616	0.55019
DF1	Equal variances assumed	0.306	0.581	-0.549	209	0.583	-0.10036	0.18267	-0.46048	0.25976
	Equal variances not assumed			-0.541	140.192	0.590	-0.10036	0.18567	-0.46743	0.26671
DF2	Equal variances assumed	.123	0.726	0.752	209	0.453	0.12418	0.16523	-0.20154	0.44990
	Equal variances not assumed			0.749	145.508	0.455	0.12418	0.16572	-0.20335	0.45172
DF3	Equal variances assumed	0.849	0.358	0.416	209	0.678	0.08041	0.19311	-0.30029	0.46110
	Equal variances not assumed			0.406	136.465	0.686	0.08041	0.19818	-0.31149	0.47230
DF4	Equal variances assumed	0.854	0.357	1.202	209	0.231	0.23516	0.19561	-0.15047	0.62079
	Equal variances not assumed			1.175	137.572	0.242	0.23516	0.20017	-0.16064	0.63096
DF5	Equal variances assumed	0.446	0.505	-0.881	209	0.380	-0.16845	0.19129	-0.54556	0.20865
	Equal variances not assumed			-0.873	143.174	0.384	-0.16845	0.19297	-0.54990	0.21299
DF6	Equal variances assumed	.831	0.363	-0.391	209	0.696	-0.07415	0.18975	-0.44821	0.29991
	Equal variances not assumed			-0.382	137.419	0.703	-0.07415	0.19424	-0.45824	0.30994
DF7	Equal variances assumed	0.773	0.380	0.697	209	0.486	0.13867	0.19891	-0.25346	0.53081

Appendix E (continue)

	Equal variances not assumed			0.686	140.517	0.494	0.13867	0.20201	-0.26069	0.53804
MEF1	Equal variances assumed	2.415	0.122	1.339	209	0.182	0.25442	0.18996	-0.12006	0.62890
	Equal variances not assumed			1.280	129.342	0.203	0.25442	0.19877	-0.13885	0.64768
MEF2	Equal variances assumed	0.094	0.760	-0.928	209	0.354	-0.16180	0.17431	-0.50544	0.18183
	Equal variances not assumed			-0.911	139.240	0.364	-0.16180	0.17760	-0.51295	0.18934
MEF3	Equal variances assumed	0.926	0.337	-0.125	209	0.900	-0.02382	0.18983	-0.39805	0.35041
	Equal variances not assumed			-0.123	137.964	0.902	-0.02382	0.19405	-0.40752	0.35988
MEF4	Equal variances assumed	3.478	0.064	-0.145	209	0.885	-0.02889	0.19964	-0.42245	0.36467
	Equal variances not assumed			-0.139	130.841	0.890	-0.02889	0.20802	-0.44041	0.38264
MEF5	Equal variances assumed	0.651	0.421	1.096	209	0.274	0.20578	0.18782	-0.16448	0.57603
	Equal variances not assumed			1.107	151.215	0.270	0.20578	0.18582	-0.16136	0.57292
MEF6	Equal variances assumed	1.176	0.279	-0.760	209	0.448	-0.13550	0.17817	-0.48674	0.21574
	Equal variances not assumed			-0.748	140.030	0.456	-0.13550	0.18117	-0.49367	0.22267
MEF7	Equal variances assumed	0.123	0.727	0.056	209	0.956	0.00953	0.17102	-0.32762	0.34668
	Equal variances not assumed			0.055	143.430	0.956	0.00953	0.17241	-0.33127	0.35033
MEF8	Equal variances assumed	0.092	0.762	1.607	209	0.110	0.26911	0.16747	-0.06104	0.59926
	Equal variances not assumed			1.628	152.347	0.105	0.26911	0.16525	-0.05738	0.59559
MEF9	Equal variances assumed	2.137	0.145	0.761	209	0.448	0.12726	0.16723	-0.20241	0.45693
	Equal variances not assumed			0.794	164.919	0.429	0.12726	0.16037	-0.18939	0.44391
MEF10	Equal variances assumed	0.706	0.402	1.271	209	0.205	0.22235	0.17499	-0.12262	0.56733
	Equal variances not assumed			1.241	137.357	0.217	0.22235	0.17917	-0.13193	0.57663
MEF11	Equal variances assumed	0.396	0.530	0.746	209	0.456	0.13063	0.17503	-0.21442	0.47569
	Equal variances not assumed			0.760	154.225	0.449	0.13063	0.17196	-0.20907	0.47034
MEF12	Equal variances assumed	.002	0.961	0.028	209	0.978	0.00496	0.17922	-0.34835	0.35828
	Equal variances not assumed			0.027	141.934	0.978	0.00496	0.18136	-0.35355	0.36348
MEF13	Equal variances assumed	0.279	0.598	0.855	209	0.394	0.15684	0.18345	-0.20480	0.51848
	Equal variances not assumed			0.862	149.974	0.390	0.15684	0.18203	-0.20284	0.51652
LF1	Equal variances assumed	0.168	0.682	0.519	209	0.604	0.09728	0.18734	-0.27204	0.46660
	Equal variances not assumed			0.519	146.713	0.604	0.09728	0.18736	-0.27299	0.46755
LF2	Equal variances assumed	1.427	0.234	-0.108	209	0.914	-0.01916	0.17738	-0.36884	0.33052

