T.C.
ISTANBUL GEDİK NIVERSITY
INSTITUTE OF GRADUATE STUDIES

STUDYING THE CLAIMS OBTAINED AS A RESULT OF THE PARTIAL HANDOVER OF THE CONSTRUCTION PROJECT

MASTER THESIS

Omar Mahmood Turki AL-ISAWI

Civil Engineering Department

Master in Civil Engineering English Program

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LİSANSÜSTÜ EĞİTİM ENSTİTÜSÜ MÜDÜRLÜĞÜ

Bu çalışma 13.10 2023 tarihinde aşağıdaki jüri tarafından İnşaat Mühendisliği Anabilim Dalı, İnşaat Mühendisliği (Tezli Yüksek Lisans) Programı Yüksek Lisans Tezi olarak kabul edilmiştir.

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DECLARATION

I, Omar Mahmood Turki AL-ISAWI, declare that this thesis titled “Studying the Claims Obtained As A Result of the Partial Handover of the Construction Project” is original work I did for the award of the master’s degree in Civil Engineering. 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. (13/10/2023)

Omar Mahmood Turki AL-ISAWI

DEDICATION

I would like to dedicate my dissertation to all my family members especially my parents who have supported my entire journey. Moreover, I also dedicate this research to my friends and colleagues their guidance helped me greatly throughout my journey.

Furthermore, this research is also dedicated to my supervisor Asst. Professor Dr. Hasan Bozkurt NAZİLLİ who has given guidance and expertise made my research journey easier and successful for me.

At last, I would like to express my gratitude to all my family members, friends, colleagues, and supervisor. Who has been supportive and dedicated throughout my entire journey.

Omar Mahmood Turki AL-ISAWI

FOREWORD

As the creator of this proposition, I have constantly investigated the subject, drawing from a different scope of writing, contextual investigations, and lawful systems, planning to add to a more profound comprehension of the development business, its difficulties, and the legitimate components tending to questions. I stretch out my ardent appreciation to my scholarly counselors, tutors, and friends for their unfaltering help in molding this exploration. My loved ones have been a steady wellspring of consolation and strength. It is my expectation that this proposition fills in as an important asset for experts, scholastics, and anyone with any interest at all in the multifaceted connection between development projects and lawful cases. Go along with me on this scholarly undertaking as we investigate the diverse universe of cases coming about because of incomplete development project handovers.

PREFACE

I would like to express my gratitude towards those who have been helpful and supportive throughout my entire journey of the thesis. I would like to say thanks to my supervisor Asst. Professor Dr. Hasan Bozkurt NAZİLLİ, My family members, my colleagues, and my friends.

Their guidance, patience, support, and expertise was the main reason that now I am able to achieve this goal,

November2023 Omar Mahmood Turki AL-ISAWI

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ABBREVIATIONS

EOT : Extension of Time
HO : Head Office
DM : Defects Liability Period Manager
JCT : Joint Contracts Tribunal
SS : Sum of Square
DF : Degree of Freedom

STUDYING THE CLAIMS OBTAINED AS A RESULT OF THE PARTIAL HANDOVER OF THE CONSTRUCTION PROJECT

ABSTRACT

A crucial tool for efficient project management is the examination of claims at various stages of a construction project. Even though maintaining quality, adhering to safety and environmental regulations, on-time completion, and budget control are all crucial aspects of project management, the analysis of claims supports these goals. Claims may surface during the partial handover and at any time throughout the project, from the planning stage to the actual construction phase and even after completion. Project managers have the chance to identify potential issues and create successful mitigation strategies by methodically documenting and examining claims. These could include changing contract provisions or adapting the project schedule, all of which would help streamline the building process. Additionally, reviewing claims enables more open and helpful communication among stakeholders, promoting a more effective and fruitful project outcome.

The creation of standardized processes to record and assess claims at every stage of a construction project is promoted in this paper. Adopting cutting-edge technologies is also advised to improve stakeholder collaboration and make it easier to analyze claims data. A deeper investigation into the various claim management techniques and how they affect project outcomes may reveal essential best practices for project management. Although claims are not the primary focus of project management in the construction industry, their systematic study and analysis can provide substantial supplementary advantages. They can aid in the successful completion of construction projects by assisting project managers in identifying underlying issues, formulating solutions, and enhancing stakeholder relationships. The various causes of project abandonment, the effects on hired engineers, and the conditions necessary for restarting and finishing such projects could all be explored in further studies.

Keywords: *Claims Management, Construction Project, Budget, Quality.*

STUDYING THE CLAIMS OBTAINED AS A RESULT OF THE PARTIAL HANDOVER OF THE CONSTRUCTION PROJECT

ÖZET

Bir inşaat projesinin verimli yönetimi için önemli bir araç, proje sürecinin çeşitli aşamalarında taleplerin incelenmesidir. Kalitenin korunması, güvenlik ve çevresel düzenlemelere uyulması, zamanında tamamlanma ve bütçe kontrolü, proje yönetiminin kritik yönleridir; ancak taleplerin sistemli bir şekilde belgelenip incelenmesi, bu hedeflere destek sağlar. Talepler, kısmi teslimat sırasında veya proje planlamasından başlayarak inşaat aşamasına kadar herhangi bir zamanda ortaya çıkabilir, hatta tamamlanmadan sonra bile gelişebilir. Proje yöneticileri, potansiyel sorunları tespit etme ve başarılı önlemler geliştirme şansına sahiptirler. Bu önlemler, sözleşme hükümlerini değiştirmeyi veya proje programını uyarlamayı içerebilir, bu da inşa sürecini daha verimli hale getirebilir. Ayrıca, taleplerin gözden geçirilmesi, paydaşlar arasında daha açık ve yardımcı iletişimi teşvik ederek daha etkili ve meyveli bir proje sonucuna katkıda bulunabilir.

Bu makalede, bir inşaat projesinin her aşamasında talepleri kaydetmek ve değerlendirmek için standartlaştırılmış süreçlerin oluşturulması teşvik edilmektedir. Ayrıca, paydaş işbirliğini iyileştirmek ve taleplerle ilgili verileri analiz etmeyi kolaylaştırmak için çağdaş teknolojilerin benimsenmesi önerilmektedir. Talep yönetimi tekniklerinin çeşitli incelemeleri ve bunların proje sonuçları üzerindeki etkilerinin daha derinlemesine incelenmesi, proje yönetimi için temel en iyi uygulamaları ortaya çıkarabilir. Talepler inşaat sektöründeki proje yönetiminin ana odak noktası olmasa da, sistemli bir şekilde incelenip analiz edildiklerinde önemli ek avantajlar sağlayabilirler. İnşaat projelerinin terk edilmesinin çeşitli nedenleri, işe alınan mühendisler üzerindeki etkileri ve bu tür projelerin tekrar başlatılması ve tamamlanması için gerekli koşullar ileri çalışmalarda incelenebilir.

Anahtar Kelimeler: *Talep Yönetimi, İnşaat Projesi, Bütçe, Kalite*

1. INTRODUCTION

1.1. Introduction

The construction industry is a complicated and multi-layered sector influenced by several variables, including on-time completion, cost control, quality assurance, and adherence to safety and environmental standards. The crucial process of project handover—transferring ownership or control over specific project phases or the entire undertaking—takes place within this complex environment. Although handovers frequently mark the end of a project, they can also happen in part during different phases of a project for various reasons, including phased project completion, financial constraints, or unforeseen challenges. While meeting deadlines, staying within budget, and ensuring quality and safety continue to be the primary goals of project management, managing claims serves a secondary but crucial role. Contrary to the conventional understanding, claims can occur at any stage and can be started by any stakeholder, including the contractor or the client. Traditionally, claims have been thought to only occur during the final stages of a project or after a complete handover. Claims might be made, for instance, if the soil conditions differ from those described in geotechnical reports or if the provided drawings are deemed unrealistic. Claim management faces a unique set of difficulties in the context of partial handovers. Due to the segmented nature of the handover, various project components may be in various stages of completion and be bound by various contractual obligations. As a result, this study seeks to clarify the role of claim management as a supplementary and strategic element that interacts specifically with partial handovers rather than as its primary focus. We want to investigate this complex relationship and offer practical frameworks and methods for navigating the challenges of partial handovers in the construction sector.

1.2 Construction Claim

A construction claim is when one party (usually the contractor) asks for more time and payment because the other party (often the client) did not fulfill their responsibilities as stated in the contract. The claim is a way to get compensation for the losses caused by the other party's actions. Compensation can involve additional payment or an extension of the project's timeline(EOT). Construction claims frequently occur when clients, contractors, and subcontractors try to achieve their objectives and maximize their gains. Because the market is highly competitive, contractors may sometimes need to submit project bids with low-profit margins to remain competitive.As a result, contractors are under more pressure to finish projects while earning less money. This situation increases the chance of the contractor failing to meet the client's expectations and goals during project execution, ultimately leading to conflicts and disagreements (Bakhary et al.,2015). Many people involved in projects consider construction claims highly stressful and unpleasant. These claims can lead to lengthy legal disputes or even bankruptcy. Several factors contribute to the occurrence of claims, such as inadequate project planning, changes in scope, requested modifications, errors, and omissions. Understanding the different types of construction claims helps project owners identify potential claim situations.

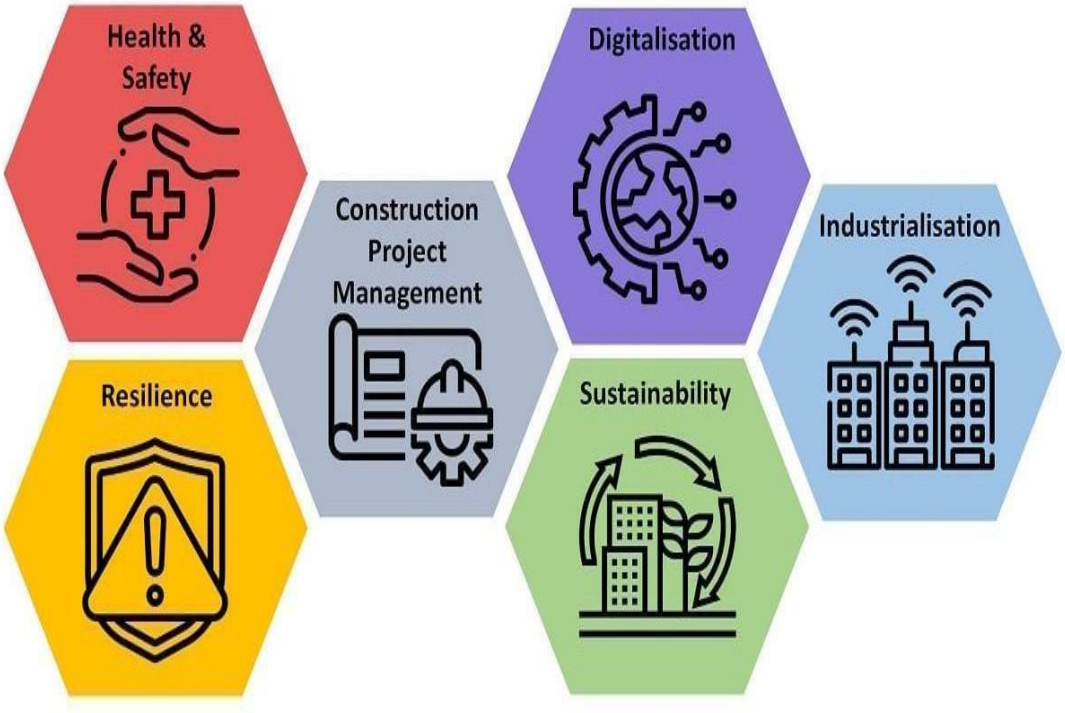

Figure 1.1: Construction and Project Management

1.2.1 Types of construction claims

Types of construction claims are described below:(Moura et al.,2007)

Delay Claim: It happens when unexpected events cause a construction project to take longer than planned. Delays in construction result in lost time and money. Even things beyond the contractor's control, like faulty designs, lousy weather, a pandemic, or an earthquake, can cause such delays.

Damage Claim: When a construction project causes damage to a business or neighboring property, a claim is made. In such cases, the affected customer can hold the contractor responsible for the damage and seek compensation by filing a claim for damages.

Price Escalation Claim: Price escalation claims occur when the expected project budget increases due to the need for early or on-time completion. In such cases, the clients are responsible for covering the additional costs associated with expediting the service. Therefore, it is the clients who submit these claims.

Change in Site Condition: A different site conditions claim can arise when the actual conditions of the project site are different from what the client described in the contract.

Injuries: A claim may be filed when accidents happen at construction sites, and safety rules are not followed. Both construction workers and bystanders can be affected by the incident.

Change of Work: One of the most common claims in the construction industry is when the customer requests a change order after the project has started. This claim occurs when there are disagreements between the customer and the contractor regarding what is included in the contract and what is not.

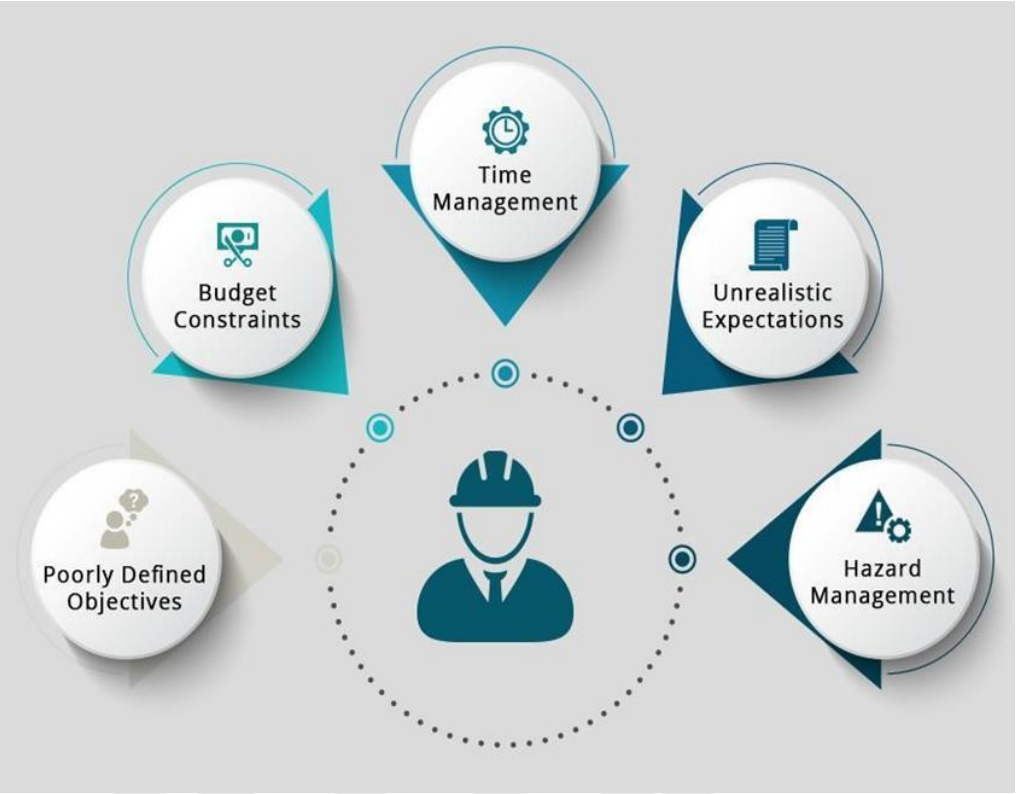

Figure 1.2: Challenges Faced by Construction Project Managers

1.2.2 Causes of construction claim

In the construction industry, conflicts often arise among different parties, leading to claims. Experts in the field, such as experienced contractors, clients, designers, arbitrators, and professors, have identified the following causes for construction claims (Zaneldin et al.,2006):

1. Delays in receiving drawings, site handover, material supply, payments, project start, and completion.
2. Request for a refund of the maintenance deposit.
3. Losses incurred due to extended project timelines and additional overhead expenses.
4. Losses due to idle machinery and labor.
5. Design errors leading to issues and conflicts.
6. Insufficient information in the design causes complications.
7. Changes in the scope of work resulting in disputes.
8. Changes in plans and specifications during construction causing conflicts.

9. Ambiguities in the contract documents leading to disagreements.
10. Insufficient site investigation causing unforeseen issues.
11. Contractors bidding with low rates in the tender leading to conflicts.
12. Changes made or occurrences not requested by the owner causing disputes.
13. Extensions of time (EOT) leading to conflicts.
14. Financial failure of the contractor causing complications.
15. Technical inadequacy of the contractor resulting in issues.
16. Poor quality construction work and incorrect equipment usage causing problems.
17. Failure to follow authorized procedures causing conflicts.
18. Damages occurring to neighboring buildings during construction.
19. Work stoppage by workers leading to disruptions.
20. Accidents on-site resulting in claims.
21. Natural disasters affecting the project.
22. Increases in material and fuel costs causing conflicts.
23. Weather conditions impacting the project.

1.2.3 Unexpected ground conditions causing issues

As contractors, it is essential to take preventive measures to avoid the lengthy process of construction claims and costly legal battles. These measures help reduce the chances of getting involved in expensive litigation (Sabri et al.,2022). The following measures can prevent construction-related disputes in construction contracts:

1. Having clear contract terms and conditions helps protect all parties involved and reduces the likelihood of legal disputes. Distributing risks somewhat is essential to minimize the chances of conflicts and risks.
2. Giving the design team enough time to create detailed and accurate specifications, quantity estimates, and drawings with minimal errors or inconsistencies is crucial.

3. Contractors prioritize the safety of their employees and the project's property during construction. Implementing a construction safety program helps address safety concerns and reduce the risk of injuries.
4. Keeping accurate and timely project records is essential. This includes maintaining records of timesheets, daily entries, reports, photographs, labor records, equipment used on the site, weather conditions and their impact on progress, and the overall construction progress.
5. Before starting any modifications on the site, contractors should ensure that change orders are signed and documented.
6. Contractors should hire qualified workers and employ effective management practices to maintain the quality of their work.

1.3 Contract Claims in Construction

The disputes often occur between the parties involved in construction contracts. These disputes can arise due to delays, changes, unexpected situations, lack of information, and disagreements. The claims can be made for various reasons, including financial losses, additional time needed, and predetermined penalties for not meeting deadlines. The contract should clearly state what can be considered a claim and provide guidelines on handling them. There might also be claims related to hiring consultants (Levin et al.,1998).

Claims must be properly constituted and documented:

- Make sure you have a valid legal right to claim.
- Show clear evidence of cause and effect through timely records.
- Support any additional costs with complete and relevant documents.

Avoid making unjustified and exaggerated claims and being overly optimistic when discussing settlement amounts with managers. Be open to accepting a reasonable settlement offer without resorting to costly legal proceedings, which can drain valuable management resources. Keep in mind that success in court is not guaranteed.

1.3.1 The client

The client should keep mind:

- The desirability of avoiding claims.
- It is preferable to avoid claims whenever possible
- Resolve legitimate claim entitlements promptly and professionally.
- Conduct thorough surveys, including ground investigations and landscape surveys, to minimize the chances of claims. Research shows that a significant portion of claims, around 60%, stem from delays caused by ground-related issues.
- Ensure that all geotechnical data is accessible to all parties involved in the bidding process.
- Choose the most suitable finding method based on risk allocation and appropriate contract conditions. This involves deciding which aspects of the project should be designed by the contractor or subcontractors.
- Be careful when making changes to standard contract forms. Such changes may introduce ambiguity and uncertainty. In case of any ambiguities, the interpretation will favor the party that did not draft the contract. The "contra referendum" rule may be applied in such cases.
- Settling disputes at an early stage is usually more cost-effective There are significant benefits to reducing dislike between the contract parties.

1.3.2 Tender documentation

Several strategies can be used in the preparation of tender documentation to help avoid claims:

- Avoid addressing issues after the tender process. Statements like "to be agreed" can lead to disputes without the benefit of competition.
- Phrases such as "to suit the contractor's program" are open to interpretation.
- Setting a conditional date, such as "by the builder's instruction," creates ambiguity for bidding contractors. It is not possible to enforce an agreement to agree.

- Prevent ambiguity in design responsibility, such as "the contractor will complete any required design after the consultants have finalized the drawings provided for tender purposes."
- Ensure that programs, resource charts, and method statements submitted by contractors with their tenders are only used for tender assessment and not adopted as contract documents or the basis for changes.
- If possible, avoid using "letters of intent" as they can lead to arguments over contract details not covered in the letter. There have been cases where disputes ended in court without a signed contract. At the very least, a letter of intent should limit activities to pre-construction tasks like engineering design and pre-ordering long-delivery items. Defining payment terms in a letter of intent is also beneficial, as this can be a contentious matter in legal disputes. There is no precise legal definition of Quantum Meruit, so a letter of intent should describe how overheads, profit, and indirect costs will be handled.

1.3.3 Design

Many claims arise from delays caused by design consultants providing schedules, drawings, and specifications after construction. This can lead to conflicts due to various issues with the information:

- Missing or not provided
- Delayed
- Incorrect
- Insufficient for ordering or construction
- Impractical
- Unclear or contradictory
- Inconsistent with pricing information
- Incorrect or not suitable for the intended purpose
- Not coordinated with other information

Standard contracts usually allow some flexibility for the design team to provide additional drawings and details as reasonably necessary to clarify or expand

on the contract drawings. Contractors may be responsible for raising any questions about newly received information within 28 days or risk forfeiting their right to an additional payment.

1.3.4 Contractor’s master programmer

Many contracts require the contractor to create a detailed schedule called the "contractor's master program" after signing the contract. The contract should specify the level of detail needed in this schedule, but the contractor should consider the following factors:

- Realistic timeframes for each work section, considering input from significant subcontractors.
- Reasonable periods for specialized design and manufacturing, including approval time for checking conformity and coordination with other specialists.
- Distributing workload evenly for consultants to review and approve specialist drawings.
- Establishing a system to track progress against the schedule and update it when changes occur.

Upon receiving the contractor's master program, the client's team should carefully review and question any unjustified aspects. This schedule will likely form the basis for future claims related to delays, extensions of time, disruptions, and additional costs. Challenging the schedule later, when claims are made, puts the client in a weaker position. It is important to note that the client should not "approve" the contractor's master program, as approval might release the contractor from liability for meeting the completion date.

1.3.5 Cause and effect

Combining various causes of delay into a single claim, known as a global claim, has not always been favored by the courts. This approach, often called "death by a thousand cuts," can be quickly challenged by the client's team. They can highlight the contractor's shortcomings, such as labor shortages, poor management, equipment breakdowns, and subcontractor issues. This raises the question of whether

the delays were happening simultaneously or separately. It is more effective to make a claim specific rather than general. This requires careful and thorough analysis as the claimant identifies each alleged problem, connects it to the resulting delay and its impact, and provides supporting contemporary evidence. This precise approach is better for determining the amount of compensation and allows for a judgment based on facts. In other words, for a claim to succeed, the claimant must establish a clear connection between the breaches alleged and the resulting delay and associated costs.

1.3.6 Notice and particulars

According to UK commercial law and all building contracts, any party involved must notify the other party as soon as they notice a breach to fix or reduce its impact. If this notice is not given, the right to receive additional payment for any resulting loss or expenses is lost.

The notice regarding delay or loss and expense should include:

- Clearly stating the details of the breach and the contractual clauses that support the claim.
- Providing as much information as possible, including how the delay has affected the project.
- Specifying the dates and periods of the delay.
- Explaining any critical impact on the project's completion date.

The client's team should promptly review the facts presented in the notice and address any parts that seem to be based on personal opinions or subjective views.

1.3.7 Concurrent delay

Concurrent delay occurs when multiple factors contribute to a delay happening simultaneously. For instance, it could happen when consultants provide their details late, and there is also a dispute among workers that delays critical work. In recent legal decisions, the courts have disregarded arguments about which delay was more significant and have focused on the principle that each party should bear the consequences of their delays. For example, the contractor may be eligible for an extension of time and relief from damages. However, they may not be entitled to claim for additional costs or expenses incurred due to the delay.

1.3.8 Quantifying claims

Quantifying claims involves considering several factors:

Costs: The actual expenses incurred are the proper basis for evaluating claims. It is a common misconception that the contractor is limited to their tender rates as their full entitlement. Costs may also include adjustments for inflation resulting from delays.

Preliminaries: Preliminaries encompass setup costs, ongoing expenses, and dismantling costs. Therefore, extensions of time should not include setup or dismantling costs but only the running costs during the breach and its associated period of delay.

Disruption: Disruption refers to the Loss caused by inefficient productivity, which is challenging to assess. A more effective approach is to focus the claim on a specific area affected by the breach. A more accurate evaluation can be made by comparing individual productivity before and after the Disruption occurred to productivity during the period of Disruption. Generic claims based on statements like "this was the tender price, and this is the final cost" are unlikely to succeed.

- Head office or factory overheads: The courts generally accept Hudson's formula: (HO Profit % / 100) x (contract sum/contract period (weeks)) x (delay (weeks)). However, the following should be subtracted when applying the formula:
- Credit for staff time included in the project costs as visiting supervision.
- Any additional overhead recovered within the final account, such as the variation account.
- Credit where resources were redeployed due to delay.
- Loss of profit/Opportunity costs: This applies only when the claimant can prove that contract breaches prevented them from making a profit elsewhere. Deductions must be made for additional profit already received for extra work instructed and priced within the final account.

Finance charges and interest

Finance charges and interest on extra capital required to fund costs arising from contract breaches are recoverable, provided that:

- Proven and reasonable interest rates are used (e.g., prevailing market rates during the breach period).
- If financed within the corporate group, the rate will be based on the interest received from the deposited funds.

1.4 Study Topic

- Due to the failure of some companies to comply with the completion of construction projects or any other projects, and also due to the occurrence of some security reasons that affect the projects and leave them partially completed, which leads to the failure to complete the project in the required manner. Therefore, the primary and secondary requirements must be discussed to complete the remainder of the completion of the project, and the reasons are as follows. Explanation of the justification for the research:
- Because of the need to know the percentage of project completion.
- To know the materials and tools used.
- To study the reasons for not completing the project

1.4 Purpose of Thesis

The research aims to study the due requirements due to the partial delivery of the construction project. The importance of the research lies in the following:

- Examine the problems of abandoning the project.
- Knowing the main reasons and what should be done for the engineers who were recruited for this project.
- Submitting a study of the necessary requirements to complete the structural construction.

1.6 Hypothesis

1. Identifying the reasons for leaving the project.
2. Studying the previous construction plan and amending it.

1.7 Research Outline

The first chapter briefly introduced the dissertation, while the second chapter dealt with literary reviews of similar studies. The third chapter dealt with a theoretical part about some materials' physical and chemical factors. The fourth chapter dealt with a questionnaire on the subject that included several questions discussed with engineers to reach claims, and finally, the fifth chapter concluded.

2. LITERATURE REVIEW

2.1. Background of the Study

Claims appear to affect the completion of construction, cause delays in delivering projects, and affect the overall budget, which results in a strained relationship of parties, stalemates, delays, and disputes that cause or carry the potential force for litigious and arbitral action of the parties, for resolution in the Contract. Both parties are responsible for this unpleasant situation. The Employer and their professional representative rush to prepare the Contract, resulting in many shortcomings and failures to fulfill their obligations. Despite knowing that some aspects of their documentation are indefensible, they still try to defend it. On the other hand, many claims made by contractors are unfounded because they misunderstand the basic principles and neglect common sense and psychology, which are essential in claim preparation and cost nothing. Neither of these attitudes can be justified, so both parties must be objective when dealing with claims (Long et al., 2004). Therefore, contractors or engineers must think before embarking on partial ownership:

- Partial possession
- Logistical issues

A developer wants to take control of some of the development so the tenant can start their interior work. The developer claims that the building contract allows for partial possession. What should the Contractor consider in this situation? The first and most crucial step is to review the building contract thoroughly.

Is practical complete Suppose the Contract does not provide for sectional completion. Does the Contract enable the developer to take possession of part of the development before the practical completion of the whole of the works?

Ion achieved at the end of the works, or is sectional completion permitted?

2.2 Partial Possession

Partial possession allows the developer, with the Contractor's consent (which should not be unreasonably withheld or delayed according to the JCT forms of

Contract), to take control of a specific development area before the scheduled completion date. Unlike sectional completion, the usual requirements for practical completion no longer apply, and practical completion of that specific part is automatically considered to have occurred upon possession (Bair, Jennifer et al., 2012).

This has several implications, including:

- The developer assumes the risk for that particular area, regardless of its condition.
- The defects liability period, during which any necessary repairs are the responsibility of the Contractor,
- The amount of liquidated damages will be reduced proportionately.
- Insurance obligations for that part will be transferred to the developer.
- Retention funds may be released for that specific area.

2.3 Logistical issues

From a practical standpoint, partial possession can be complicated. The Contractor is still responsible for finishing the work within the agreed completion date. However, new challenges can arise for the project when the developer takes possession of a part of the development and the tenant starts their fit-out works. While these disruptions may lead to a time extension, it is crucial for the Contractor to thoroughly assess all potential risks before agreeing to a partial possession request. One possible solution to mitigate the risk of disruption and ensure smooth progress for the rest of the project is to enter into a supplemental agreement establishing a clear access plan. This can help minimize disruptions and allow the Contractor to proceed with the remaining work as initially planned (Son et al.,2012).

2.4 Claims in construction projects

2.4.1 Definitions of claims

A construction claim is one aspect of project management, albeit not the only crucial one. It is a formal request usually made by one of the contracting parties—often the Contractor—seeking restitution for harms brought on by the other party's

breach of the terms of the agreement. This payment may be in the form of extra money or an extension of time (EOT). A construction project may experience claims at any stage, from planning to completion. They are not just used in scenarios with only a partial handover. Claims might be made, for instance, when soil conditions do not match up with geotechnical reports or when the provided drawings are not accurate. Understanding the various construction claim types can assist owners and contractors in anticipating and managing potential problems. This can impact project outcomes regarding budget, timeline, quality, safety, and environmental considerations. Following the filing of a claim, the contracting parties may either concur, create a change order or contract modification, or disagree, resulting in a construction contract dispute. According to Hughes and Barber (1992), a claim is a request, demand, or application for payment that the Contractor feels he is legally entitled to, whether rightfully or incorrectly. The following factors are frequently used to support claims:

- Seeking an extension of time.
- Looking for more money.
- Seeking reimbursement of costs.
- Failure of one party to uphold their end of the

2.4.2 Types of claims

There are several ways to classify construction claims. By determining their relevant legal vasoconstriction, claims can be classified as follows Claims can be classified as (Chaitanya Khekale, 2015).

- Claims based on the Contract.
- Claims outside the Contract.
- Claims for a reasonable payment.
- Claims made as a gesture of goodwill.
- Claims made in response to another claim.

A claim is a request for reimbursement of project costs or for an increase or decrease in execution time from either the parties and may be due to a difference in the payments made or something else. Under the Contract shall be for any One of the

parties to the Contract has the right to claim, and the Contract also provides the necessary procedures for making legal claims by the Contractor because:

1. The emergence of unexpected events not within the Contractor's expectations.
2. Receive additional payment or additional time.

2.4.3 Factors contributing to the occurrence of claims

- The way the contract is secured (the bid method).
- The role of the engineer in the design.
- Political aspects.
- Legal/contractual aspects.

2.4.4 Reasons for claims

Claims between the parties to a contracting contract have causes, often stemming from the Contract itself or a party's breach of their obligations towards the other. The main reasons for obtaining claims in the field of building and construction are (Khulusi et al.,2006):

1. Reasons belonging to the Contractor: such as breaching his obligations towards the Employer, executing the construction works in a dispute Specifications and conditions agreed upon, or transgression or excessive maintenance of building materials if the Employer provides them, or to bring it with poor quality without what was agreed upon in terms of quality. Alternatively, to make modifications or additions to the building without referring to the Employer (Al-Sarkhasi et al.).
2. Reasons about the Employer: such as refusing to receive the building after its completion from the Contractor or delaying the construction. Receive it from him with his ability to do so. Alternatively, cause an increase in expenses for the Contractor if he is sluggish in issuing a building permit until it is too late. The date specified for the commencement of construction, or the Contractor has contracted workers or hired construction machinery or is to be late. In handing over the rent to the Contractor, especially if it was in installments, and the completion of the construction stages depending on the payment made by the boss.

3. Reasons related to the contracting contract itself: This is when the contracting contract does not include a description of the building to be constructed, Materials and machinery used in construction, or to default from a statement of wages due to workers or method of payment If the rent is in installments, or if there is ambiguity in the terms of the Contract, or if it is worded, it is more likely than not. Concerned or neglecting to specify the obligations and responsibilities of each of the parties to the Contract, which means thePossibility of occurrence of Claims between the parties to the Contract (Dr. et al.).
4. Inability to acknowledge all risks, and failure to deal between the two contracting parties.
5. Risks that have been ignored, or dealt with arbitrarily.
6. Employers' tendency to fabricate all risk obligations to the contractor only.
7. Inadequate investigations and haste in attempting to develop the project without adequate study of potential risks.
8. Failure on the part of the effective parties in the contract, and their disposition in a timely manner to perform their duties, and commitment contractually fulfilled.
9. Unrecognized circumstances and force majeure.
10. DM competency in contract administration on the part of the employer.
11. Low bid or contract rate, and look for an opportunity to demand an increased bid rate, which will lead to a dispute.

2.5 Claims Procedures

2.5.1 Notification of claims

The Contractor shall, notwithstanding the other provisions of the Contract, if he intends to claim any additional payments, under any provision of these Conditions, or otherwise, the Engineer shall give notice of his intention to do so and send a copy of such notice to the Employer within days from the first appearance of the accident giving rise to the claim. When the event has occurred, the Contractor shall keep records of the facts necessary to substantiate any claim that may be made.

He wishes to submit them later, and the Engineer, once he receives the notification, must examine these records, and he may. He may instruct the Contractor to keep such additional records as are reasonable, and the Contractor shall permit The Engineer to examine all records kept by the Contractor pursuant to this Clause and provide the Engineer with a copy of it whenever you receive instructions from him.

Article 12 - First of Chapter Eleven of the Government Contract Implementation Instructions No. (2) for the year 2014 stipulates that "the contracting party must comply with the application of the contracting conditions for civil engineering works for the year 1987 and the contracting conditions for electrical, mechanical and chemical engineering works for the year 1987 or what replaces them and considers them as part of separated from the Contract (The Ministry of planning, 2017).

2.6 Literature Review

The literature on claims in the earlier studies that were evaluated concentrated on the causes, categories, and categorization of claims in building projects. By examining the state and effects of the claims management process for building projects in the Iraqi setting, this study adds to the body of existing work. Attempts have been made to put in place a formal, uniform claim-handling procedure outside of the nation (Kululanga et al., 2001; Zaneldin, 2005; Moura & Teixeira, 2007; Hassanein& El Nemr, 2008) instead of self-evaluation or intuition. This study, however, focused on the level of awareness, obstacles, and effects of the process on project cost overrun. Numerous elements in the construction sector contributed to the rising bad project cost performance. In practically every building project, claims are present. In order to avoid disagreements and disruptions in the construction process and to maintain good relations between project participants, claims management is Crucial. Claims management is a crucial component of project contract management, and it should receive the in-depth research it merits if the parties involved are to minimize loss and reap the financial benefits of business strategy (Chen & Wang, 2011). According to Kululanga et al. (2001), the biggest problem contractors face in today's unstable economic environment is the management of construction claims. Construction projects are increasingly prone to several issues that result in cost recovery and time extensions. Therefore, strategies for the construction claim

management process must be developed in Nigeria to solve the industry's existing issues. An efficient and effective management approach can still reduce the impact of claims, although it is more difficult to prevent them after construction has started. A thorough grasp of the developed construction claims management process may help prevent unresolved claims, frequently leading to conflicts between construction owners, contractors, and other players (Long, 2013).

Ren et al. (2001) said that construction claims management aims to ensure that claimants are compensated relatively for obstructing the Contract's execution. They added that, in addition to the management tasks carried out during the construction phase, claims management also heavily relies on legal guidelines and other management theories during the pre-construction stage, which primarily entails standard construction forms, risk management theory, and project procurement systems. The administration of construction claims entails several sub processes. Said that claims management strives to anticipate potential claims and identify them. Actual claims, prepare for preventative actions and coordinate claims across the whole project among all stakeholders. When a claim arises at any point throughout the process of turning customers' dreams into reality, claim management is considered one of the project management methods utilized to settle a project problem. Construction claims management procedure that is inconsistent can have various disruptive implications. This might develop into a significant source of contractual problems, resulting in the project being completely abandoned. According to Ren et al. (2001), there is minimal proof that claims handling has significantly improved. As a result, the ongoing development of conflicts, claims, and disputes demonstrates that the pre-construction research's suggested remedies need to be revised. It is necessary to consider claims management strategies rather than relying solely on legal and fundamental principles during pre-construction.

Moura and Teixeira (2007), the correct identification, notification, documenting (and quantification), presentation, and settlement of claims processes were noted in their study. A claim management process is a planned series of connected actions in response to a request made by one of the Contract's parties and intended to produce a specific outcome for all parties. The tasks include resource consumption, management, and interdependence to accomplish a specific objective. The core concepts of claims management were outlined by Levin (1998). They

included the following steps: recognizing and identifying the claim, notifying the claim, accurately documenting the claim, analyzing its influence on costs and timelines, preparing the claim, and negotiating the claim. Together, these six Guiding principles help a claims management system accomplish its goal of being efficient. Moura and Teixeira (2007), the correct identification, notification, documenting (and quantification), presentation, and settlement of claims processes were all mentioned in their study, according to Shehu,Endut, Akintoye and Holt (2014), Overruns in construction project costs continue to be a severe problem for the sector. This is widely established in the building sectors of emerging economies (Ogun et al., 2006; Senoia et al. (2016). Cost is a significant factor throughout the project management life cycle, one of the most crucial project characteristics, and a critical factor in project success (Azhar et al., 2008). The cost encompasses all expenses from the commencement to the completion of the project, underscoring the importance of diligently managing each task throughout the entire development process?

3. METHODOLOGY

3.1 Methodology

The methodology section serves as the blueprint of the research, providing a detailed roadmap for the investigative journey ahead. Its core purpose is to elucidate the procedural steps and analytical techniques employed in gathering and evaluating data. This is instrumental in establishing the study's credibility, as it enables both peer researchers and stakeholders to scrutinize the research design, data collection, and analytical processes. The methodology outlines the means to attain the objectives stated in the research proposal, thereby ensuring that the conclusions drawn are both reliable and valid. By presenting a meticulous methodology, this study aspires to set a benchmark for transparent, replicable, and robust research within the field of construction project management.

3.2 Research Design

This study employs a cross-sectional research design, capturing data at a single point in time to explore the complexities surrounding construction claims management. A cross-sectional approach is advantageous for its efficiency and cost-effectiveness, which are crucial given the constraints of time and resources. Moreover, it allows for the immediate analysis of current trends and issues, providing timely insights into the construction sector's challenges. The research utilizes a primary data quantitative approach for its data collection and analysis. This approach was chosen for several reasons. First, it permits the objective measurement and statistical analysis of data, yielding empirical results that can be generalized to a broader population. Second, a quantitative methodology facilitates the comparative analysis of variables such as project status, claim types, and resolution methods, thereby aiding in identifying patterns and making predictive statements. Lastly, quantitative data is conducive to rigorous statistical tests, ensuring that the findings are both robust and replicable. Hence, a primary data quantitative approach aligns

seamlessly with the research objectives, offering a structured and empirical framework for analysis.

3.3 Data Collection

The sampling method employed in this study is stratified random sampling. Construction projects inherently involve multiple stakeholders, including project managers, contractors, and engineers. Stratification ensures that each subgroup within the population is adequately represented, thus providing more accurate and insightful data. Subsequently, random sampling within these strata ensures the generalizability of the findings to the broader construction industry. The questionnaire was distributed electronically to professionals working in various capacities within the construction sector. The respondents primarily include Project Managers, Engineers, