T.C.
ISTANBUL GEDİK UNIVERSITY
INSTITUTE OF GRADUATE STUDIES

THE IDENTIFICATION OF THE CAUSES THAT HAVE CONTRIBUTED TO THE DELAY IN CONSTRUCTION PROJECTS IN THE IRAQI CITY OF MOSUL

MASTER THESIS

Ahmed Haitham Ghazi GHAZI

Engineering Management Department

Engineering Management Master in English Program

MARCH 2022

T.C.
ISTANBUL GEDİK UNIVERSITY
INSTITUTE OF GRADUATE STUDIES

THE IDENTIFICATION OF THE CAUSES THAT HAVE CONTRIBUTED TO THE DELAY IN CONSTRUCTION PROJECTS IN THE IRAQI CITY OF MOSUL

MASTER THESIS

Ahmed Haitham Ghazi GHAZI
(191281038)

Engineering Management Department

Engineering Management Master in English Program

Thesis Advisor: Assist. Prof. Dr. Redvan GHASEMLOUNIA

MARCH 2022

T.C
İSTANBUL GEDİK ÜNİVERSİTESİ
LİSANSÜSTÜ EĞİTİM ENSTİTÜSÜ MÜDÜRLÜĞÜ

Yüksek Lisans Tez Onay Belgesi

Enstitümüz, Engineering Management Department İngilizce Tezli Yüksek Lisans Programı (191281038) Ahmed Haitham Ghazi GHAZI"nin "The Identification of the Causes That Have Contributed to the Delay in Construction Projects in the Iraqi City of Mosul" adlı tez çalışması Enstitümüz Yönetim Kurulunun 18.03.2022 tarihinde oluşturulan jüri tarafından Oy Birliği ile Yüksek Lisans tezi olarak Kabul edilmiştir.

Öğretim Üyesi Adı Soyadı

Tez Savunma Tarihi: (18/03/2022)

1) Tez Danışmanı: Dr. Öğr. Üyesi Redvan GHASEMLOUNIA

2) Jüri Üyesi: Dr. Öğr. Üyesi Babak VAHEDDOOST

3) Jüri Üyesi: Dr. Öğr. Üyesi Hasan Bozkurt NAZİLLİ

DECLARATION

I, Ahmed Haitham Ghazi GHAZI, do hereby declare that this thesis titled as "The Identification of the Causes that Have Contributed to the Delay in Construction Projects In the Iraqi City of Mosul" is original work done by me for the award of the masters degree in the faculty of Engineering Management. I also declare that this thesis or any part of it has not been submitted and presented for any other degree or research paper in any other university or institution. (18/03/2022)

Ahmed Haitham Ghazi GHAZI

DEDICATION

My thesis is dedicated to every one of my family and friends. I owe a particular debt of appreciation to my supportive parents, whose words of advice and encouragement to keep going are still ringing in my ears, reminding me to put in the effort to attain my goals.

I also dedicate my thesis to my supervisor, assist. Prof. Dr. Redvan GHASEMLOUNIA, who has helped me strengthen my technological skills throughout the process.

I want to express my gratitude to two of my best friends, Younis Yazin Younis and Omar Salam Adnan, for their constant support throughout the project period. Thanks for being a part of my life.

Finally, I give the results of this thesis to my city, Mosul, I hope that my thesis will help to alleviate some of the negative consequences that construction projects have on it.

PREFACE

At the beginning of this research, I want to thank God Almighty for providing me with the strength and fortitude to accomplish this study. Everyone who helped me complete my thesis, and especially my supervisor assist. Prof. Dr. Redvan Ghasemlounia who provided me with invaluable direction and support over the course of its preparation. I would want to express my gratitude to Istanbul Gedik University, its graduate school and scientific research, management, and professors. Thanks to everyone who helped make this study possible, particularly the Mosul employees and engineers for the chance to conduct this study and for their efforts in filling out the questionnaire and conducting the interviews. I thank them all from the bottom of my heart. Finally, I would like to express my heartfelt gratitude and regards to my family members, particularly my father Haitham Ghazi and mother Walaa Abd, who have supported and encouraged me throughout my entire academic career and who have stood by my side and provided me with all of the support and assistance I have needed throughout the entire thesis process.

March 2022 Ahmed GHAZI

Civil Engineer

TABLE OF CONTENT

ABBREVIATIONS

ICOM : International Council of Museums.
SPSS : Statistical Package for the Social Sciences.
PMI : Project Management Institute.
ISIS : Islamic State of Iraq and Syria.
RII : The Relative Importance Index.
M : Mean.
S.D : Standard Deviation.

LIST OF TABLES

Page

LIST OF FIGURES

Page

THE IDENTIFICATION OF THE CAUSES THAT HAVE CONTRIBUTED TO THE DELAY IN CONSTRUCTION PROJECTS IN THE IRAQI CITY OF MOSUL

ABSTRACT

The purpose of the study is to identify the main factors that have contributed to the long delays in construction projects in Mosul, Iraq. The study also aims to raise awareness of the risks that cause project delays among all stakeholders involved in the project, including the contractor, owner, and consultant. The primary motivation for this study is the increased delay in the completion of construction projects in Mosul over the past few years, particularly after the war against ISIS, which saw the destruction of many government buildings as well as bridges, roads, and other infrastructure. When reconstruction began, it was observed that most construction projects were delayed, resulting in a negative impact on the success of these projects, such as time overruns and increased cost estimates. The field survey is used for projects that are still going on and for projects that have already been completed, with the assistance of the opinions of participants in the field survey via an electronic questionnaire, in order to gather genuine responses and diverse perspectives on the causes. The analysis and classification of the most significant causes of delay are carried out using the relative importance index (RII), which is based on the frequency with which they occur from the perspective of those who responded to the questionnaire. This study employs a combined quantitative and qualitative research strategy, with a case study being utilized to obtain qualitative data and a field survey using an electronic questionnaire to acquire quantitative data. And then analyze the data and extract the results by providing general information about the people who took part in the field survey or questionnaire, while also revealing the factors that cause delays in construction projects in Mosul, ranked by the frequency with which they occur and the importance with which they occur. Finally, a summary of the study completed is provided, as well as ideas and recommendations for preventing or reducing the reasons that cause delays in construction projects.

Keywords: *Causes of delays; Effects of delays; Scheduling; Time overrun; Construction Management; Construction project; Construction delay; Delay analysis; Questionnaire.*

IRAK'IN MUSUL ŞEHRİ İNŞAAT PROJELERİNDEKİ GECİKMEYE KATKI SAĞLAYAN NEDENLERİN BELİRLENMESİ

ÖZET

Çalışmanın amacı, Irak'ın Musul kentindeki inşaat projelerinde uzun süre gecikmelere neden olan ana faktörleri belirlemektir. Çalışma aynı zamanda müteahhit, mal sahibi ve danışman da dahil olmak üzere projeye dahil olan tüm paydaşlar arasında proje gecikmelerine neden olan riskler konusunda farkındalık yaratmayı amaçlamaktadır. Bu çalışmanın temel motivasyonu, son birkaç yılda Musul'daki inşaat projelerinin tamamlanmasındaki artan gecikmedir özellikle birçok hükümet binasının yanı sıra köprülerin, yolların ve diğer altyapının yıkımına sahne olan IŞİD'e karşı savaştan sonra. Yeniden yapılanma başladığında, çoğu inşaat projesinin ertelendiği, bunun da zaman aşımları ve artan maliyet tahminleri gibi bu projelerin başarısını olumsuz etkilediği gözlendi. Saha araştırması, halen devam eden projeler ve daha önce tamamlanmış projeler için, saha anketine katılanların görüşlerinin elektronik bir anket aracılığıyla, gerçek yanıtlar ve nedenler hakkında farklı bakış açıları toplamak için kullanılır. Gecikmenin en önemli nedenlerinin analizi ve sınıflandırılması göreceli önem indeksi kullanılarak yapılır, ankete cevap verenlerin bakış açısından ortaya çıkma sıklığına dayalıdır. Bu çalışma, birleşik bir nicel ve nitel araştırma stratejisi kullanır, nitel veri elde etmek için bir vaka çalışması ve nicel veri elde etmek için elektronik bir anket kullanan bir saha araştırması ile. Ardından, saha araştırması veya ankete katılan kişiler hakkında genel bilgi vererek verileri analiz edilir ve sonuçları çıkartılır, aynı zamanda Musul'daki inşaat projelerinde gecikmelere neden olan faktörleri ortaya koyarak, bunların oluşma sıklığına ve meydana geldiği öneme göre sıralanmıştır. Son olarak, tamamlanan çalışmanın bir özetinin yanı sıra inşaat projelerinde gecikmelere neden olan nedenlerin önlenmesi veya azaltılmasına yönelik fikir ve öneriler sağlanmaktadır

Anahtar Kelime: *Gecikme Nedenleri; Gecikmelerin Etkileri; Zamanlama; Zaman Aşımı; İnşaat Yönetimi; İnşaat Projesi; İnşaat Gecikmesi; Gecikme Analizi; Anket.*

1. INTRODUCTION

1.1 Background of the Study

The construction industry in Iraq is a very important sector of economic growth because it is one of the developing countries (Rezaei and Jalal, 2018). Where the construction sector is the tool that achieves the community goals in the development of rural and urban areas (Khan, 2018). Delays in construction affect the entire economy (Mohammed and Jasim, 2017). In the recent period in the city of Mosul, delays occur in almost every construction project and their impact on the project is very significant, so it is necessary to detect the reasons for the delay in order to avoid or reduce delays in construction.

Many of the future construction projects completed and under way in Mosul have many problems, such as delays in the delivery time of the project and in Iraq in general, a project is rarely found that does not suffer from delays (Al Hadithi, 2018). Among the projects that have suffered delays or been completely abandoned, such as the reconstruction of bridges, hospitals and roads damaged by the war, and the resumption of construction in residential complexes such as the Diwan Residential Compound and the Ain Al Iraq city. The level of delay effects in construction projects varies from one project to another, ranging from days to years, so delivery of the project in the specified time was an indication of the efficiency and success of the project (Shebob, Dawood and Xu, 2011; Tafazzoli and Shrestha, 2017).

Many unexpected variables and factors can occur during the implementation of construction projects due to various factors such as site conditions and the performance of project parties, which are likely to result in time overruns and project costs, so all parties involved in the project must be informed for damage to delays to recover time and costs (Mohammed and Jafar, 2011).

Under field conditions, activities and tasks in the course of implementation cannot be completed in the required time due to the large number of events and other unforeseen factors that lead to delays, so the work of the schedule of the construction

project has an important role to play in the success and efficiency of the project (Tafazzoli and Shrestha, 2017)

The estimators in scheduling the project can save a substantial time to complete the activity and also save the time required to finish the project leads to encouraging the team to prevent wasting time despite the deterrent circumstances that are taken into account.

In view of the many consequences of delays in construction projects in Mosul, this study was conducted to provide results to all parties involved in the project in minimizing delays in construction as much as possible.

1.2 Problem Statement

Delayed projects are a severe and expensive issue for all parties engaged in building projects, from project owners to subcontractors and everyone in between. Owners are likely to suffer a financial loss as a result of the loss of potential income from the usage of the project as well as additional administrative costs associated with maintaining and overseeing the contracts. The contractor also suffers losses in overhead and profit as a result of the rise in pricing as the project progresses, and as a result, he is forced to reduce his available capital. Construction delays, as Sweis et al. (2007) points out, are often responsible for the conversion of lucrative projects into losses. As a result, it is important to identify the variables that contribute to the delay of building projects.

The city of Mosul recently after its liberation from the war in 2017 witnessed many construction projects and building reconstruction projects because it is a considered a disaster city, major projects have been set up by both private and public sectors, including housing projects, hospitals, roads, educational institutions and other facilities. Where it suffered from a major problem is delay in completing the construction project from the completion time agreed between the parties to the project.

The researcher also revealed that the problem of delays in construction projects in Mosul was suffered by many years where the excitement was very negative to the relationship between the contractor and the owner and also pay the additional fees to complete the project and suffer heavy losses due to delays in construction projects.

Al Hadithi (2018) mentioned in his study on delays in construction projects in Iraq, many construction projects were abandoned permanently or temporarily between 2003 and 2014 due to political crisis of the country and led to an escalation of disputes between the parties to the project and eventually the litigation was used as a last resort to resolve or settle disputes.

1.3 Research Aims and Objectives

The basic step when delays occur in construction projects is to verify the events contributing to the delay. Therefore, the researcher targeted the following objectives:

1. Provide a comprehensive overview according to a literature survey of previous research that identifies the causes of delays in construction projects around the world.
2. Determining the possible reasons for the delay in private and public construction projects in the city of Mosul by conducting a survey questionnaire.
3. Analysis of the reasons by taking the perceptions of the three main parties, which are the owners, contractors and consultants.
4. Determine the relative importance of all potential delays and provide tables and lists arranged from the first ten reasons for delay according to the opinions of the main parties participating in the field survey.

The results of the study will provide a lot of benefits for private and public construction projects in the city of Mosul by reducing the delay for specialists to realize the reasons that lead to the delay and taking the necessary measures to avoid exceeding the schedule of construction projects.

1.4 Scope of The Study

The research will be limited to the implemented construction projects that have been delayed in the city of Mosul, Iraq, and the study will focus on the parties involved in the implementation of the projects from contractors, consultants, owners and workers in the city of Mosul because of its proximity to the researcher, which facilitates the distribution and retrieval of questionnaires.

The main reasons for selecting Mosul as a case study are the construction and consulting firm's accessibility, familiarity with the country's culture and ethnicity, ease of collection of data, familiarity with the construction industry's operating system, and the desire to produce a high-quality study that will aid in addressing the issue of delay factors in Mosul's construction industries.

Within the limits of the study, previous sources and research on the causes for delaying construction projects were reviewed, then understood the concept of delay and explained the types of delay, as well as the main reasons for delays in projects around the world, which made the study more useful and based on the results and conclusions obtained recommendations were made for future studies. When looking for information in the literature, various keywords were selected, including construction delay, schedule delays, delay in project delivery, the impact of delay, delay mitigation measures, and construction projects in Iraq, among others.

2. LITERATURE REVIEW

2.1 Introduction

In this part of the chapter the literature review on construction project management, its characteristics, objectives, quality, and life cycle are explained. It also includes the concept, types and causes for delays in building projects in various countries of the world and its effects on the time of completion of the project.

Where local construction projects in Iraq suffer from delays in implementation that lead to not completing the project on time. To minimize or avoid delays, the actual reasons for it must be identified.

2.2 Effective Project Management

2.2.1 The definition of project

A project is an individual or cooperative project that is carefully planned to achieve a particular goal (Al-turfi, 2017).

According to project management institute a project is defined as the time it takes to produce a unique service or product (Heagney, 2012; PMI, 2017) .

The project is also defined as a series of unique, complex and related activities with a single objective or purpose that must be completed at a specified time, within budgetary limits and according to specifications (Wysocki and McGary, 2003).

The project in the ICOM model is the process of converting different types of inputs into specific outputs within a set of constraints using a different scope to complete and terminate the project, as shown in figure 2.1 (Busneina, 2018).

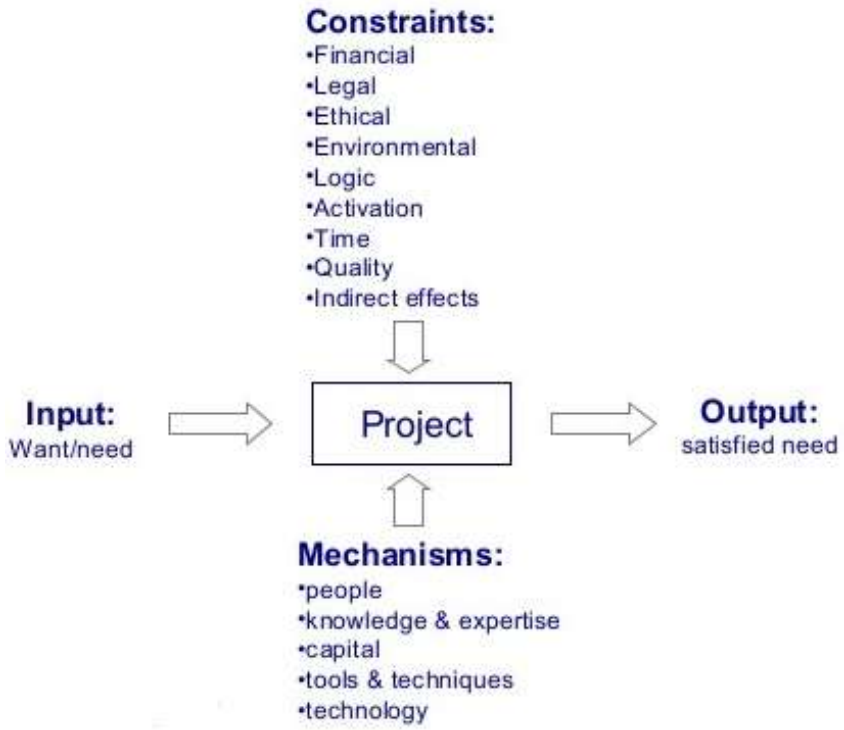

Figure 2.1: The Project in The ICOM Model

Source: (Busneina, 2018).

The project consists of a set of interrelated and restricted business activities, a budget and a schedule for the delivery of the capital assets required to achieve the strategic objectives of the company (Fleming, 2009).

2.2.2 The definition of project management

Project management is the administrative process of applying skills, tools, and techniques to all project activities to complete the project and achieve it by completing management processes (initiation, planning, implementation, monitoring, control and closure) (Heagney, 2012).

Project management is also defining with a set of acceptable management-based methods used to plan and control work activities to reach the desired final on time within the budget and in accordance with specifications (Wysocki and McGary, 2003).

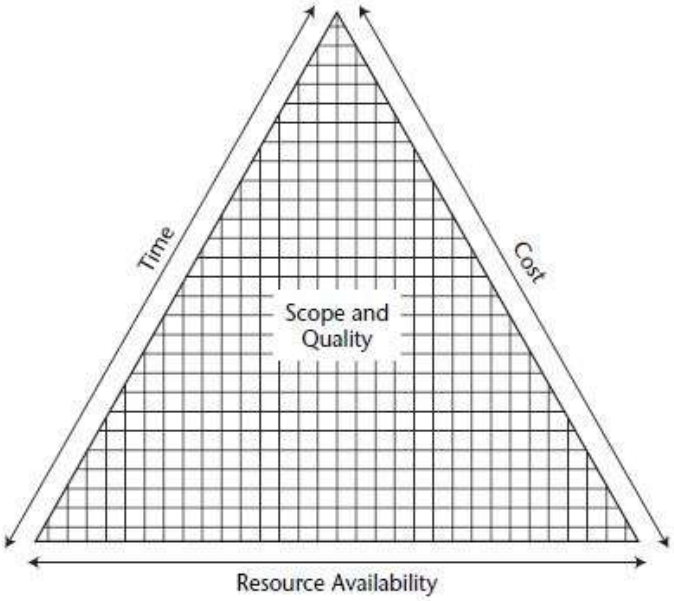

Figure 2.2: Over View Of Project Management

Source: (Wysocki And Mcgary, 2003).

Figure 2.2 Shows that project management controls the main elements according to the availability of information that achieves the project objectives most effectively. Means the use of resources in a particular activity within the constraints of time, cost, performance and good relations between the parties to the project.(Wiley, 2003; Najmi, 2011).

There are many definitions of project management, but the Knowledge Body for Project Management defined it as applying knowledge, skills, tools and techniques to project activities to provide for the needs and expectations of project owners (Najmi, 2011).

2.2.3 Characteristics of the project

Each project differs in terms of the diversity of activities in each company or organization, where the characteristics of the project can be expressed as follows:

2.2.3.1 Objectives

Objectives are the main characteristics of the project. Each project starts based on project objectives that include time, budget, quantity and quality (Wysocki and McGary, 2003).

Also, attention must be paid to these objectives by the management, because poor interest will lead the project to failure (Busneina, 2018). All project tasks are

implementation during the building phase to achieve the objectives required at the end of the project.

2.2.3.2 Purpose

The constant purpose of the project is to carry out all project tasks or activities within the main objectives of the project (Busneina, 2018).

2.2.3.3 Life cycle

It is known as the project path and also the period during which project activities in each phase have moved to the closure of the project. The end of the project, whether successful or unsuccessful is closed (Watt, 2010).

Project life cycle procedures are transitional at the beginning and end of the project where the definition of project life cycle can be used to link the project to the ongoing operations of the implementing company (Square, 2000).

2.2.3.4 Complexity

Complexity requires many interrelated tasks as well as people with different experiences and responsibilities to coordinate precision and control time, cost and performance (Stare, 2019). The project manager must have a clear view of this complexity at each stage of the project for conflict and crisis prevention (Busneina, 2018).

2.2.3.5 Uniqueness

Factors can vary from project to project because of their uniqueness (Wiley, 2003). There are no very similar construction projects.

Projects produce unique products, services or outcomes, so they are unlikely to be replicated in the same way as the same participants, there is flexibility in dealing with reality because there are so many exceptions (Busneina, 2018; Stare, 2019).

2.2.3.6 Conflict

Project managers live in a more contradictory environment than other managers. Inter-departmental projects compete for resources and individuals, and individuals have different goals and priorities. Competition can also be seen through conflicts of interest to project stakeholders (client, enterprise, project team and public) (Stare, 2019).

2.2.3.7 Riskiness

There is a risk that the team will be surprised by many problems during the phases of the project, such as (difficulties in implementation, change and weather requirements, and influential individuals). All of this could lead to delays in projects (Stare, 2019).

2.2.4 The main goals of the project

The main project objectives are to achieve the outline required at the end of each project in three axes: cost, time, and performance (Meredith and Mantel, 2009; Kuşakcı, Ayvaz and Bejtagic, 2017). As shown in Figure 2-3, the functions of the project are related to each other and differ in each project and according to a specific time for the project. As Roumeissa, Karima and Souad (2018) points out, that time is a proxy for project performance, and together with other cost and quality factors, it represents the project's roadmap, since it has an effect on its success.

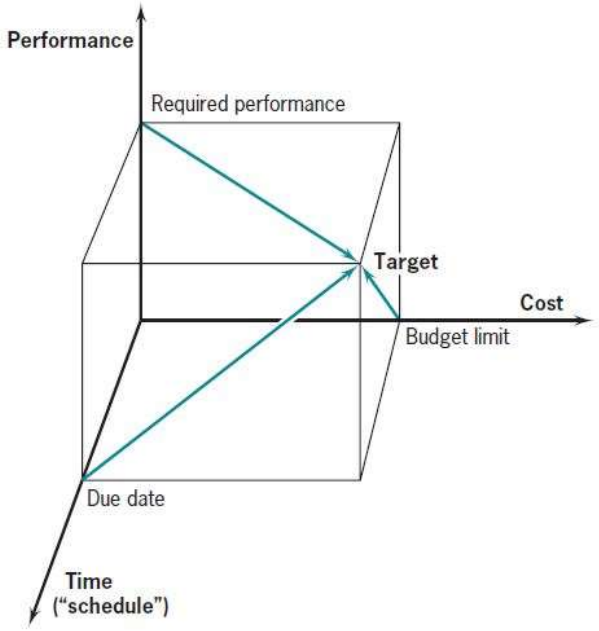

Figure 2.3: Direct Project Goals

Source: (Meredith And Mantel, 2009).

In order to achieve satisfactory achievement at the end of the construction project, the project sets out very clearly the objectives planned in the initial phase, which is the most important section of project management (Muhammad, 2020).

The objectives of project management are to create an organization that works as a team within the estimated budget and time specified.

The team works in the requirements of high quality and satisfactory to all parties to the project as contractor, consultant and employer. (Zerin and Joy, 2020).

- Time

  Complete the project in time is a key criterion for successful project management.

  One of the main objectives of a construction project is to identify delays because they can threaten the project. Any delay can be avoided only when there are reasons for it (Pawar and Attarde, 2015).

- Cost

  The costing of the construction project is carried out once and in predefined in the project. Effective project management requires a good understanding of the techniques in preparing the project budget and controlling the costs, because managing the cost of a poor project is one way to derail the project (PMI, 2017).

- Performance

  The objective of the work performance at the project implementation stages is to conform to the required specifications for acceptance of the final work. Quality-specific work performance measures are defined at the start of the project as part of the project management plan (PMI, 2017).

During the implementation of a project, there must be a relationship between the objectives of the project with each other (time, cost and performance). For example, if the time frame for the completion of the project is reduced, additional costs will be required and the budget for the completion of the project will be increased. If there is no possibility to increase the budget, the project is likely to be underperformed and in poor quality. (PMI, 2017; Busneina, 2018).

2.2.5 Project Life Cycle

According to institute of project management the life cycle of a project is the sequential or overlapping phases through which the project passes from inception to completion (PMI, 2017).

The most common stages of the project are four stages in project life cycle. As in some articles and books, there are more than four stages.

In this research, we will mention four phases in the life of a construction project:

1. Project Start-Up

   The first phase of project life cycle is to clarify the main idea of the project. Determining the purpose of the project and to assess its expected usefulness in terms of carefully studying the feasibility of the project
   and also determining the scope of the project in conjunction with budget. Moreover, a project manager must be appointed at this stage (Watt, 2010; Stare, 2019).

2. Project Planning and Organization

   The phase by which the project manager, the task team and the engineers, plan the steps that are needed to determine the project's tasks for establishing a work line that includes activities, schedule, costs, equipment and resources, and the organization of the project through relationships and responsibilities. This phase is considered important for determining and ways to deal with problems faced by the project in its implementation phase in order to reduce the incidence of the problem, causing delays in project delivery (Watt, 2010; Stare, 2019).

3. Work or Implementation of the Project

   The most important phase in the project life cycle is the implementation of the tasks and activities agreed upon at the planning stage and proceeding according to the work plan and schedule.

   In order for this stage to be more successful, work must be constantly monitored to avoid delays during implementation, so the project must be restored to the original workflow when it departs from the project schedule (Watt, 2010; Stare, 2019).

4. Project Closure or Termination

   The final phase of project life cycle is the completion phase. Project closed involves termination of contracts, dissolution of project team and release of resources. Project manager finishes documentation, writes the final project report and delivers it to all stakeholders (Watt, 2010; Stare, 2019).

2.2.6 Factors affecting construction project implementation

Where the researcher took Busneina (2018) the external and internal factors affecting the project that directly support the implementation of the project and are also a reason for delaying the completion of the project. Factors include:

1. External factors: outside the control of the project.

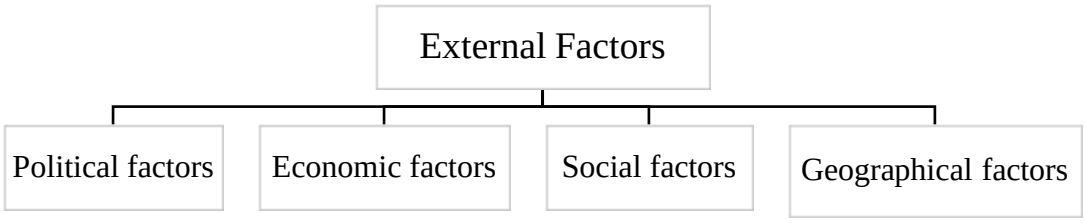

Figure 2.4: External Factors Affecting Construction Project

Source: (Busneina, 2018).

Political factors such as wars, battles and security disturbances. Economic factors such as increased debts. Social factors such as race and religion. Geographical factors such as climatic conditions and rainfall.

2. Internal factors: factors caused by the executing company from within the project

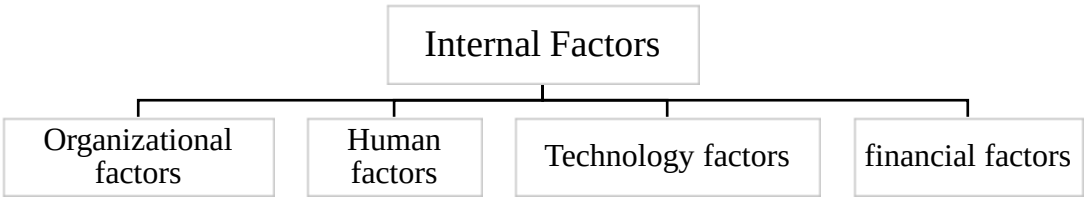

Figure 2.5: Internal Factors Affecting Construction Project

Source: (Busneina, 2018).

Organizational factors such as management, leadership and performance. Human factors such as work experience and skills. Technology factors used in the project such as equipment. Financial factors as resources for financing the project.

2.2.7 Types of construction projects

The construction project involves all the work and materials necessary for the construction and preparation of the final structure, including construction work, electrical work, mechanical work and other necessary work to complete the project.

According to Elbeltagi (2009) in his lecture notes on construction project management at Mansoura University in Egypt, there are main types of construction projects including:

1. Residential Housing Construction

   One of the most common sections, as it is known, includes houses and apartments, either as building, redesigning or repairing the structure. Developers in this area are often responsible for its effective and successful construction management. Usually, residential housing is implemented by architects and civil engineers in cooperation with contractors and the party that funds it to implement all works and activities related to the project. The housing market is influenced by the country economic conditions, so high demand results in a large number of investments in residential buildings. The real estate market is a competitive market with high risks and huge gains (Elbeltagi, 2009).

2. Institutional and Commercial Building Construction

   Construction of all buildings that are used for commercial purposes. Commercial and institutional construction includes many different types of projects, such as the construction of hospitals, health clinics, sports facilities, warehouses, large shopping centers, schools, universities, office skyscrapers and hotels. Specialized architects are often involved in designing this type of building in conjunction with the relevant contractors. Because of the high construction costs and the many complications of construction in this type of building, which take a long time to implement and terminate, there is little market access and few competitors compared to housing construction.

3. Specialized Industrial Construction

   A special type of building that requires a high level of specialization, skill and technological complexity in structure planning in terms of design and construction.

   These large projects include steel plants, nuclear processing plants, oil refineries and chemical processing plants, as well as specialized industrial construction projects that require substantial capital.

   This type is considered as a huge project for industrial or profitable companies, as it is closely related to the economic situation, so you need to take the right decision that leads to the completion of the construction, the completion of the project in the correct manner and the long-term Forecasting during the work duration.

4. Infrastructure and Heavy Construction

These include highways, streets, bridges, tunnels, dams, sewage systems, and pipelines. Usually, these projects are publicly owned and are financed from taxes or bonds. Infrastructure and heavy construction projects require a variety of skills and the intensity of workers and engineers with experience and high specialization.

2.3 Delays in Construction Projects

Delays are one of the most common problems facing construction companies at the present time. They can cause many negative effects, such as increased costs, disputes between the owner and the contractor, and loss of revenue. Construction delays are generally excessive the timely completion of the construction project is profitable for all parties involved in the project (Alghrairi, 2017).

Delays in most construction projects in Iraq occur at the planning stage and during the implementation phase. The review of the literature is based on factors that negatively affect the construction project completion schedule in different countries.

2.3.1 The concept of delay

Delay can be defined as time overrun and slowdown of work contrary to what was agreed in the contract to deliver the project where the word delay means that the project is not stopped altogether (Al-taie, 2018). In addition, the delay can be known as the time deviations that occur in the activities in the work schedule within the project (Ercan, 2019).

Delays in construction projects can be described as the time difference in the real date of completion of the project referred to in the contract (Falqi, 2004; Busneina, 2018). According to Dinakar (2014) delay in the construction project could be defined as exceeding the completion time of the project compared to the schedule established at the planning phase (Dinakar, 2014). And according to study Bekr (2015) The time during which part of the construction project work was extended due to unforeseen circumstances delayed the completion of the project (Bekr, 2015). It is also known as the timing difference between the project completion date and the actual date agreed upon between the concerned (Al-hadithi, 2020).

2.3.2 Types of delays

In the literature it could founda variety of issues related to construction delays in previous studies, The researcher Baha (2020) divided the delays into four main sections critical or none-critical, excusable, or none-excusable, Compensable or none-compensable and concurrent or none-concurrent. These mentioned delays are presented in figure 2.6

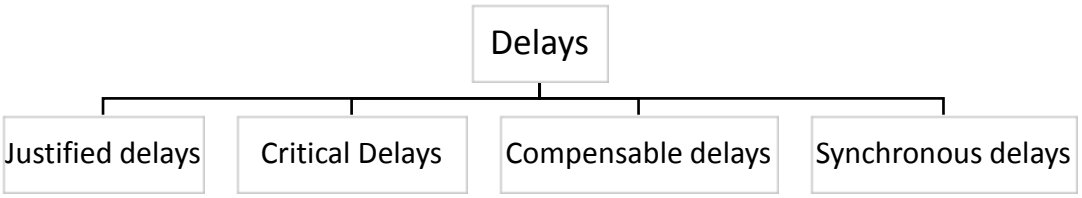

Figure 2.6: Type of Delays in The Construction Project

Source: (Baha, 2020).

2.3.2.1 Justified delays

According to the study which was done by Sumaiyya and Khare (2016) recalls that a justified delay is an activity outside the control of the contractor and is unexpected to get, such delays being called "acts of God" (Alaghbari *et al.*, 2007) , no particular party is liable. An example is a flood, a fire, or a change in construction (Baha, 2020).

Unjustified delays are caused by the contractor or suppliers of materials without reason from the owner (Alaghbari *et al.*, 2007; Hamzah *et al.*, 2011). The customer is entitled to compensation either lost time through expediting work or money compensation (Sumaiyya and Khare, 2016). Therefore, unjustified delays result in the contractor not being given money or overtime. An example of this is faulty manufacturing for the contractor or delayed performance of either suppliers or contractors (Baha, 2020).

2.3.2.2 Critical delays

Delays resulting in the extension of the completion date of the construction project, which includes a deviation from the project route, which is known as critical and also affects subsequent activities.

Non-critical delays can be described as delays that do not extend the project's completion date, i.e., the contractor is not entitled to extend the time but can recover the money due to additional delay costs (Jafar, 2010).

Also, according to Baha (2020) that the activities that directly affect the project completion date are called critical delays, and the activities that do not affect the project completion or closing date are non-critical delays such as schedule of the contractor, project limitations as money and classification of stages according to contracts.

In general, the overall schedule of the project must has a decisive impact unless the other effects of the noncritical activity become critical later, so methods related to the critical path of scheduling must be used and these delays avoided (Jafar, 2010).

2.3.2.3 Compensable delays

Compensable delays caused by the owner or his agents (Alaghbari *et al.*, 2007; Tumi, Omran and Pakir, 2009). The most common example is insufficient delivery of maps and specifications from the architect. The contractor is also entitled to additional time or funds (Sumaiyya and Khare, 2016). Resulting in an extension of schedule and loss money for the owner.

According to Tumi et al (2009), non-compensable delays are also caused by accidents or other parties beyond the control of both the owner and the contractor, for example, fires, weather, or political actions by the government in this case, the contractor is usually entitled to extend the time, but without damage to all parties. This kind of delay is like a justified delay.

2.3.2.4 Synchronous delays

The word synchronous means that it occurs in the same period of time (Baha, 2020). And in the construction synchronous delays are the situation that makes more than one factor at the same time or at overlapping periods in the schedule to delay the project (Alaghbari *et al.*, 2007).

Also, according to a study to Sumaiyya and Khare (2016) that Synchronous delays occur when the same delays or problems that affect the critical activity of the project are repeatedly.

In general, the conditions for synchronous delays are occurring in the same time period and it has the ability to change the total project duration independently (Baha, 2020).

2.3.3 Causes of delays

There are many different causes that affect the date of completion of the construction project. The causes Different from one study to another depending on the location and nature of the project. The main factors that expose the project to delays need to be understood because it helps to identify problems encountered by the project during the planning or implementation process. In table 2.1, the researcher was able to obtain previous studies identifying reasons for delays in the completion time of construction projects in various countries around the world.

Table 2.1: Causes for Delays in Different Countries

The Authors	Country	Causes of Delays
(Assaf and Al-Hejji, 2006)	Saudi Arabia	- Changes made by the owner during construction - Delay in payments - Ineffective planning and scheduling by the contractor - Poor site management and supervision by the contractor - Difficulties with financing by the contractor and labor shortage.
(Acharya, Im and Lee, 2006)	Korea	- Public interruptions - Site conditions - Poor construction site - Poor planning and scheduling - Design mistakes
(Sweis *et al.*, 2007)	Jordan	- Financial difficulties of the contractor - Poor planning and scheduling by the contractor - Change orders by the owner - Lack of skilled manpower - Lack of equipment and machines
(Ren, Atout and Jones, 2008)	Dubai	- The unique culture of the people - High Architectural Designs - High quality requirements - Shortage of workers - International construction teams
(Abd El-Razek, Bassioni and Mobarak, 2008)	Egypt	- Funding by the contractor during the implementation phases - Delay by the owner to pay the contractor - Design changes during building

Table 2.1: Causes for Delays in Different Countries (Cont.)

(Tumi, Omran and Pakir, 2009)	Libya	- The planning is incorrect - lack of effective communication - Design errors - Slow decision-making and narrow financial issues - Shortage of materials
(Fugar and Agyakwah-Baah, 2010)	Ghana	- Poor site management and professional management - Fluctuation in the price of building materials - Lack of materials - Reducing project completion time by the contractor - Late honoring certificates - Poor supervision - Difficulty obtaining bank credit - Reducing project costs and complexity
(Haseeb *et al.*, 2011)	Pakistan	- Delay in payments to the supplier and subcontractor - Poor site management - Natural disasters - Unexpected site conditions - Quality and shortage of materials - Delays caused by subcontractors, - Changes in graphics - Inappropriate equipment and outdated technology
(Perera and Halwatura, 2012)	Sri Lanka	- Bad weather conditions - Financial difficulties on the part of the contractor - shortage of worker - Rules of Road Authorities - Delay in the contractors' work
(Kazaz, Ulubeyli and Tuncbilekli, 2012)	Turkey	- Changes in design during construction - Delaying payment to the concerned authorities - Poor cash flow - Financial problems of the contractor - Poor Worker productivity
(Hasan, A Suliman and Al Malki, 2014)	Bahrain	- Lack of planning, worker and materials on the part of a contractor - Delay in making the decision for the owner - Owner financial problems - Lack of experience consultants

Table 2.1: Causes for Delays in Different Countries (Cont.)

(Othuman Mydin *et al.*, 2014)	Malaysia	- Weather conditions and poor site conditions - Poor management of the site by the contractor with construction errors - Lack of experience of the site consultant, with not completing the required documents - The financial problems of the contractor and lack of coordination with other parties - Contract modifications by the customer - Delay in approval of major changes in scope of work by the consultant
(Soliman, 2014)	Kuwait	- Delay in submitting documents by the consultant - Owner management is inappropriate - Lack of experience for contractor staff - Financial problems of the contractor and the owner - Inconsistency between the contractor and the consultant - Not planning before starting the project
(Mohamed, 2015)	Sudan	- Changes in prices of building materials - Lack of materials - Estimated schedule and cost is inaccurate - Errors during implementation and design changes - Delay in payment to contractors - Compensation and poor planning
(Shiri, 2015)	Zimbabwe	- Financial problems from the client - Changes made by the customer - Financial difficulties by the contractor - Estimating wrong time with late payment
(Islam *et al.*, 2015)	Bangladesh	- Little experience of construction manager - Lack of owner financing - Project site limitations - Incorrect planning and scheduling - Shortage of skilled workers and excessive contractor workload - Failure to provide adequate management by both the contractor and the owner - Contractor cash flow problem during construction - Building material prices escalate

Table 2.1: Causes for Delays in Different Countries (Cont.)

(Emam, Farrell and Abdelaal, 2015)	Qatar	- Delayed response from agencies - Change in designs during implementation - Poor planning and scheduling - Ineffective control - changes in project scope
(Erick *et al.*, 2016)	Bia West	- Poor planning and scheduling by the contractor - Bad payment by the customer - Low skills and experience of contractors - Changes by the customer
(Sumaiyya and Khare, 2016)	India	- Delay in payment to the contractor - Poor project management and information lag - Compensation issues - Design changes - Worker strikes.
(Koshe and Jha, 2016)	Ethiopia	- Poor financing on the part of the contractor - Increasing the price of building materials - Poor planning and scheduling of the project - Delays in payments for completed work - Lack of skilled professionals - Lack of labor saving - Low labor productivity - Delay in the delivery of materials - The workers are not qualified - Survey and data collection are not eligible to start the project
(Feyzbakhsh, Telvari and Lork, 2017)	Iran	- Failure of the owner to pay the contractor or advance payment for the work - Delayed obtaining of necessary permissions by the owner - Uncertainty by the owner - Weakness poor planning and supervision by consulting engineers
(Al-taie, 2018)	Iraq	- Weakness of contractor administrative staff - Delays in approval of schemes, design errors and inadequate details of schemes - Corruption of the consultant and their absence on the site - Weak understanding with the staff involved in the project - Poor site management and lack of equipment at the site

Table 2.1: Causes for Delays in Different Countries (Cont.)

(Roumeissa, Karima and Souad, 2018)	Algeria	- Insufficient of previous studies - Failure to provide a schedule for project activities - Lack of planning experience in project management - Decisions and organizational causes - Poor risk management and human resources management
(Raut, Gohatre and Nistane, 2018)	India	- Poor project management and labor unrest - Design changes - The effect of weather conditions - Delay by contractors - Compensation issues - Delay in obtaining information
(Bajjou and Chafi, 2018)	Morocco	- Delay in payment - Lack of experience of the staff - Waste management is very poor - Unrealistic contract term - Re-work for reasons to construction errors - Delay in obtaining permits by government agencies - Poor planning and scheduling - Lack of teamwork - Failure to provide a skilled workforce
(Hayat, 2020)	Pakistan	- Shortage of construction equipment - Lack of material preparation - Poor site management - Weak contractor experience and lack of skilled workers - Changes made by the owner during construction - Delay in payment to contractors - Unexpected weather condition - Site accidents due to negligence - Poor planning and schedule - Government approvals

Previous studies show that delays in projects depend on the general situation of a State or country such as the economy and security. Some reasons differ in the type and nature of the project, such as road projects and Housing projects.

According to Baha (2020) study in his thesis recalled that developed countries with an excellent economy and a high level of safety had fewer delays than developing countries with economic difficulties.

Most common and recurrent causes in most construction projects are summarized as poor management of the site from the contractor; financial problems of the owner or contractor; changes in execution by the owner; poor communication between project parties; material price fluctuations; delays by the legal authorities and the highest levels of the country; poor decision-making; delay in the work of subcontractors; poor consulting and supervision and reduced project cost etc.

2.4 Effects of Delays in Construction Projects

The effect of the delay on the construction project is that the causes for the delay were not effectively identified during the planning or implementation period (Ercan, 2019). Whereas one of the greatest reasons for the desire to identify the causes of delays in construction projects is to avoid or minimize their effects on the project (UÇMAZBAŞ, 2016). The effect of the delay is different for all parties to the project. According to the owner, the effect is to waste time and money because of the loss of revenue, according to the contractor, causing delay paying the cost of equipment and daily wages to the employees for the duration of the delay, according to the users, the delay leads to not using the buildings and facilities on time as planned to her.

According to the study conducted in Libya by Kuşakcı et al. (2017) on the causes and effects of delays in construction projects, the impacts were classified into five factors including: Cost overruns, time overruns, disputes, total abandonment and project neglect (Kuşakcı, Ayvaz and Bejtagic, 2017).

That impact of the delay on the projects could cause the construction of the provocative relationship, the rejection of the project, its problem in the financial flow and the general sense of fear around the project parties (Ahmed *et al.*, 2000).

Khair et al. (2017) also mentioned in their article about the consequences of delays in road construction projects in Sudan, such as the reduction of road quality, the complete abandonment or cancellation of the project, and major physical cuts.

All these effects lead to additional costs or time, and the high costs associated with delays in road construction cause the length of roads to decline and their annual restoration (Khair *et al.*, 2017).

According to the study which was done by Raut et al. (2018) field investigations were conducted to obtain the impact of delays on the construction of the project namely cost overruns, disputes, negative social effects and additional work.

Through the previous studies related to the effect of delays identified by the researchers, the most important effects of delays in construction projects can be identified, which are as follows: (Erick *et al.*, 2016)

1. Main effect in project adversarial relationship.
2. Time overruns.
3. Cost overruns.
4. Distrust.
5. Cash flow problems.
6. Arbitration.
7. Litigation.
8. Complete abandonment

3. FIELD SURVEY

3.1 Introduction

It is known that a delay in construction is when the project doesn't finish on time, even though the contract says it should be done by a certain date. This part of the study talks about how to find out why construction projects in Mosul are taking so long to finish. As soon as we figure out what caused the delay, we can lessen the risk of them happening again (Ghazali, 2017). The causes for the delays are depended by the nature of the location in which the building projects are being conducted, as well as the contract's provisions, which impose fines for delays that put the project at danger. As a result, the purpose of this chapter is to clarify the strategies and methodologies that will be used in the research sections. The data gathering processes as well as the selected analytic methodologies are also presented in detail.

Conducting a study and field survey for construction projects that are currently in progress and those that have been finished in Mosul provides the required information to discover the causes for the delay. According to Alghrairi (2017) study, the research strategy is the means by which the research goals are met, and research methods are divided into two categories: qualitative and quantitative research. Quantitative research describes by presenting the reasons or characteristics provided by the responders and transforming the opinions of the responders and any other variable into numbers and then graphs, whereas qualitative research describes by presenting the reasons or characteristics from the results of previous studies provided by the respondents (Shiri, 2015).

Quantitative research is used in the field survey to collect the realistic data and also study the relationships between previous research results as a qualitative approach. Thus, an understanding and perception is provided to specialists in the fields of building and construction in Mosul regarding the reasons that affect the delay of construction projects.

The findings of the field study are expected to give practical information and suggestions that will help the Mosul city construction sector grow. In this study, the researcher used two sources to acquire field survey data:

Secondary sources include: Sources obtained by the researcher from the review of literature and previous studies have included the identification of delay construction project factors.

Priority sources: Field research, which provided the researcher with direct access to construction project delay data.

3.2 The Goal of The Field Survey

To manage costs and offer resources within quality standards, develop adequate plans for the project schedule before the building project is performed. It is also well known that most construction projects fail owing to delays happening over the project's life cycle, which impacts the project's operations, resulting in litigation and conflicts (Niazai and Gidado, 2017; Haritha, 2018). As a result, project management forecasting the risks associated with the causes of delay and making the appropriate decisions during implementation guarantees that the construction project is effectively finished and the effects of delays are minimized (Tawil *et al.*, 2014; Sheena and Remmiya, 2015; Alenezi, 2020; Carvalho *et al.*, 2021; TAFESSE, 2021). Furthermore, good planning prior to the start of construction is critical for preventing delays (Multashi and Salgude, 2016; Sumaiyya and Khare, 2016; Ercan, 2019).

It is vital to notify the project participants (owner, contractor, and consultant) of the variables that create project delays and risks so that safeguards may be taken to guarantee that project activities go as planned and the project is finished on time and on budget.

The purpose of the field survey is to assist the researcher in conducting a study to discover and identify the primary and secondary causes of construction project delays in Mosul. Thus, comprehensive data on the reasons for construction project delays in Mosul city are provided, as well as ways to reduce delays by listing the most common reasons in the study's findings, which benefits the economy of a large and important segment in the field of building and construction, as well as assisting project parties and decision makers in reducing delays in future construction projects.

3.3 The Scope of The Field Survey

Because of recent construction activity after the city's rehabilitation following the war, this research was confined to building and construction projects in Mosul. Where the researcher visited prestigious projects in Mosul and learned about the different types of public and private construction projects that are being implemented, including projects that have already been completed, such as building projects, government facilities, road projects, and reconstruction and sanitation projects.

The primary aim of the field study is to attract members involved in construction projects, such as project managers, contractors, consultants, and engineers from various fields with different experiences, to obtain diverse perspectives on the subject of delay, which the researcher considers to be the most important part of the questionnaire through which the causes of delay in these construction projects are identified. Due to security concerns and differences in working conditions across cities, the remainder of Iraq cities were not included in the survey.

The researcher briefed on the construction projects in Mosul city, which are divided into three groups: the first group, funded by the Iraqi government and divided into several sections such as residential complexes, road projects, bridges, hospitals, government institutions, and infrastructure, the second group projects granted by foreign countries and located in Mosul in the form of organizations such as American UNDB, German GIZ and other countries in their role work mainly on the reconstruction of Mosul city after the end of the war From ISIS in 2017, the third group is a private projects carried out by engineering offices and companies such as commercial construction and large shopping centers.

3.4 Methodology of Field Survey

In order to demonstrate the work associated with the second chapter literature review, the researcher decided to follow the method of previous studies from various sources (previous research, reports, scientific articles, doctoral and master's letters) published and related on the subject of delays in building and construction projects. The goal of the follows of past studies in discovering the causes of construction project delays is to assist professionals comprehend all parts of the research on schedule delays and how to combat or prevent them (Haritha, 2018). Previous studies

contain a lot of discussions about delays in construction projects (Falqi, 2004; UÇMAZBAŞ, 2016). The main concern in field study is to give a wide knowledge of building projects in Mosul, as well as pertinent acceptable standards.

Previous research is reviewed by: -

1. Determining sorts of delays in building and construction projects by collecting sources.
2. Identify data on the causes of project delays in different parts of the world.
3. Discussion the results of previous studies.
4. Delay factors from previous research are compiled into a final list that will be used in this study.

Conduct a comprehensive review of the literature on the experiences of researchers specializing in studying the causes of delays in construction projects, selecting the contents of delays, assessing the most common causes, and analyzing the results by listing the critical causes of construction delays and cost overruns, as well as the effect of delays on construction projects, to avoid confusion in the research parts and provide a comprehensive understanding of the study away from uncertainty. Previous study has aided in the researcher's expansion of information about building and construction projects. After this step, all of the causes for building project delays were collated and compared to projects within Mosul city.

It was found through previous studies and research that the questionnaire was one of the best ways to get data in the field surveying quickly and cheaply, as well as improved data processing as a successful statistical analysis (Shebob, Dawood and Xu, 2011). A questionnaire may be defined as a series of questions that represent a certain notion in order to elicit information about that concept from respondents (Raiq, 2021). Thus, the questionnaire was used as a way of gathering the data necessary in the field survey by asking questions regarding delays gleaned from previous studies in order to adapt the causes affecting the timetable for construction projects in Mosul.

A preliminary experimental questionnaire was made with the goals of the study in mind. The questionnaire is a set of logical questions that are asked of participants based on their practical and scientific point of view. And light of the different factors

that cause construction projects to be delayed and the different conditions that the country is exposed to, it was important to develop the questionnaire. Determining all the reasons of delay in comparable underdeveloped nations with a situation in Mosul and listed around 120 factors that cause delays in construction projects. Experts and specialists in the field of building and construction have been interviewed about the questionnaire, so that we can look at the data we have and see if we can apply it to the situation in Mosul city. When we looked at the opinions of senior engineers who have worked on construction projects in Mosul for more than 10 years, we got a lot of positive feedback about the way the questionnaire was put together. The researcher next summarized the questionnaire and analyzed causes associated with delays that had been replicated in other studies and reformed, recognized comparable causes and classified them under a single meaning, and also removed factors that had no significant influence in this study. This is due to the simplicity with which the questionnaire can be used and the survey can be conducted effectively, since too many questions might tire respondents and lead to inaccurate responses.

The result was a total of 40 hazardous variables causing delays and failing to meet the requirements of Mosul city building and construction projects as shown below:

Table 3.1: Final Causes for The Delay Have Been Selected

No	Delay Causes	No	Delay Causes
1	Delay in laboratory tests	21	Shortage of equipment and machinery
2	Contractor’s financial problems	22	Inappropriate equipment and old technology
3	The owner’s financial problems	23	Unique culture of the people and high architectural designs
4	The fluctuation in the prices of building materials	24	slow decision-making process
5	Ineffective planning and miscalculation of project time	25	Difficulty getting bank credit
6	The owner is late in paying the dues to the contractor	26	Reduce project costs
7	Lack of commitment with the project progress schedule	27	Unpredictable site conditions
8	Poor management of the siter	28	Site accidents due to the negligence of the safety engineer
9	Absence of the consultant from the workplace	29	natural disasters

Table 3.1: Final Causes for The Delay Have Been Selected (Cont.)

No	Delay Causes	No	Delay Causes
10	Lack of experience of the contractor	30	Bad weather
11	Lack of experience workers for the project	31	Changes in the agreement and contract
12	Selling the contract to more than one contractor	32	Cause by construction agencies
13	Terrorist acts	33	Changes in project scope
14	Road and street interruptions	34	Delays in compensation cases
15	Delays in the processing of building materials	35	Workers strike
16	Poor coordination between project parties	36	Survey and data collection are not eligible to start the project
17	lack of teamwork	37	Weak management staff
18	Changes in Execution during construction	38	Delays in approval of building plans
19	Errors in design during construction	39	Insufficient details in building plans
20	Skilled Worker shortage and low productivity	40	Government approvals

The final electronic questionnaire was then created using Google platform models in both Arabic and English in order to disseminate the questionnaire in their official language region of Arabic and to make it apparent to the participants how to answer the questions quickly. After receiving clearance from the research supervisor, the questionnaire was chosen as the approach for a field survey to gather and analyze the most critical causes for building project delays in Mosul city. The electronic questionnaire is attached to Appendix A.

The following are the stages used in the field survey to identifying the causes for the delays in construction projects in Mosul city: -

The first stage: - The questionnaire is divided into two sections. The first section comprises general questions for field survey participants by inquiring about the respondent's basic information, which includes four questions to ascertain the degree of delay they faced and to ascertain the respondent's capacity to qualify him to determine the cause of the delay. Table 3.1 includes the questionnaire participants questions.

Table 3.2: The Questionnaire Participants Questions

Questionnaire participants questions	
1	Age
2	Scientific specialization
3	Scientific Degree
4	Years of Experience

The second section includes measuring the frequency of delays on a four-point Likert scale (levels of delay occurrence) by asking respondents to answer closed questions and indicating the level of occurrence of each of the reasons for delaying construction projects in Mosul. which were identified from previous studies where a total of 40 factors were a major cause and risk of delays in construction projects that have a high impact and combine the owner, consultant, contractor, equipment, designs, materials, and employment as well as external and internal factors of the site.

Also included at the end of the questionnaire is an open question that allows respondents to identify any additional reasons for the delay that were not previously mentioned in the questionnaire form. This allows users of the questionnaire to state the reason that he or she encountered during his or her working period.

The Likert scale used in this study goes from 1: Doesn't Happen to 4: Happens a lot, as seen in Table 3.2, which allows the responder on the questionnaire to categorize the risk of occurrence building and construction project delays in the city of Mosul.

Table 3.3: Likert Scale Labels Used in The Questionnaire

Degree of impact	**Code**
Doesn't Happen	D-H
Rare occurrence	R-O
Happens Sometimes	S-H
Happens a lot	L-H

It was decided to use a Likert quadruple scale so that respondents could express their opinions without having to be neutral. Because the primary goal of this study was to discover the frequency with which different delays occurred in construction projects throughout Mosul, we did not want to include a neutral option in the questionnaire because we required a specific response. As seen in Table 3.3 above, a symbol has

been introduced for each scale to make the analytical procedure in the next chapter more straightforward.

The second stage: - Initiating a field survey and data collecting by distributing a questionnaire to all parties involved in the building and construction industry randomly, in all public and private construction projects in Mosul, and the relevant authorities include manufacturers and suppliers of construction materials and accessories, as well as financiers, investors, consultants, designers, and implementation supervisors, construction and contracting companies, foreign companies and implementation offices, international organizations, and government institutions such as the Engineers Syndicate, and thus the responses of senior working professionals are taken in the Mosul municipality. Several means of distribution were utilized in the field study to guarantee rapid diffusion of the questionnaire by asking participants to complete it through email, social media, and personal interviews for two reasons, they are supply smart devices to everyone and provide Internet access.

The third stage: - Data from the questionnaire used in the field survey is evaluated using descriptive statistics, which is a type of statistics. Descriptive analysis is a crucial tool for ranking causes in order of significance as perceived or expressed by participants (Onozulike, 2016). Given the variety of analysis techniques available, it was critical to choose an advanced analysis approach that would expose the questionnaire data in a systematic, trustworthy, fast manner. Therefore, the computer was employed, and the best available method was the Statistical Package for Social Sciences (SPSS v26) (Falqi, 2004; Shebob, Dawood and Xu, 2011; Pawar and Ambure, 2015; Mohammed and Jasim, 2017; Rezaei and Jalal, 2018; Aladayleh Jameel, Ferrer Gisbert and Fuentes Bargues, 2020). Additionally, with the assistance of the (EXCEL) program for data access, the findings of the field survey may be extracted (Busneina, 2018).

The fourth stage: - Determine the essential relevance of the reasons that cause delays in Mosul building projects by asking respondents to identify the severity of the cause depending on the frequency with which it occurs. to determine the gravity of the most significant causes.

The fifth stage: - is about interpreting the results and summarizing the conclusions after statistical analysis of the questionnaire data, deciding what is important, and making suggestions for how to reduce on construction delays in the future.

4. DATA ANALYSIS AND RESULTS

4.1 Introduction

This chapter contains the results of the analysis of the information gathered via the questionnaires. The information obtained from this research was utilized to meet the study's purpose by use of a methodology, as previously discussed in the third chapter, the field survey technique as well as the technological tools that were used to evaluate the data collected through the questionnaire. It also shows the results of the questionnaires that were done with the (SPSS v26). Tables and descriptive statistics were used to show the results. Besides the Cronbach Alpha test, which shows how well the questionnaire works. Analysis of the electronic questionnaire in the (SPSS v26) program attached to Appendix B.

This part of the research is separated into three sections. The background of the participants in the questionnaire used in the field study to determine the causes for the delay is shown in the first section of the analysis. The second section of the study discusses the field survey's primary goals and the explanations given by respondents in the questionnaire. The third section of the study describes the order of the causes, their frequency, and their relevance according to the respondents' various viewpoints.

4.2 Collection of Data and Question Reaction

The field survey lasted 60 days, during which time questionnaires were distributed online to selected respondents in Mosul city, and the responses were carefully recorded and respondents were allowed to freely answer questions without feeling rushed since they had adequate time to do so. The questionnaire was distributed to the targeted people, numbering 200 persons distributed among building companies in the first place, civil and governmental construction companies, governmental and international organizations specialized in the field of construction and various fields in the construction industry, as well as implementation offices that operate within the city of Mosul and Nineveh Governorate. On 40 causes for building project delays in Mosul city, a total of 183 full and diverse replies were gathered, with partly

completed answers being eliminated from the study. The questionnaire had a response rate of 91.5%. It is deemed suitable for the analysis given the target audience. Because if the response rate is less than 40%, the findings of the field survey might be regarded of low value and skewed (Salhi and Messaoudi, 2021).

The questionnaire was then closed after it was determined that there were enough questionnaires to get valid results and that the area was big enough for the results to be believable.

4.3 Processing of Statistical Analysis

The analysis began with the researcher entering the data acquired during the field survey into a computer, where it was completely processed and with great precision. The researcher entered the data and assigned it numbers to convert the verbal responses to digital ones through the Excel program. Thereafter, all of the replies were statistically analyzed on a computer using the Statistical Package for Social Sciences (SPSS v26), which is thought to be one of the best programs for analyzing statistical evidence in sociology (Shebob, Dawood and Xu, 2011; Rezaei and Jalal, 2018).

4.4 Questionnaire Stability

The precision gauge stability is defined as the tool's ability to provide similar results if the measurement is repeated on the same individual numerous times in the same circumstances, where the tool's stability is dependent on internal consistency, which means that all of the questionnaires paragraphs are applied to the purpose of the research (Busneina, 2018).

The researcher examined Cronbach's alpha coefficient to measure stability, which is a method that many researchers in the area of building and construction and other disciplines have advised. This factor is concerned with the internal consistency test of the questionnaire paragraphs with each other and with all of the paragraphs in general, which is used to establish the credibility and reliability of the measurements in the field survey (Akadiri, 2011).

Most of the time, the reliability factor varies from 0 to 1 when evaluating the questionnaire concordance with the data collected (Rehman, 2015). The

questionnaire is regarded authenticated if the result of Cronbach's alpha coefficient is greater than or equal to 70% (Mohammed and Jasim, 2017). In other words, if Cronbach's alpha is near to 1, it already indicates that the criteria in the questionnaire are reliable (Akadiri, 2011; Mohammed and Jasim, 2017).

Cronbach's alpha coefficient in this study was calculated using the Statistical Package for Social Sciences (SPSS v.26) program, and it reached 88.5% as displayed in the table below: Cronbach's alpha coefficient is attached in Appendix B.

Table 4.1: Cronbach's Alpha in Questionnaire

Reliability Statistics	
Cronbach's Alpha	N of Items
0.885	44

The preceding table shows a high Cronbach Alpha coefficient, which is considered a very good percentage, indicating that all questions and internal consistency in the questionnaire were correctly answered. The results of the analysis have established a high level of credibility and questions were reliable., and the questionnaire is now ready for analysis.

4.5 Questionnaire Analysis

4.5.1 Respondents to the field research

4.5.1.1 In terms of age

Among the 183 people who filled out the questionnaire, 120 people were identified, 65.6% of whom were between the ages of 25 and 35, as shown in Table 4.2. There were also 31 people, 16.9% of whom were between the ages of 35 and 45, We have learned that the majority of those who have taken part in the reconstruction of Mosul are young individuals who have had firsthand experience with current construction projects. 19 people, 10.4%, are between the ages of 45 and 55.

Only 13 people, 7.1%, are over 55 which represent the smallest proportion This is due to the fact that they are not on the construction site and have been in their office multiple times when they were visited.

Table 4.2: Ages of Respondents in the Questionnaire, Frequency

Ages	Frequency	Percent
25-35	120	65.6
35-45	31	16.9
45-55	19	10.4
more than 55	13	7.1
Total	183	100.0

4.5.1.2 In terms of profession.

Fortunately, 94 people, 51.4% of those who responded were working on building projects in Mosul are civil engineers, while 13.1% are mechanical engineers, equal to 24 mechanical engineers, 15 architects, comparable to 8.2%, and 9 electrical engineers. The opinions of different non-engineering professions, such as contractors, labor, mechanical technicians, and construction technicians, were also obtained from the project parties, accounting for 22.4% percent, 41 people. Table 4.3 shows the results.

Table 4.3: The Professions of Respondents in the Questionnaire, Frequency

Specialization	Frequency	Percent
Civil	94	51.4
Architectural	15	8.2
Mechanical	24	13.1
Electrical	9	4.9
Different Professions	41	22.4
Total	183	100.0

4.5.1.3 In terms of their educational background

The student’s opinions were not included in the survey since they lacked appropriate expertise in the area of building and construction. According to the educational backgrounds of the 183 respondents in the questionnaire, bachelor's degree holders made up the largest proportion of those who answered the questionnaire 70.5%, with a total of 129 persons participating. Those with a master's degree account for 19.7%, while those with a doctoral degree account for 9.8%. Shown in Table 4.4.

Table 4.4: Academic Qualifications of Questionnaire Participants, Frequency

Degree	Frequency	Percent
Bachelor	129	70.5
Master	36	19.7
Doctorate	18	9.8
Total	183	100.0

4.5.1.4 In terms of professional experience

According to the field survey participants' professional experience, 101 people had less than 10 years of professional experience, representing 55.2 percent of those who took part, 32 people represented by 17.5 percent who had professional experience of 10–15 years, and 22 people represented by 12 percent who had professional experience of 15–25 years. Finally, 28 people, or 15.3%, had more than 20 years of professional experience. The vast majority of those who took part in our poll were highly experienced experts from the construction business. This demonstrates that the outcomes we will achieve will be legitimate.

Table 4.5: Respondents Professional Experiences in the Questionnaire, Frequency

Length	Frequency	Percent
<10	101	55.2
10-15	32	17.5
15-20	22	12.0
>20	28	15.3
Total	183	100.0

4.5.2 Detecting delays in Mosul building and construction projects

The second section of the questionnaire aims to elucidate the factors that contribute to the delay in the completion of building projects in Mosul, by conducting an analysis of each of the questionnaire's 40 questions using data acquired during the field survey. The study uses descriptive statistics to display the findings as reported by the questionnaire respondents.

Equations (3.1) and (3.2) are used to compute the mean score and standard deviation (Mohammed and Jasim, 2017). To accomplish this research on the causes for the delay of the building project in Mosul, the degrees of frequency of occurrence for each delay factor are determined using the SPSS program. Table 4.6 shows the results.

$$M = \left(\sum_{i=1}^{k} x_i \times f_i \right) \Big/ n \qquad \textbf{(4.1)}$$

$$S.D = \left[\left(\sum_{i=1}^{k} \left(x_i - M \right)^2 \times f_i \right) \Big/ \left(\sum_{i=1}^{k} f_i \right) \right]^{1/2} \qquad \textbf{(4.2)}$$

The symbols in this case indicate, M: Mean, S.D: Standard Deviation, xi: Especially Weight Value, fi : Frequency count, and n: Total number of responses.

Table 4.6: Delays in Mosul Construction Projects, According to Responders

Descriptive Statistics							
No	**Factors delaying construction project completion**	**Frequency**				**M**	**S.D**
		L-H	S-H	R-O	D-H		
1	Delay in laboratory tests	61	83	24	15	3.038	0.892
2	Contractor's financial problems	156	23	2	2	3.820	0.486
3	The owner's financial problems	108	67	6	2	3.536	0.618
4	The fluctuation in the prices of building materials	76	86	14	7	3.262	0.761
5	Ineffective planning and miscalculation of project time	117	46	13	7	3.492	0.791
6	The owner is late in paying the dues to the contractor	100	64	12	7	3.404	0.778
7	Lack of commitment with the project progress schedule	115	48	17	3	3.503	0.733
8	Poor management of the siter	96	59	14	14	3.295	0.908
9	Absence of the consultant from the workplace	71	68	26	18	3.049	0.962
10	Lack of experience of the contractor	89	60	19	15	3.219	0.935
11	Lack of experience workers for the project	69	75	25	14	3.087	0.904
12	Selling the contract to more than one contractor	121	41	10	11	3.486	0.851
13	Terrorist acts	63	63	37	20	2.923	0.992
14	Road and street interruptions	63	66	31	23	2.923	1.008
15	Delays in the processing of building materials	46	92	27	18	2.907	0.888
16	Poor coordination between project parties	78	79	21	5	3.257	0.766
17	lack of teamwork	57	65	32	29	2.820	1.046
18	Changes in Execution during construction	63	85	22	13	3.082	0.864
19	Errors in design during construction	64	81	25	13	3.071	0.877
20	Skilled Worker shortage and low productivity	85	59	23	16	3.164	0.958

Table 4.6: Delays in Mosul Construction Projects, According to Responders (Cont.)

Descriptive Statistics							
No	**Factors delaying construction project completion**	**Frequency**				**M**	**S.D**
		L-H	S-H	R-O	D-H		
21	Shortage of equipment and machinery	50	84	25	24	2.874	0.961
22	Inappropriate equipment and old technology	102	47	18	16	3.284	0.964
23	Unique culture of the people and high architectural designs	29	67	37	50	2.410	1.054
24	slow decision-making process	74	70	17	22	3.071	0.989
25	Difficulty getting bank credit	74	73	16	20	3.098	0.961
26	Reduce project costs	39	75	31	38	2.628	1.040
27	Unpredictable site conditions	52	71	40	20	2.847	0.960
28	Site accidents due to the negligence of the safety engineer	56	71	35	21	2.885	0.974
29	natural disasters	7	49	60	67	1.978	0.889
30	Bad weather	19	81	54	29	2.492	0.882
31	Changes in the agreement and contract	54	78	25	26	2.874	0.995
32	Cause by construction agencies	25	80	32	46	2.459	1.015
33	Changes in project scope	23	90	36	34	2.557	0.935
34	Delays in compensation cases	66	70	22	25	2.967	1.016
35	Workers strike	9	41	52	81	1.880	0.924
36	Survey and data collection are not eligible to start the project	42	71	37	33	2.667	1.024
37	Weak management staff	65	78	20	20	3.027	0.952
38	Delays in approval of building plans	91	67	17	8	3.317	0.817
39	Insufficient details in building plans	69	75	26	13	3.093	0.894
40	Government approvals	115	49	11	8	3.481	0.797

The respondent's opinions on the frequency of occurrence of the reasons of delays in building projects in the city of Mosul are shown in the table above, and the respondent identified the most severe cause of occurrence on a Likert scale as the most serious cause of occurrence. The descriptive analysis that was done with SPSS v26 Statistics came up with the arithmetic mean, standard deviations, and the frequency of each of the reasons for the delay. The variation or dispersion between recurring integers is measured by the standard deviation. The more common the cause, the lower the standard deviation value, whereas the less frequent the cause, the higher the standard deviation value. Also, the arithmetic mean is calculated by adding the numbers together and then dividing by the total number of respondents.

The greater the value of the arithmetic mean compared to other reasons in terms of the severity of the occurrence, the more frequent the cause. We conclude that the standard deviation and the arithmetic mean have an indirect connection, with the standard deviation serving as a measure of variance in a collection of data presented from the arithmetic mean.

According to this study, the lowest standard deviation obtained was 0.486, which at the same time is the highest arithmetic mean of 3.820, representing the financial difficulties of the contractor, followed by the financial difficulties of the owner, which obtained the second lowest standard deviation of 0.618, with an arithmetic mean equal to 3.536. The fact that this component has a low standard deviation and a high arithmetic mean indicates that the responder is certain that the financial stalemate is the primary cause for the construction delay in the city of Mosul.

Compared with the highest value of the standard deviation obtained, 1.054, and with an arithmetic mean equal to 2.41 for the unique culture of the people and high architectural designs. The standard deviation for this reason indicates the high dispersion obtained compared to the arithmetic mean of 2.41, note that there is a lower arithmetic mean, which is 1.978 for the factor of natural disasters and 1.88 for the factor of worker strikes. As a consequence, when categorizing delays in construction projects, the standard deviation and the dispersion between recurring values cannot be relied upon; instead, the arithmetic mean should be used in order to get more accurate conclusions based on the frequency of occurrence.

Using the open question framework, we received an additional 58 responses related to construction projects in Mosul, as well as 125 respondents who did not provide an additional response. It became clear that the reasons outlined in the questionnaire were appropriate for the purpose for which it was created. In total, 35 of the 58 responses concerned financial and administrative corruption within government institutions, a significant weakness in coordination between ministries in Mosul city, as well as illegal taxes collected outside of government control that caused building and construction projects to be delayed or cancelled entirely.

The remaining responses are generally determined by the project to which the responders were subjected, and include things like failure to hand over the project to specialists and expertise people, delays in obtaining a building permit, failure to

comply with technical specifications, loss of censorship over the construction project, repeated thefts, and contractors not qualified to build a huge construction project.

4.5.3 Arranging the reasons of construction delays in Mosul

After disclosing the responder's perspectives on the causes for delaying construction projects in Mosul, this section of the study discusses the organization of the statistical result of the questionnaire data according to the degree of risk of its occurrence. Although we may order the causes according to their mean and standard deviation, this is not the most effective method of ranking the data according to its relevance (Onozulike, 2016; Baha, 2020). As a result, the relative importance index (RII) is used to apply and rate the relevance of each factor that contributes to building project delays.

The Relative Importance Index (RII) approach is used to provide a quantitative dimension to each reason for the delay in order to facilitate comparison with the rank of other causes observed by participants (Sarıkaya, 2010; Abu Hassan, 2016; Ogunde *et al.*, 2017; Sivaprakasam, Dinesh and Jayashree, 2017).

Where the relative importance index approach was adopted by numerous researchers in the field of building and construction, such as Emam, Farrell and Abdelaal (2015), Pawar and Ambure (2015), Sheena and Remmiya (2015), Bajjou and Chafi (2018), Khan (2018), Alenezi (2020), Baha (2020), Raiq (2021) and Salhi and Messaoudi (2021).

As a consequence, the relative importance index (RII) approach is used to illustrate how significant each factor was for delaying construction projects in order to explain the final findings of the field survey conducted in the city.

According to what has been said earlier, by evaluating the risk of each cause of delay on a four-point Likert scale for each factor, it was accepted and translated into relative importance indices (RII) as follows: 4 = Doesn't Happen, 3 = Rare occurrence, 2 = Happens Sometimes, 1 = Happens a lot. RII is calculated using the following equation:

$$RII = \frac{\sum w}{A \times N} \quad \textbf{(4.3)}$$

The RII value goes from 0 to 1 (0 not inclusive), with a greater value indicating that the cause occurs more frequently than others (Sarıkaya, 2010). In addition, it presents a risk to building projects.

Were:

W: represents the weighting assigned to each element by the field survey participants (ranging from 1 to 4).

A: the most significant weight (i.e., 4 in this case).

N: the total number of responses received. (i.e., 183)

Table 4.7: Classifying Delays Depending on their Riskiness of the Occurrence

No	Factors delaying construction project completion	RII	Degree of cause
1	Contractor's financial problems	0.955	1
2	The owner's financial problems	0.884	2
3	Lack of commitment with the project progress schedule	0.876	3
4	Ineffective planning and miscalculation of project time	0.873	4
5	Selling the contract to more than one contractor	0.872	5
6	Government approvals	0.870	6
7	The owner is late in paying the dues to the contractor	0.851	7
8	Delays in approval of building plans	0.829	8
9	Poor management of the siter	0.824	9
10	Inappropriate equipment and old technology	0.821	10
11	The fluctuation in the prices of building materials	0.816	11
12	Poor coordination between project parties	0.814	12
13	Lack of experience of the contractor	0.805	13
14	Skilled Worker shortage and low productivity	0.791	14
15	Difficulty getting bank credit	0.775	15
16	Insufficient details in building plans	0.773	16
17	Lack of experience workers for the project	0.772	17
18	Changes in Execution during construction	0.770	18
19	Slow decision-making process	0.768	19
20	Errors in design during construction	0.768	20
21	Absence of the consultant from the workplace	0.762	21
22	Delay in laboratory tests	0.760	22
23	Weak management staff	0.757	23
24	Delays in compensation cases	0.742	24
25	Terrorist acts	0.731	25

Table 4.7: Classifying Delays Depending on their Riskiness of the Occurrence (Cont.)

No	Factors delaying construction project completion	RII	Degree of cause
26	Road and street interruptions	0.731	26
27	Delays in the processing of building materials	0.727	27
28	Site accidents due to the negligence of the safety engineer	0.721	28
29	Changes in the agreement and contract	0.719	29
30	Shortage of equipment and machinery	0.719	30
31	Unpredictable site conditions	0.712	31
32	Lack of teamwork	0.705	32
33	Survey and data collection are not eligible to start the project	0.667	33
34	Reduce project costs	0.657	34
35	Changes in project scope	0.639	35
36	Bad weather	0.623	36
37	Cause by construction agencies	0.615	37
38	Unique culture of the people and high architectural designs	0.602	38
39	Natural disasters	0.495	39
40	Workers strike	0.470	40

There was an analysis of the contribution made by each factor to the total delays, and the qualities were arranged according to how severe the delays were seen by the respondents.

Table 4.7 shows that the contractor's financial problems came in top, with a RII of 95.5 %, indicating that the participants in the field survey evaluated the contractor's financial problem to be the most common cause among all the reasons for construction project delays.

This corresponds to the findings of the studies Sweis et al (2007), Abd El-Razek, Bassioni and Mobarak (2008), Haseeb et al (2011), Perera and Halwatura (2012), Sumaiyya and Khare (2016), Koshe and Jha (2016), Feyzbakhsh, Telvari and Lork (2017). The owner's financial difficulties come in second, with a RII of 88.4 %. As a result, financial difficulties in general are the most often encountered obstacle in the city of Mosul's construction projects. Lack of commitment with the project progress schedule was rated third in occurrence by respondents, with a RII of 87.6%. Afterwards, the levels are given in accordance with the findings; planning is

ineffectual, which results in a misestimation of the project's completion time, which amounts to a RII of 87.3%. As a result, it is deemed a high percentage that has an impact on the project's completion timeline, and for the contractor, the delay due to the sale of the contract to more than one person got a ratio of RII = 87.2%, The delay in government approvals, which includes state departments and ministries within the city, which supported the majority of participants for this reason through the open question, was determined and amounted to RII = 87%, followed by the owner's delay in paying dues to the contractor, which amounted to RII = 85.1%, the delay in approving building plans, which amounted to RII = 82.9%, poor management of the siter, which amounted to RII = 82.4%, and insufficient equipment and outdated technology, which amounted to RII = 82.1%. Among the less frequent reasons is the workers' strike (RII = 47%) which is the lowest percentage obtained, this is followed by natural disasters (RII = 49.5%), which means that many construction projects in the city of Mosul do not encounter natural obstacles while working. And also, a unique culture of the people and high architectural designs do not happen in abundance. They got a rate of RII = 60.2%. It was also discovered from the causes that do not occur often, which amounted to RII = 61.5 %, by building agencies.

5. CONCLUSIONS AND RECOMMENDATION

5.1 Introduction

All throughout the world, but particularly in Iraq, construction projects and the building industry are infamous for their delays. where, as has been stated throughout the research, time is money in the construction industry and delays should be avoided at all costs. The primary objectives of this study were to utilize qualitative and quantitative methodologies to analyze the critical factors that create delays in building projects in Mosul, with the goal of reducing delays. This is significant since anticipating delays and taking remedial action are key indications of a project's complete success. This chapter summarizes the study's results based on earlier research and field surveys done inside Mosul. The results of the questionnaire used in the field survey connected to building project delays and presented in the previous chapter, which served as the basis for the suggestions for controlling delays. The last part of this chapter makes many recommendations that might aid future study on the causes of construction project delays.

5.2 Conclusions

5.2.1 Responder characteristics

There were a variety of sizes of building and construction projects dealt with by the respondents, as well as a variety of various sorts of experiences in those projects where the number of participants whose data was subjected to statistical analysis was large enough (183) participant. Because of their familiarity with building delays, the survey findings indicate that respondents with fewer than ten years of construction experience account for 55.2 % and civil engineers account for 51.4 % are the ones who determine the cause of current construction delays in Mosul, since they are well-versed in the risks and problems caused by building delays.

Additionally, those aged 25-35 account for 65.6 % of respondents, indicating that the majority of workers in Mosul's construction projects, which are directly affected by

reconstruction, are from the youth group. and the highest number of bachelor's degrees is 70.5 %.

While valuable information has been provided by individuals with more than ten years of experience in a variety of other disciplines, to achieve the primary goal of this section is to obtain diverse opinions from respondents to the questionnaire in order to demonstrate a high level of knowledge about construction delays.

5.2.2 Delay causes

The possible causes of delays in construction projects in Mosul were reviewed through a literature assessment and an official survey of 183 supposed survey responses from a construction industry specialist. Questions have been carefully picked from previous research studies while taking into consideration the local context in the city of Mosul, and distributed to relevant stakeholders in construction projects. According to the data, the top ten severe causes in terms of frequency of occurrence out of (40) factors that contributed to the postponement and delay of building projects in Mosul in the recent time, it is illustrated in the figure below:

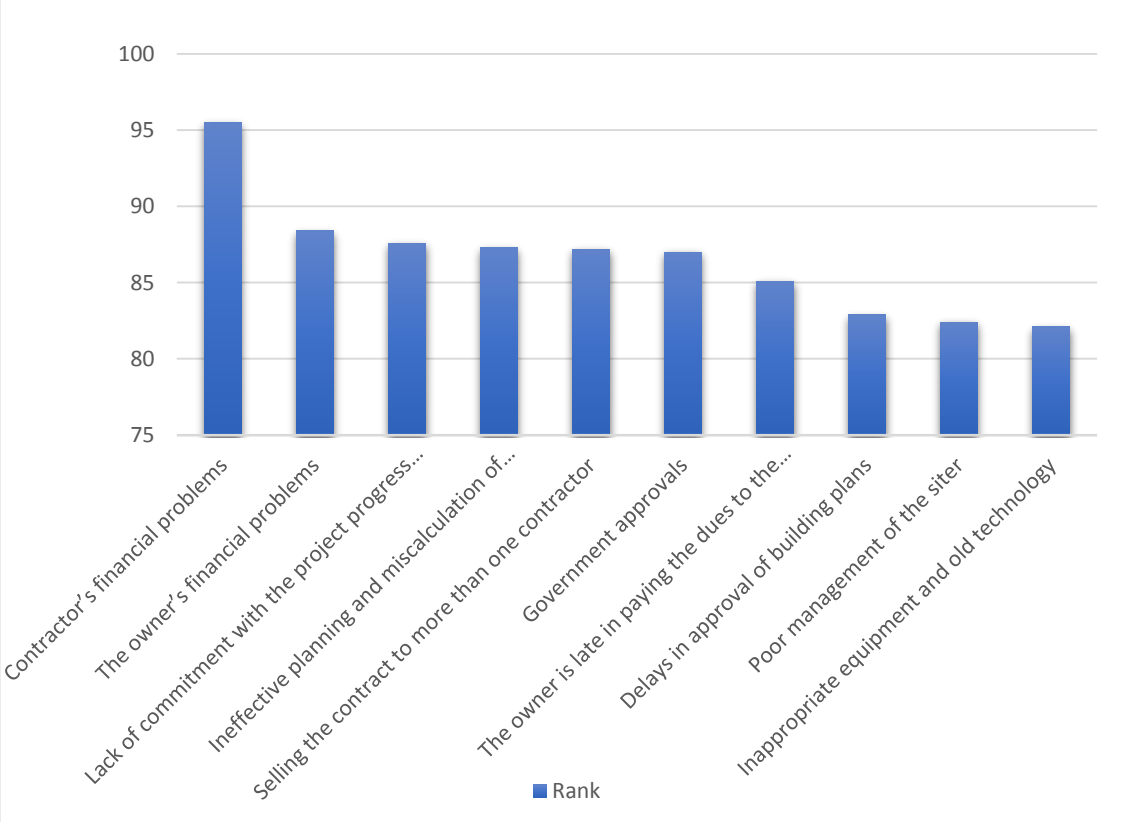

Figure 5.1: The 10 Most Common Causes of Building Delays in Mosul

It is also possible to include financial and administrative corruption within government institutions as a major cause of construction project delays in Mosul, as has been mentioned numerous times in the open question in the questionnaire, and which is considered to be a serious cause of critical delay for all construction projects.

According to the findings of the study, In the city of Mosul, the sort of construction delay that happens the most often is compensable and critical. Contractor's financial difficulties are a kind of unjustified delay caused by disagreements between the owner and the contractor, and the owner is entitled to claim reimbursement for either time or money spent. If we contrast it with the owner's failure to make timely payments to the contractor and his financial difficulties, it is a sort of delay for which the owner is liable for compensation in proportion to the amount of damage he has suffered. Lack of commitment with the project progress schedule, ineffective planning and miscalculation of project time, selling the contract to more than one contractor, poor management of the siter are all examples of critical types of delays that cause the entire construction project to deviate and are also compensable if the owner or contractor is responsible. Government approvals and delays in approval of building plans are regarded non-compensable delays since they are beyond the control of both the owner and the contractor. Finally, inappropriate equipment and old technology generate a simultaneous delay since they cause the schedule to be delayed on the same activity each time. The result of compensable delays is very high compared to other types of delays. This shows that this sort of delay, which is more typical in Mosul, has become a regular occurrence associated with time and cost overruns.

While at least ten causes were displayed in terms of their frequency of occurrence as follows:

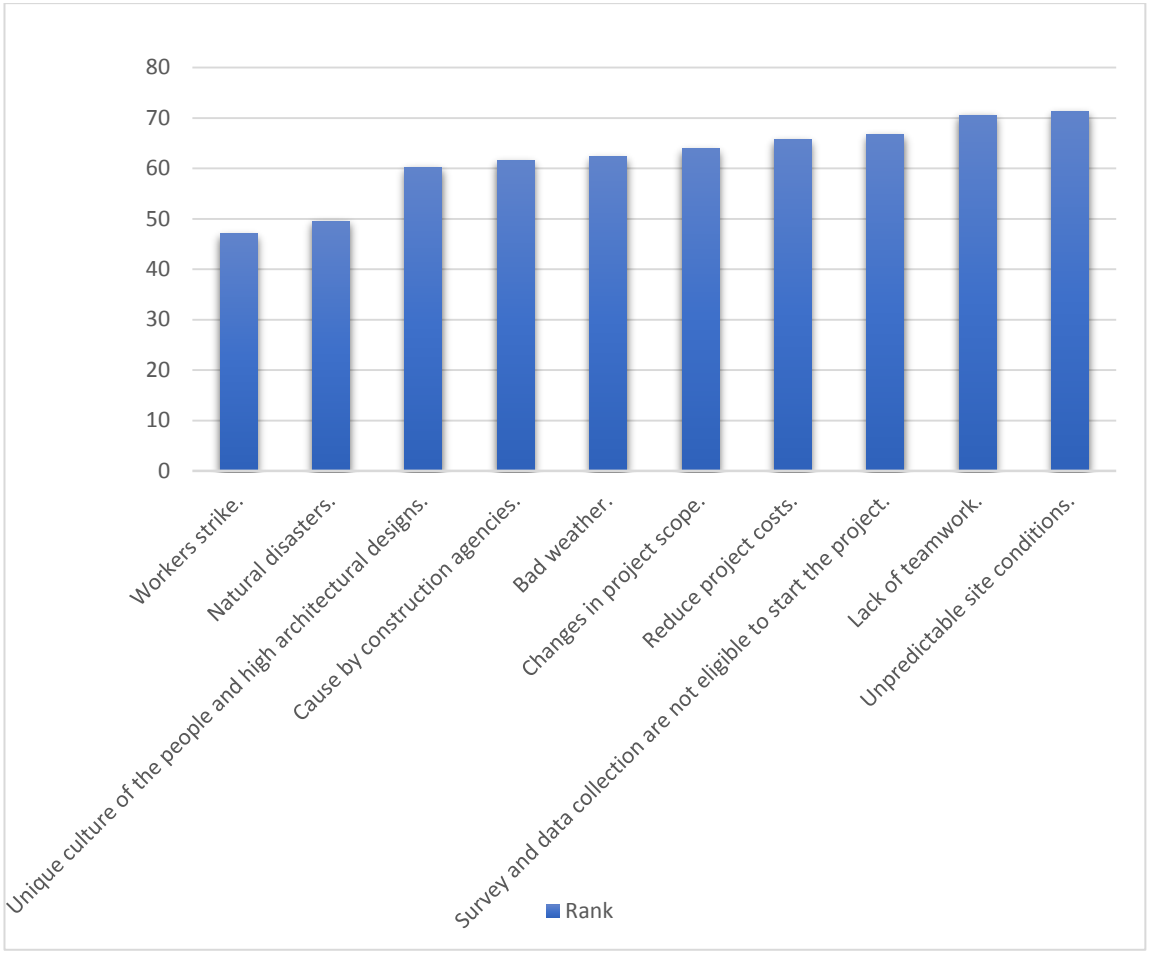

Figure 5.2: Causes for Least Frequent Delays in Building Projects in Mosul

5.3 Recommendations

Based on the above conclusions, some basic suggestions are made that may be effective in decreasing and controlling construction delays in the assessed project. 10 risks were identified as the cause of a significant delay in the project's completion date.

The following are some recommendations for improving the management of delays in building and construction projects in Mosul:

1. The contractor must be chosen through the pre-qualification of the companies in order to be able to manage his money and plan his cash flow before the construction project even starts.
2. The owner must pay the contractor's financial obligations on time. The owner must also provide enough time during the project design stage to reach an agreement with the project parties on cash payment schedules.

3. The contract that is signed between the project's parties must have provisions that encourage the completion of the project on time.
4. To avoid conflicts during the implementation phase, the owner must prepare valuation report and charts that will be approved by the consultants and contractors before beginning the project. The owner must also obtain a work plan that will be used to evaluate the activities during the implementation phase to avoid conflicts.
5. Responsibility for concurrent delays and criticality should be clearly delineated in the contract.
6. Establishing instant communication amongst all project stakeholders in order to resolve issues quickly.
7. To minimize variance throughout construction, the advisory committee should establish a schedule for producing official documents, papers, and other items.
8. The contractor must choose competent project managers to ensure that the job is carried out smoothly, with the needed quality, and within the budgetary constraints. For this reason, the contractor's understanding of construction project management must be adequate in order to prevent delays.
9. The owner must check the equipment and machinery before signing the contract to avoid problems caused by outdated technology.
10. When it comes to Mosul's present development projects, the city's responsible authorities must offer constant financing to prevent delays in construction projects such as those in need of finance, such as the Diwan Residential Complex and the Iraq Eye Complex. Modern equipment and machine skills are also required for road constructions in order to facilitate tiling without encountering delays. Reconstruction projects may be completed more quickly if legal and administrative permits are expedited.

5.4 Suggestions for Future Studies

Finally, the study project finishes with the following suggestions for further research into the factors that contributed to the delay:

1. A total of 183 respondents provided information for the data collection, which was limited owing to a shortage of time, particularly in Mosul. If you want better results, you should raise the number of responses to at least 300.
2. The demographics of respondents should be spread among all of Iraq cities in order to present a truer depiction of delays that apply across the whole nation.
3. Current study did not have access to reports released by government entities. He made an attempt to collect details on building delays from the Iraqi Planning Commission and the Mosul municipality.
4. Conducting more surveys and field investigations in this region, as well as demonstrating the impact of the delay on Mosul.

REFERENCES

Abd El-Razek, M. E., Bassioni, H. A. and Mobarak, A. M. (2008) 'Causes of Delay in Building Construction Projects in Egypt', *Journal Of Construction Engineering And ManagemeNT*, p. 838. doi: 10.1061/(ASCE) 0733-9364 (2008)134:11(831).

Abu Hassan, M. (2016) *Causes Of Delay In Construction Projects*. Qatar University.

Acharya, N. K., Im, H.-M. and Lee, Y.-D. (2006) 'Investigating delay factors in construction industry: A Korean perspective', *Korean Journal of Construction Engineering and Management*, 7(5), pp. 177–190.

Ahmed, S. M. *et al.* (2000) 'Construction Delays in Florida: An Empirical Study', *ASC Proceedings of the 39th Annual Conference*, pp. 491–500.

Akadiri, O. P. (2011) *Development of a multi-criteria approach for the selection of sustainable materials for building projects, PhD Thesis - University of Wolverhampton*. Available at: http://wlv.openrepository.com/wlv/bitstream/2436/129918/1/Akadiri_PhD thesis.pdf.

Al-hadithi, B. I. (2020) 'Investigating the Delay Factors of Construction Projects Using Narrative Analysis Approach', *Iraqi Journal Of Civil Engineering*, pp. 2–9. Available at: https://www.iasj.net/.

Al-taie, D. M. R. (2018) 'Optimal Responsibility in Causing of Delay for Construction Projects in Iraq by Using ANP Technique', *International Journal of Science and Research (IJSR)*, 7(1), pp. 1666–1676. doi: 10.21275/ART20179699.

Al-turfi, S. (2017) *Best Practice Project management for the Sustainable Regeneration of Holy Karbala Province in Iraq*. The University of Bolton School.

Aladayleh Jameel, K., Ferrer Gisbert, P. and Fuentes Bargues, J. L. (2020) 'Factors Influencing Construction Projects Delay: an Exploratory Study At a Jordanian Public University', *International Congress on Project Management and Engineering Alcoi*, (July), pp. 109–122.

Alaghbari, W. *et al.* (2007) 'The significant factors causing delay of building construction projects in Malaysia', *Engineering, Construction and Architectural Management*, 14(2), pp. 192–206. doi: 10.1108/09699980710731308.

Alenezi, T. (2020) 'Covid-19 Causes Of Delays On Construction Projects In Kuwait', *International Journal of Engineering Research and General Science*, 8(4), pp. 35–39. Available at: www.ijergs.org.

Alghrairi, N. (2017) *Risk Management Of Construction Projects In Iraq*. Yildiz Technical University.

Assaf, S. A. and Al-Hejji, S. (2006) 'Causes of delay in large construction projects', *International Journal of Project Management*, 24(4), pp. 349–357. doi: 10.1016/j.ijproman.2005.11.010.

Baha, M. yonis (2020) *Delay Causes Of Road Construction Projects In Afghanistan*. Anadolu University Graduate.

Bajjou, M. S. and Chafi, A. (2018) 'Empirical study of schedule delay in Moroccan construction projects', *International Journal of Construction Management*, pp. 1–17. Available at: https://doi.org/10.1080/15623599.2018.1484859.

Bekr, G. (2015) 'Causes of delay in public construction projects in iraq', *Jordan Journal of Civil Engineering*, 9(2), p. 149. Available at: https://www.researchgate.net/publication/281698741%0ACauses.

Busneina, Z. F. J. (2018) *Project Management: Investigation On Causes Of Delay In Construction Projects In Benghazi Municipility - Libya*. İstanbul Aydin Universitesi Institute.

Carvalho, A. B. *et al.* (2021) 'Study on the factors of delay in construction works', *Ambiente Construído*, 21(3), pp. 27–46. doi: 10.1590/s1678-86212021000300536.

Dinakar, A. (2014) 'Delay Analysis in Construction Project', *International Journal of Emerging Technology and Advanced Engineering*, 4(5). Available at: www.ijetae.com.

Elbeltagi, E. (2009) 'Lecture Notes on Construction Project Management', *Mansoura University, Faculty of Engineering*. Egypt, p. 11.

Emam, H., Farrell, P. and Abdelaal, M. (2015) 'Causes of delay on infrastructure projects in Qatar', *Raidén, A B and Aboagye-Nimo, E (Eds) Procs 31st Annual ARCOM Conference, 7-9 September 2015, Association of Researchers in Construction Management.*, pp. 773–782.

Ercan, Asli Merve (2019) *Türkiye'deki Yapim Projelerinde Gecikmeye Neden Olan Faktörlerin Belirlenmesi*. İstanbul Teknik Üniversitesi.

Erick, M. C. J. *et al.* (2016) *Management of Delays in Construction Projects in Bia West District, Revista CENIC. Ciencias Biológicas*. Kwame Nkrumah University of Science and Technology.

Falqi, I. (2004) *A comparative study on construction delay factors in Saudi Arabia and the United Kingdom*. doi: 10.13140/RG.2.2.12178.04805.

Feyzbakhsh, S., Telvari, A. and Lork, A. R. (2017) 'Investigating the Causes of Delay in Construction of Urban Water Supply and Wastewater Project in Water and WasteWater Project in Tehran', *Civil Engineering Journal*, 3(12), p. 1295. doi: 10.28991/cej-030958.

Fleming, G. (2009) *Construction Project Management Handbook*. Washington.

Fugar, F. D. and Agyakwah-Baah, A. B. (2010) 'Delays in Building Construction Projects in Ghana', *Australasian Journal of Construction Economics and Building*, 10(1/2), p. 103- 116.

Ghazali, N. A. (2017) *the Causes of Delay in Construction Project in Kuantan*. Universiti Malaysia PahanG.

Al Hadithi, B. I. (2018) 'An investigation into factors causing delays in highway construction projects in Iraq', *MATEC Web of Conferences*, 162. doi: 10.1051/matecconf/201816202035.

Hamzah, N. *et al.* (2011) 'Cause of Construction Delay - Theoretical Framework', *Procedia Engineering*, 20(Kpkt 2010), p. 491. doi: 10.1016/j.proeng.2011.11.192.

Haritha, C. (2018) 'Factors that cause delay in construction project- A critical review', *International Journal of Advance Research, Ideas and Innovations in Technology ISSN:*, 4(6), pp. 208–214.

Hasan, R., A Suliman, S. M. and Al Malki, Y. (2014) 'An Investigation into the Delays in Road Projects in Bahrain', *International Journal of Research in Engineering and Science (IJRES)*, 2(2), pp. 38–47. Available at: www.ijres.org.

Haseeb, M. *et al.* (2011) 'Causes and Effects of Delays in Large Construction Projects of Pakistan', *Kuwait Chapter of Arabian Journal of Business and Management Review*, 1(4), p. 37.

Hayat, M. M. (2020) *An Investigation into Causes of Delays in Construction Projects of Pakistan*. Capital University of Science and Technology, Islamabad.

Heagney, J. (2012) *Fundamentals of project management*. 4th edn, *Journal of Chemical Information and Modeling*. 4th edn.

Islam, M. S. *et al.* (2015) 'Causes of Delay in Construction Projects in Bangladesh', *International Conference on Construction Engineering and Project Management*, pp. 1–6. doi: 10.1504/mejm.2018.10012114.

Jafar, S. S. (2010) *Construction Delay Analysis Using Daily Windows Technique*. University of Baghdad.

Kazaz, A., Ulubeyli, S. and Tuncbilekli, N. A. (2012) 'Causes of delays in construction projects in Turkey', *Journal of Civil Engineering and Management*, 18(3), pp. 426–435. doi: 10.3846/13923730.2012.698913.

Khair, K. *et al.* (2017) 'A Management Framework to Reduce Delays in Road Construction Projects in Sudan', *Arabian Journal for Science and Engineering*, 43(4), pp. 1925–1940. doi: 10.1007/s13369-017-2806-6.

Khan, M. Z. (2018) 'Causes of delay in construction projects', *ijariie*, 4(4), p. 843.

Koshe, W. and Jha, K. N. (2016) 'Investigating Causes of Construction Delay in Ethiopian Construction Industries', *Journal of Civil, Construction and Environmental Engineering*, 1(1), pp. 18–29. doi: 10.11648/j.jccee.20160101.13.

Kuşakcı, A. O., Ayvaz, B. and Bejtagic, E. (2017) 'An Analysis of Causes and Effects of Delays in Construction Projects in Libyan Oil Industry', *Karaelmas Fen ve Mühendislik Dergisi*, 7(1), pp. 274–282. Available at: http://fbd.beun.edu.tr.

Meredith, J. R. and Mantel, S. J. (2009) *Project Managment A Managerial Approach*. 7th edn. United States of America.

Mohamed, M. B. I. (2015) *A Study of Project Delay In Sudan Construction Industry*. Universiti Tunku Abdul Rahman,.

Mohammed, S. R. and Jafar, S. (2011) 'Construction Delay Analysis Using Daily Windows Technique', *Journal of Engineering*, 17(October), pp. 186–199.

Mohammed, S. R. and Jasim, A. J. (2017) 'Study and Analysis of the Delay Problems in Iraqi Construction Projects', *International Journal of Science and Research*, 6(5), pp. 2331–2336. doi: 10.21275/ART20173791.

Muhammad, S. (2020) 'Construction Project - Goals and Objectives', pp. 1–13. doi: 10.13140/RG.2.2.35925.99040.

Multashi, A. T. and Salgude, R. R. (2016) 'Delay Analysis in Construction Project a Case Study - Alkut Olympic Stadium', *International Journal of Science and Research (IJSR)*, 5(6), pp. 822–827. doi: 10.21275/v5i6.6061607.

Najmi, H. S. (2011) *Project Management for Construction Projects*. An-Najah National University.

Niazai, G. A. and Gidado, K. (2017) 'Causes of Project Delay in the Construction Industry in Afghanistan', *Engineering, Construction and Architectural Management*. doi: 10.1108/ECAM-03-2016-0085.

Ogunde, A. O. *et al.* (2017) 'Factors Militating Against Prompt Delivery of Construction Projects in Lagos Megacity, Nigeria: Contractors' Perspective', *Mediterranean Journal of Social Sciences*, 8(3), pp. 233–242. doi: 10.5901/mjss.2017.v8n3p233.

Onozulike, E. J. (2016) *Causes of delay in large construction project in Nigeria construction industry., University of Central Lancashire*.

Othuman Mydin, M. A. *et al.* (2014) 'Imperative Causes of Delays in Construction Projects from Developers' Outlook', *Building Surveying and Technology Undergraduate Conference*, 10(MATEC Web Conf.), pp. 1–6. doi: 10.1051/matecconf/20141006005.

Pawar, S. and Ambure, S. (2015) 'An assessment of the factors causing delays on building residential construction projects', *International Journal of Science and Research*, 6(1), pp. 2319–2323.

Pawar, S. and Attarde, P. M. (2015) 'Time and Cost Planning in Construction Project', *International Journal of Science and Research (IJSR)*, 4(8), pp. 1–4.

Perera, W. D. A. and Halwatura, R. U. (2012) 'Causes and Effects of Delays in Construction of Medium Scale Drinking Water Supply Projects in Sri Lanka', *Annual Transactions of Institution of Engineers, Sri Lanka*, pp. 151–159.

PMI (2017) *A guide to the project management body of knowledge (PMBOK guide)*. 6th edn, *Project Management Institute*. 6th edn.

Raiq, A. A. (2021) *Causes And Effects Of Construction Project Delay*, *İstanbul Kültür University Institute Of Graduate Studies*.

Raut, S. P., Gohatre, V. S. and Nistane, H. P. (2018) 'Causes of Delays in Construction Projects', *International Journal of Engineering Science and Computing*, 8(11), p. 19277.

Rehman, G. (2015) *Causes of Delay in Construction Projects In Abu Dhabi*, *The British University in Dubai*. Available at: https://www.pharmascope.org/ijrls/files/publish/published-pdf-0608-6-Causes of Delay in Construction Projects.pdf.

Ren, Z., Atout, M. and Jones, J. (2008) 'Root Causes Of Construction Project Delays In Dubai', *Dainty, A (Ed) Procs 24th Annual ARCOM Conference*, (September), pp. 749–757.

Rezaei, A. and Jalal, S. (2018) 'Investigating the causes of delay and cost-overrun in construction industry', *International Advanced Researches and Engineering Journal*, 02(02), pp. 75–79. Available at: www.dergipark.gov.tr.

Roumeissa, S., Karima, M. and Souad, S. B. (2018) 'Identification of Factors Causing Delays in Construction Projects in Algeria', *European Journal of Engineering and Formal Sciences*, 2(1), pp. 6–10. doi: 10.26417/ejef.v2i1.p6-11.

Salhi, R. and Messaoudi, K. (2021) 'The Effects of Delays in Algerian Construction Projects: An Empirical Study', *Civil and Environmental Engineering Reports*, 31(2), pp. 218–254. doi: 10.2478/ceer-2021-0027.

Sarıkaya, Ö. (2010) *Causes of Delay in And Their Effects on Construction Projects in Turkey*. Bigazici University.

Shebob, A., Dawood, N. and Xu, Q. (2011) 'Analysing construction delay factors: A case study of building construction project in Libya', in *Association of Researchers in Construction Management, ARCOM 2011 - Proceedings of the 27th Annual Conference*, pp. 1005–1012.

Sheena, M. and Remmiya, C. (2015) 'An Analytical Study on Significant Causes and Effect of Delays in Construction Project', *International Journal of Science and Research (IJSR)*, 6(3), pp. 836–839. Available at: https://www.ijsr.net/archive/v6i3/ART20171615.pdf.

Shiri, T. (2015) *An Investigation Of The Causes And Effects Of Construction Delays On Zimbabwean Construction Projects*. National University of Science And Technology.

Sivaprakasam, S., Dinesh, S. and Jayashree, J. (2017) 'Review of Causes of Delay in Construction Projects', *International Journal for Scientific Research & Development - IJSRD*, 5(2), pp. 1108–1110.

Soliman, E. M. (2014) 'Delay Causes in Kuwait Construction Projects', pp. 1–10.

Square, N. (2000) *Project Management Institute A Guide to the Project Management Body of Knowledge*, *Management*. Pennsylvania USA.

Stare, A. (2019) *Project management, Course book*. Available at: http://www.ef.uni-lj.si/zaloznistvo/studijska_gradiva.

Sumaiyya, N. and Khare, P. (2016) 'Causes of Delays in any Construction Project', *International Journal of Science and Research (IJSR)*, 5(1), pp. 59–61. doi: 10.21275/v5i1.nov152573.

Sweis, G. *et al.* (2007) 'Delays in construction projects: The case of Jordan', *International Journal of Project Management*, 26(6), pp. 665–674. doi: 10.1016/j.ijproman.2007.09.009.

Tafazzoli, M. and Shrestha, P. P. (2017) 'Investigating Causes of Delay in U.S. Construction Projects', *Associated Schools of Construction*, (September), pp. 611–621.

Tafesse, S. (2021) 'A Review on the Critical Factors Causing Delay of Delivery Time in Construction Projects', *International Journal of Engineering Technologies IJET*, 6(4), pp. 69–81. doi: 10.19072/ijet.815025.

Tawil, N. M. *et al.* (2014) 'A pilot survey on causes of delay in Malaysian construction project', *MATEC Web of Conferences*, 15, pp. 1–8. doi: 10.1051/matecconf/20141501010.

Tumi, S. A. H., Omran, A. and Pakir, A. H. K. (2009) 'Causes of Delay in Construction Industry in Libya', *The International Conference on Economics and Administration*, 14(15), pp. 265–272.

Uçmazbaş, Ö. (2016) *İnşaat Projelerinde Gecikmeye Neden Olan Faktörler: Bir Sentezleme Çalişmasi*. İstanbul Teknik Üniversitesi ?

Watt, A. (2010) *Project Management*. HONG KONG: This work is licensed under a Creative Commons-ShareAlike 4.0 International License. Available at: http://open.bccampus.ca/find-open-textbooks/?uuid=8678fbae-6724-454c-a796-3c666 7d826be&contributor=&keyword=&subject=.

Wiley, J. & S. (2003) *Project Management A Systems Approach to Planning, Scheduling, and Controlling*. 8th edn, *Anasthesiologie Intensivmedizin Notfallmedizin Schmerztherapie*. 8th edn. doi: 10.1055/s-1999-230.

Wysocki, R. and McGary, R. (2003) *Effective Project Management: Traditional, Adaptive, Extreme*. 3rd edn, *Journal of Chemical Information and Modeling*. 3rd edn. Canada.

Zerin, F. and Joy, A. (2020) 'Construction Management Using Primavera', 9(6), pp. 1–4. doi: 10.21275/SR20607214623.

APPENDICES

Appendix A: Questionnaire for Respondents

Appendix B: The Results of the Questionnaire on IBM the Statistical Package for Social Sciences (SPSS v26).

Appendix A: Questionnaire for Respondents

The Causes for the delay of construction projects in Iraq, the city of Mosul - أسباب تأخر المشاريع الانشائية في العراق بمدينة الموصل

Due to the large number of construction and reconstruction projects in recent times, the questionnaire below is related to a study on the Causes for the delay in construction projects in the city of Mosul.
I would be grateful for your participation in this questionnaire.
For help and further information, contact me at: ahmedhaitham86@gmail.com

* Required

1. Age? *

Mark only one oval.

- ◯ 25-35
- ◯ 35-45
- ◯ 45-55
- ◯ more than 55

2. what is your Major? *

Mark only one oval.

- ◯ Civil
- ◯ Architectural
- ◯ Mechanical
- ◯ Other: _____

3. Your Degree? *

Mark only one oval.

- Bachelor
- Master
- Doctorate

4. Years of Experience *

Mark only one oval.

- 10<
- 10-15
- 15-20
- >20

Please choose the Causes for delaying construction projects based on field and practical experience according to the following options: (Happens a lot, Happens Sometimes, Doesn't Happen and Rare occurrence) - يرجى اختيار أسباب تأخير المشاريع الإنشائية بناءً على الخبرة الميدانية والعملية وفقًا للخيارات التالية: (يحدث كثيرًا - يحدث أحيانًا - لا يحدث - نادر الحدوث)

5. Delay in laboratory tests - تأخير في الفحوصات المختبرية *

Mark only one oval.

- happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

6. Contractors financial problems - المشاكل المالية للمقاولين *

Mark only one oval.

- Happens a lot - يحدث كثيراً
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

7. The owners financial problems - المشاكل المالية للملاك *

Mark only one oval.

- Happens a lot - يحدث كثيراً
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

8. The fluctuation in the prices of building materials - التذبذب في أسعار مواد البناء *

Mark only one oval.

- Happens a lot - يحدث كثيراً
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

9. Ineffective planning and miscalculation of project time - عدم فعالية التخطيط و سوء تقدير زمن المشروع *

Mark only one oval.

- Happens a lot - يحدث كثيراً
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

10. The owner is late in paying the dues to the contractor - تأخر المالك في دفع المستحقات للمقاول *

Mark only one oval.

- Happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

11. Lack of commitment with the project progress schedule - عدم الالتزام بجدول تقدم المشروع *

Mark only one oval.

- Happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

12. Poor management of the siter - سوء إدارة الموقع *

Mark only one oval.

- Happens a lot - يحدث كثيراً
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

13. Absence of the consultant from the workplace - غياب الاستشاري عن مكان العمل *

Mark only one oval.

- Happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

14. Lack of experience of the contractor - قلة خبرة المقاول *

Mark only one oval.

- Happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

15. Lack of experience workers for the project - قلة خبرة العاملين بالمشروع *

Mark only one oval.

- Happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

16. Selling the contract to more than one contractor - بيع المقاولة لأكثر من مقاول *

Mark only one oval.

- Happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

17. Terrorist acts - الأعمال الإرهابية *

Mark only one oval.

- Happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

18. Road and street interruptions - الانقطاعات في الطرق والشوارع *

Mark only one oval.

- Happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

19. Delays in the processing of building materials - التاخير في تجهيز مواد البناء *

Mark only one oval.

- Happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

20. Poor coordination between project parties - ضعف التنسيق بين أطراف المشروع *

Mark only one oval.

- Happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

21. lack of teamwork - قلة العمل الجماعي *

Mark only one oval.

- Happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

22. Changes in Execution during construction - التغييرات في التنفيذ أثناء البناء *

Mark only one oval.

- Happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

23. Errors in design during construction - أخطاء في التصميم أثناء البناء *

Mark only one oval.

- Happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

24. Skilled Worker shortage and low productivity - نقص العمالة الماهرة وانخفاض الإنتاجية *

Mark only one oval.

- Happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

25. Shortage of equipment and machinery - نقص المعدات والآلات *

Mark only one oval.

- Happens a lot - يحدث كثيراً
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

26. Inappropriate equipment and old technology - المعدات غير الملائمة والتكنولوجيا القديمة *

Mark only one oval.

- Happens a lot - يحدث كثيراً
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

27. Unique culture of the people and high architectural designs - ثقافة فريدة من نوعها للشعب وتصاميم معمارية عالية *

Mark only one oval.

- Happens a lot - يحدث كثيراً
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

28. slow decision-making process - بطء عملية صنع واتخاذ القرار *

Mark only one oval.

- Happens a lot - يحدث كثيراً
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

29. Difficulty getting bank credit - صعوبة في الحصول على الائتمان المصرفي *

Mark only one oval.

- Happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

30. Reduce project costs - خفض تكاليف المشروع *

Mark only one oval.

- happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

31. Unpredictable site conditions - ظروف الموقع غير متوقعة *

Mark only one oval.

- happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

32. Site accidents due to the negligence of the safety engineer - حوادث الموقع نتيجة إهمال مهندس السلامة *

Mark only one oval.

- happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

33. natural disasters - الكوارث الطبيعية *

Mark only one oval.

- happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

34. Bad weather - سوء الأحوال الجوية *

Mark only one oval.

- happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

35. Changes in the agreement and contract - التغييرات في الاتفاقية والعقد *

Mark only one oval.

- happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

36. Cause by construction agencies - سبب من قبل وكالات البناء *

Mark only one oval.

- happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

37. Changes in project scope - التغييرات في نطاق المشروع *

Mark only one oval.

- happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

38. Delays in compensation cases - تأخير في قضايا التعويض *

Mark only one oval.

- happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

39. Workers strike - إضراب العمال *

Mark only one oval.

- happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

40. Survey and data collection are not eligible to start the project - المسح وجمع البيانات غير مؤهلين لبدء المشروع *

Mark only one oval.

- happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

41. Weak management staff - ضعف الموظفين الإداريين *

Mark only one oval.

- happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

42. Delays in approval of building plans - التأخير في الموافقة على مخططات البناء *

Mark only one oval.

- happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

43. Insufficient details in building plans - تفاصيل غير كافية في مخططات البناء *

Mark only one oval.

- happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

44. Government approvals - الموافقات الحكومية *

Mark only one oval.

- happens a lot - يحدث كثيرا
- Happens Sometimes - يحدث أحياناً
- Doesn't Happen - لا يحدث
- Rare occurrence - نادر الحدوث

45. If there is a cause not mentioned please write here - إذا كان هناك سبب غير مذكور يرجى الكتابة هنا *

APPENDIX B: Appendix B: The Results of the Questionnaire on IBM the Statistical Package for Social Sciences (SPSS v26).

```
GET
  FILE='D:\MASTER\Thesis\analysis.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
FREQUENCIES VARIABLES=Age Major Degree Experience Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q
9 Q10 Q11 Q12 Q13 Q14
    Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24 Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32
 Q33 Q34 Q35 Q36 Q37 Q38 Q39
    Q40
  /ORDER=ANALYSIS.
```

Frequencies

```
[DataSet1] D:\MASTER\Thesis\analysis.sav
```

Statistics

		Age?	what is your Major?	Your Degree?	Years of Experience	Delay in laboratory tests
N	Valid	183	183	183	183	183
	Missing	0	0	0	0	0

Statistics

		Contractors financial problems	The owners financial problems	The fluctuation in the prices of building materials	Ineffective planning and miscalculation of project time	The owner is late in paying the dues to the contractor
N	Valid	183	183	183	183	183
	Missing	0	0	0	0	0

Statistics

		Lack of commitment with the project progress schedule	Poor management of the site	Absence of the consultant from the workplace	Lack of experience of the contractor	Lack of experience workers for the project
N	Valid	183	183	183	183	183
	Missing	0	0	0	0	0

Statistics

		Weak management staff	Delays in approval of building plans	Insufficient details in building plans	Government approvals
N	Valid	183	183	183	183
	Missing	0	0	0	0

Frequency Table

Age?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	25-35	120	65.6	65.6	65.6
	35-45	31	16.9	16.9	82.5
	45-55	19	10.4	10.4	92.9
	more than 55	13	7.1	7.1	100.0
	Total	183	100.0	100.0	

what is your Major?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Civil	94	51.4	51.4	51.4
	Architectural	15	8.2	8.2	59.6
	Mechanical	24	13.1	13.1	72.7
	Electrical	9	4.9	4.9	77.6
	Different Professions	41	22.4	22.4	100.0
	Total	183	100.0	100.0	

Your Degree?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bachelor	129	70.5	70.5	70.5
	Master	36	19.7	19.7	90.2
	Doctorate	18	9.8	9.8	100.0
	Total	183	100.0	100.0	

Years of Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<10	101	55.2	55.2	55.2
	10-15	32	17.5	17.5	72.7
	15-20	22	12.0	12.0	84.7
	>20	28	15.3	15.3	100.0
	Total	183	100.0	100.0	

Delay in laboratory tests

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	61	33.3	33.3	33.3
	Happens Sometimes	83	45.4	45.4	78.7
	Doesn't Happen	15	8.2	8.2	86.9
	Rare occurrence	24	13.1	13.1	100.0
	Total	183	100.0	100.0	

Contractors financial problems

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	156	85.2	85.2	85.2
	Happens Sometimes	23	12.6	12.6	97.8
	Doesn't Happen	2	1.1	1.1	98.9
	Rare occurrence	2	1.1	1.1	100.0
	Total	183	100.0	100.0	

The owners financial problems

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	108	59.0	59.0	59.0
	Happens Sometimes	67	36.6	36.6	95.6
	Doesn't Happen	2	1.1	1.1	96.7
	Rare occurrence	6	3.3	3.3	100.0
	Total	183	100.0	100.0	

The fluctuation in the prices of building materials

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	76	41.5	41.5	41.5
	Happens Sometimes	86	47.0	47.0	88.5
	Doesn't Happen	7	3.8	3.8	92.3
	Rare occurrence	14	7.7	7.7	100.0
	Total	183	100.0	100.0	

Ineffective planning and miscalculation of project time

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	117	63.9	63.9	63.9
	Happens Sometimes	46	25.1	25.1	89.1
	Doesn't Happen	7	3.8	3.8	92.9
	Rare occurrence	13	7.1	7.1	100.0
	Total	183	100.0	100.0	

The owner is late in paying the dues to the contractor

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	100	54.6	54.6	54.6
	Happens Sometimes	64	35.0	35.0	89.6
	Doesn't Happen	7	3.8	3.8	93.4
	Rare occurrence	12	6.6	6.6	100.0
	Total	183	100.0	100.0	

Lack of commitment with the project progress schedule

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	115	62.8	62.8	62.8
	Happens Sometimes	48	26.2	26.2	89.1
	Doesn't Happen	3	1.6	1.6	90.7
	Rare occurrence	17	9.3	9.3	100.0
	Total	183	100.0	100.0	

Poor management of the siter

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	96	52.5	52.5	52.5
	Happens Sometimes	59	32.2	32.2	84.7
	Doesn't Happen	14	7.7	7.7	92.3
	Rare occurrence	14	7.7	7.7	100.0
	Total	183	100.0	100.0	

Absence of the consultant from the workplace

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	71	38.8	38.8	38.8
	Happens Sometimes	68	37.2	37.2	76.0
	Doesn't Happen	18	9.8	9.8	85.8
	Rare occurrence	26	14.2	14.2	100.0
	Total	183	100.0	100.0	

Lack of experience of the contractor

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	89	48.6	48.6	48.6
	Happens Sometimes	60	32.8	32.8	81.4
	Doesn't Happen	15	8.2	8.2	89.6
	Rare occurrence	19	10.4	10.4	100.0
	Total	183	100.0	100.0	

Lack of experience workers for the project

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	69	37.7	37.7	37.7
	Happens Sometimes	75	41.0	41.0	78.7
	Doesn't Happen	14	7.7	7.7	86.3
	Rare occurrence	25	13.7	13.7	100.0
	Total	183	100.0	100.0	

Selling the contract to more than one contractor

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	121	66.1	66.1	66.1
	Happens Sometimes	41	22.4	22.4	88.5
	Doesn't Happen	11	6.0	6.0	94.5
	Rare occurrence	10	5.5	5.5	100.0
	Total	183	100.0	100.0	

Terrorist acts

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	63	34.4	34.4	34.4
	Happens Sometimes	63	34.4	34.4	68.9
	Doesn't Happen	20	10.9	10.9	79.8
	Rare occurrence	37	20.2	20.2	100.0
	Total	183	100.0	100.0	

Road and street interruptions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	63	34.4	34.4	34.4
	Happens Sometimes	66	36.1	36.1	70.5
	Doesn't Happen	23	12.6	12.6	83.1
	Rare occurrence	31	16.9	16.9	100.0
	Total	183	100.0	100.0	

Delays in the processing of building materials

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	46	25.1	25.1	25.1
	Happens Sometimes	92	50.3	50.3	75.4
	Doesn't Happen	18	9.8	9.8	85.2
	Rare occurrence	27	14.8	14.8	100.0
	Total	183	100.0	100.0	

Poor coordination between project parties

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	78	42.6	42.6	42.6
	Happens Sometimes	79	43.2	43.2	85.8
	Doesn't Happen	5	2.7	2.7	88.5
	Rare occurrence	21	11.5	11.5	100.0
	Total	183	100.0	100.0	

lack of teamwork

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	57	31.1	31.1	31.1
	Happens Sometimes	65	35.5	35.5	66.7
	Doesn't Happen	29	15.8	15.8	82.5
	Rare occurrence	32	17.5	17.5	100.0
	Total	183	100.0	100.0	

Changes in Execution during construction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	63	34.4	34.4	34.4
	Happens Sometimes	85	46.4	46.4	80.9
	Doesn't Happen	13	7.1	7.1	88.0
	Rare occurrence	22	12.0	12.0	100.0
	Total	183	100.0	100.0	

Errors in design during construction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	64	35.0	35.0	35.0
	Happens Sometimes	81	44.3	44.3	79.2
	Doesn't Happen	13	7.1	7.1	86.3
	Rare occurrence	25	13.7	13.7	100.0
	Total	183	100.0	100.0	

Skilled Worker shortage and low productivity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	85	46.4	46.4	46.4
	Happens Sometimes	59	32.2	32.2	78.7
	Doesn't Happen	16	8.7	8.7	87.4
	Rare occurrence	23	12.6	12.6	100.0
	Total	183	100.0	100.0	

Shortage of equipment and machinery

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	50	27.3	27.3	27.3
	Happens Sometimes	84	45.9	45.9	73.2
	Doesn't Happen	24	13.1	13.1	86.3
	Rare occurrence	25	13.7	13.7	100.0
	Total	183	100.0	100.0	

Inappropriate equipment and old technology

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	102	55.7	55.7	55.7
	Happens Sometimes	47	25.7	25.7	81.4
	Doesn't Happen	16	8.7	8.7	90.2
	Rare occurrence	18	9.8	9.8	100.0
	Total	183	100.0	100.0	

Unique culture of the people and high architectural designs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	29	15.8	15.8	15.8
	Happens Sometimes	67	36.6	36.6	52.5
	Doesn't Happen	50	27.3	27.3	79.8
	Rare occurrence	37	20.2	20.2	100.0
	Total	183	100.0	100.0	

slow decision-making process

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	74	40.4	40.4	40.4
	Happens Sometimes	70	38.3	38.3	78.7
	Doesn't Happen	22	12.0	12.0	90.7
	Rare occurrence	17	9.3	9.3	100.0
	Total	183	100.0	100.0	

Difficulty getting bank credit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	74	40.4	40.4	40.4
	Happens Sometimes	73	39.9	39.9	80.3
	Doesn't Happen	20	10.9	10.9	91.3
	Rare occurrence	16	8.7	8.7	100.0
	Total	183	100.0	100.0	

Reduce project costs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	39	21.3	21.3	21.3
	Happens Sometimes	75	41.0	41.0	62.3
	Doesn't Happen	38	20.8	20.8	83.1
	Rare occurrence	31	16.9	16.9	100.0
	Total	183	100.0	100.0	

Unpredictable site conditions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	52	28.4	28.4	28.4
	Happens Sometimes	71	38.8	38.8	67.2
	Doesn't Happen	20	10.9	10.9	78.1
	Rare occurrence	40	21.9	21.9	100.0
	Total	183	100.0	100.0	

Site accidents due to the negligence of the safety engineer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	56	30.6	30.6	30.6
	Happens Sometimes	71	38.8	38.8	69.4
	Doesn't Happen	21	11.5	11.5	80.9
	Rare occurrence	35	19.1	19.1	100.0
	Total	183	100.0	100.0	

natural disasters

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	7	3.8	3.8	3.8
	Happens Sometimes	49	26.8	26.8	30.6
	Doesn't Happen	67	36.6	36.6	67.2
	Rare occurrence	60	32.8	32.8	100.0
	Total	183	100.0	100.0	

Bad weather

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	19	10.4	10.4	10.4
	Happens Sometimes	81	44.3	44.3	54.6
	Doesn't Happen	29	15.8	15.8	70.5
	Rare occurrence	54	29.5	29.5	100.0
	Total	183	100.0	100.0	

Changes in the agreement and contract

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	54	29.5	29.5	29.5
	Happens Sometimes	78	42.6	42.6	72.1
	Doesn't Happen	26	14.2	14.2	86.3
	Rare occurrence	25	13.7	13.7	100.0
	Total	183	100.0	100.0	

Cause by construction agencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	25	13.7	13.7	13.7
	Happens Sometimes	80	43.7	43.7	57.4
	Doesn't Happen	46	25.1	25.1	82.5
	Rare occurrence	32	17.5	17.5	100.0
	Total	183	100.0	100.0	

Changes in project scope

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	23	12.6	12.6	12.6
	Happens Sometimes	90	49.2	49.2	61.7
	Doesn't Happen	34	18.6	18.6	80.3
	Rare occurrence	36	19.7	19.7	100.0
	Total	183	100.0	100.0	

Delays in compensation cases

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	66	36.1	36.1	36.1
	Happens Sometimes	70	38.3	38.3	74.3
	Doesn't Happen	25	13.7	13.7	88.0
	Rare occurrence	22	12.0	12.0	100.0
	Total	183	100.0	100.0	

Workers strike

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	9	4.9	4.9	4.9
	Happens Sometimes	41	22.4	22.4	27.3
	Doesn't Happen	81	44.3	44.3	71.6
	Rare occurrence	52	28.4	28.4	100.0
	Total	183	100.0	100.0	

Survey and data collection are not eligible to start the project

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	42	23.0	23.0	23.0
	Happens Sometimes	71	38.8	38.8	61.7
	Doesn't Happen	33	18.0	18.0	79.8
	Rare occurrence	37	20.2	20.2	100.0
	Total	183	100.0	100.0	

Weak management staff

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	65	35.5	35.5	35.5
	Happens Sometimes	78	42.6	42.6	78.1
	Doesn't Happen	20	10.9	10.9	89.1
	Rare occurrence	20	10.9	10.9	100.0
	Total	183	100.0	100.0	

Delays in approval of building plans

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	91	49.7	49.7	49.7
	Happens Sometimes	67	36.6	36.6	86.3
	Doesn't Happen	8	4.4	4.4	90.7
	Rare occurrence	17	9.3	9.3	100.0
	Total	183	100.0	100.0	

Insufficient details in building plans

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	69	37.7	37.7	37.7
	Happens Sometimes	75	41.0	41.0	78.7
	Doesn't Happen	13	7.1	7.1	85.8
	Rare occurrence	26	14.2	14.2	100.0
	Total	183	100.0	100.0	

Government approvals

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Happens a lot	115	62.8	62.8	62.8
	Happens Sometimes	49	26.8	26.8	89.6
	Doesn't Happen	8	4.4	4.4	94.0
	Rare occurrence	11	6.0	6.0	100.0
	Total	183	100.0	100.0	

```
RELIABILITY
  /VARIABLES=Age Major Degree Experience Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11
 Q12 Q13 Q14 Q15 Q16 Q17
    Q18 Q19 Q20 Q21 Q22 Q23 Q24 Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35
 Q36 Q37 Q38 Q39 Q40
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /SUMMARY=TOTAL.
```

Reliability

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	183	100.0
	Excluded[a]	0	.0
	Total	183	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
,885	44

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Age?	86.2896	298.723	.233	.884
what is your Major?	85.4918	314.043	-.164	.897
Your Degree?	86.4863	301.350	.234	.884
Years of Experience	86.0055	301.830	.104	.887
Delay in laboratory tests	85.8689	298.334	.235	.884
Contractors financial problems	86.6995	303.541	.200	.884
The owners financial problems	86.3934	304.943	.073	.886
The fluctuation in the prices of building materials	86.1038	296.181	.354	.883
Ineffective planning and miscalculation of project time	86.3388	294.962	.384	.882
The owner is late in paying the dues to the contractor	86.2568	297.686	.302	.883
Lack of commitment with the project progress schedule	86.3060	294.466	.377	.882
Poor management of the siter	86.1749	294.563	.378	.882
Absence of the consultant from the workplace	85.8852	290.058	.458	.881
Lack of experience of the contractor	86.0765	288.401	.538	.880
Lack of experience workers for the project	85.9071	289.920	.476	.881
Selling the contract to more than one contractor	86.3716	296.235	.355	.883
Terrorist acts	85.7104	290.646	.403	.882
Road and street interruptions	85.7596	289.821	.446	.881
Delays in the processing of building materials	85.7377	287.425	.577	.879
Poor coordination between project parties	86.0492	290.135	.503	.880
lack of teamwork	85.6831	286.218	.549	.879
Changes in Execution during construction	85.9126	291.740	.448	.881

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Errors in design during construction	85.8852	291.827	.427	.881
Skilled Worker shortage and low productivity	86.0055	290.291	.455	.881
Shortage of equipment and machinery	85.7486	289.387	.511	.880
Inappropriate equipment and old technology	86.1530	290.097	.480	.881
Unique culture of the people and high architectural designs	85.3607	297.375	.259	.884
slow decision-making process	85.9781	289.395	.526	.880
Difficulty getting bank credit	86.0000	294.286	.380	.882
Reduce project costs	85.5464	294.974	.327	.883
Unpredictable site conditions	85.6175	288.161	.478	.880
Site accidents due to the negligence of the safety engineer	85.6885	292.106	.379	.882
natural disasters	84.8962	295.984	.350	.883
Bad weather	85.2350	293.840	.353	.883
Changes in the agreement and contract	85.7596	296.678	.280	.884
Cause by construction agencies	85.4153	290.980	.480	.881
Changes in project scope	85.4262	289.938	.506	.880
Delays in compensation cases	85.8634	291.141	.445	.881
Workers strike	84.9180	298.109	.288	.884
Survey and data collection are not eligible to start the project	85.5246	290.580	.434	.881
Weak management staff	85.9071	291.579	.452	.881
Delays in approval of building plans	86.1475	292.720	.432	.881
Insufficient details in building plans	85.9016	291.760	.417	.882
Government approvals	86.3443	300.359	.211	.885

RESUME

Name Surname: Ahmed Haitham Ghazi Ghazi

Place and Date of Birth: Iraq 12/02/1995

EDUCATION:

- **Bachelor** :2018, Northern Technical University, Technical Engineering College of Mosul, Building and Construction Technology Engineering.
- **Master** :2022, Istanbul Gedik University, Institute of Graduate Studies, Institute of Graduate Studies in Natural and Applied Science, Engineering Management (English).