Appendix E (continue)

	Equal variances not assumed			-0.105	136.798	0.916	-0.01916	0.18188	-0.37881	0.34049
LF3	Equal variances assumed	2.824	0.094	0.906	209	0.366	0.15446	0.17048	-0.18162	0.49053
	Equal variances not assumed			0.873	132.442	0.384	0.15446	0.17685	-0.19537	0.50428
LF4	Equal variances assumed	0.071	0.790	1.303	209	0.194	0.20985	0.16099	-0.10754	0.52723
	Equal variances not assumed			1.290	142.567	0.199	0.20985	0.16266	-0.11168	0.53138
LF5	Equal variances assumed	0.154	0.695	0.481	209	0.631	0.08557	0.17785	-0.26504	0.43617
	Equal variances not assumed			0.475	141.709	0.635	0.08557	0.18007	-0.27041	0.44154
LF6	Equal variances assumed	0.106	0.745	-0.917	209	0.360	-0.16825	0.18341	-0.52982	0.19331
	Equal variances not assumed			-0.888	134.091	0.376	-0.16825	0.18942	-0.54289	0.20638
LF7	Equal variances assumed	0.000	0.996	-0.688	209	0.492	-0.11356	0.16515	-0.43913	0.21201
	Equal variances not assumed			-0.679	141.584	0.498	-0.11356	0.16726	-0.44422	0.21710
LF8	Equal variances assumed	0.548	0.460	-1.256	209	0.210	-0.21977	0.17497	-.56470	0.12516
	Equal variances not assumed			-1.240	141.680	0.217	-0.21977	0.17717	-0.57001	0.13046
PCF1	Equal variances assumed	0.235	0.628	0.469	209	0.639	0.08616	0.18357	-0.27573	0.44805
	Equal variances not assumed			0.476	152.708	0.635	0.08616	0.18099	-0.27140	0.44373
PCF2	Equal variances assumed	0.274	0.601	0.813	209	0.417	0.13073	0.16083	-0.18633	0.44780
	Equal variances not assumed			0.835	158.301	0.405	0.13073	0.15655	-0.17846	0.43992
PCF3	Equal variances assumed	3.092	0.080	-0.477	209	.634	-0.07971	0.16695	-0.40883	0.24941
	Equal variances not assumed			-0.455	128.616	0.650	-.07971	0.17506	-0.42608	0.26666
PCF4	Equal variances assumed	1.705	0.193	-0.974	209	0.331	-0.17868	0.18353	-0.54049	0.18313
	Equal variances not assumed			-00.933	130.383	0.352	-0.17868	0.19149	-0.55750	0.20014
PCF5	Equal variances assumed	0.021	0.885	0.685	209	0.494	0.11614	0.16966	-0.21832	0.45060
	Equal variances not assumed			0.690	150.141	0.491	0.11614	0.16828	-0.21636	0.44865
PCF6	Equal variances assumed	2.488	0.116	-0.237	209	0.813	-0.04159	0.17543	-0.38742	0.30424
	Equal variances not assumed			-0.230	134.303	0.819	-0.04159	0.18107	0-.39971	0.31653
PCF7	Equal variances assumed	2.673	0.104	0.565	209	0.573	0.09261	0.16399	-0.23068	0.41591
	Equal variances not assumed			0.577	156.185	0.564	0.09261	0.16039	-0.22420	0.40943
PCF8	Equal variances assumed	1.445	0.231	-2.056	209	0.041	-0.37850	0.18413	-0.74149	-0.01551
	Equal variances not assumed			-2.100	155.721	0.037	-0.37850	0.18028	-0.73460	-0.02239
PCF9	Equal variances assumed	0.012	0.915	0.960	209	0.338	0.16746	0.17439	-0.17632	0.51125
	Equal variances not assumed			0.938	137.556	0.350	0.16746	0.17845	-0.18541	0.52033

PCF10	Equal variances assumed	0.120	0.730	1.017	209	0.311	0.16766	0.16494	-0.15749	0.49281
	Equal variances not assumed			1.034	153.761	0.303	0.16766	0.16222	-0.15280	0.48812
PCF11	Equal variances assumed	0.768	0.382	0.343	209	0.732	0.06224	0.18143	0-.29544	0.41992
	Equal variances not assumed			0.333	135.374	0.739	0.06224	0.18674	-0.30706	0.43154
EF1	Equal variances assumed	2.476	0.117	1.673	209	0.096	0.29541	0.17660	-0.05273	0.64356
	Equal variances not assumed			1.613	132.577	0.109	0.29541	0.18314	-0.06683	0.65766
EF2	Equal variances assumed	1.073	0.301	-0.335	209	0.738	-0.05489	0.16376	-0.37772	0.26794
	Equal variances not assumed			-0.328	138.226	0.743	-0.05489	0.16729	-0.38566	0.27588
EF3	Equal variances assumed	0.012	0.913	0.503	209	0.616	0.09291	0.18478	-0.27136	0.45718
	Equal variances not assumed			0.505	148.326	0.614	0.09291	0.18407	-0.27083	0.45666
EF4	Equal variances assumed	0.000	0.996	-0.688	209	0.492	-0.11356	0.16515	-0.43913	0.21201
	Equal variances not assumed			-0.679	141.584	0.498	-0.11356	0.16726	-0.44422	0.21710

Appendix F: Recommendation Survey Draft

Recommendation Survey

KARADENIZ TECHNICAL UNIVERSITY

INSTITUTE OF NATURAL SCIENCES

CIVIL ENGINEERING

THESIS TITLE: AN INVESTIGATION INTO DELAY FACTORS IN BUILDING CONSTRUCTION PROJECTS; CASE OF HARGEISA, SOMALILAND

Dear Sir/Madam

Introduction:

This survey includes a set of recommendations for stakeholders and other parties involved in the construction industry, with the goal of reducing delays in building construction projects in Somaliland.

Objective:

The main objective of this survey is to ensure if these recommendations are compatible with situations of building construction projects in Somaliland, as well as to confirm if these suggestions can be effective in reducing or eliminating delays in the building construction sector.

Instruction:

This Survey is categorized into two main sections, Personal information, multiple-choice questions that are listed several recommendations regarded to the various partners involved in the construction sector. Please, kindly answer the questions attached the survey as objectively as possible. State your answer to each question by filling in the space provided or ticking in the correct answer as appropriate by using the below-mentioned scales.

1. Non-effectual 2. Slightly effectual 3. effectual 4. Very effectual 5. Very-high effectual.

I value your participation and thank you for your commitment of time and effort. If you have any comments, questions, or concerns with regards to the study, please contact me at the address below.

Sincerely,

Ahmed Abdi Mohamoud

Master's Degree at Karadeniz Technical University in Trabzon/Turkey.

Appendix F (continue)

Recommendation Survey

SECTION 1: PERSONAL DATA AND GENERAL INFORMATION

Name: _____ **Title/Position:** _____

Experience: ( ) Years. **Education Level:** BSc { } MSc{ } PhD{ }

Organization: ☐ Public/Government organization ☐ Private organization

SECTION 2: Recommendation of the Factors Causing Delays in Somaliland Building Construction Projects

Please state the most effectual recommendation for the following suggestions:

1. Non-effectual 2. Slightly effectual 3. effectual 4. Very effectual 5. Very-high effectual.

No	Recommendation for delay factors in building projects in Somaliland	Data Measurement				
	Recommendation to the Contractors	**1**	**2**	**3**	**4**	**5**
1	The contractors and project team should properly make a deep analysis for the project and study it adequately before starting its implementation, then should set realistic goals and effective project plan as well as schedule after ensuring all conceivable situations.					
2	To make construction projects more manageable, they have to break down the project activities into sections and restrict the amount of time and cost it take to complete them. To achieve this, they must hire qualified project managers who are familiar with the software that assists project management and makes it easier to track.					
3	Contractors should establish an effective management strategy to monitor and control construction sites, labors, and resources efficiency. Also, they must engage competent site engineers and supervisors in order to avoid and prevent delays in building construction projects caused by inadequate site management.					
4	Contractors must devise an effective plan to ensure that the material is delivered to the construction site on time. Moreover, the contractor's project managers should identify the required construction materials and equipment early especially considering the materials that will take longer to arrive and take action to get them delivered to the construction site on schedule.					
	Recommendations to the Owners/Clients	**1**	**2**	**3**	**4**	**5**

Appendix F (continue)

Recommendation Survey

1	The clients should confirm that sufficient funds are available before the beginning of the project to make timely payments to the contractor before the work is carried out or finished based on the contract.					
2	The clients should adequately define and articulate their requirements. Also, they should pay close attention to the design documents submitted during the design stage with the assistance of qualified consultants to avoid design errors and modification during construction, which might result in project delays and cost overruns.					
3	At the time of selecting the contractor that will implement the project, the clients should not choose according to the least cost but should select based on their experience, financial status, capacity, and skill, as well as their time commitments.					
Recommendations associated for the Contract		**1**	**2**	**3**	**4**	**5**
1	The project's stakeholders should have an official or documented contract and bilateral agreement assigned by the contractor and owner/client.					
2	The consultancy sector must be included during contract agreements.					
3	The contractors and clients should prepare together an effective and detailed project contract which must be fulfilling their agreements directly.					
4	Establishing an effective delay penalty and included to the contract.					
Recommendation to the Government		**1**	**2**	**3**	**4**	**5**
1	The government should develop the rules and regulations for the construction project.					
2	The government of Somaliland should make an effort to set up building and construction codes/standards					
3	The Government should improve the judicial system for construction projects.					
4	To upgrade the skills and knowledge of the various construction labor, the government and contractors should cooperate on how to establish technical schools and training institutes.					
5	The government should take their responsibility and grade the construction companies according to their capacity, ability, skill, and experience.					

CURRICULUM VITAE

He attended Omer Binu Abdicasis and Omer Binu Khadab Schools for his primary and secondary schools. After completing his high school education at Hamdan Binu Rashid Secondary School, he started his undergraduate education at Gollis University, Faculty of Engineering, Department of Civil Engineering in 2012. After graduating in 2015, he worked as a site engineer at Turksom Energy Construction Trade Limited, Hargeisa/ Somaliland between 2015 to 2016. Also, he worked as an engineer at Gollis Construction Company, Hargeisa/Somaliland between 2016- 2018. He was awarded the Turkish Scholarship and studied Turkish language at Karadeniz Technical University in 2019. He then began his master's degree at Karadeniz Technical University's Graduate Institute of Natural and Applied Sciences, Civil Engineering Department, Trabzon/Turkey in 2019. Ahmed Abdi Mohamoud has speaks Turkish, English, Arabic languages.In addition to his mother language which is Somali language.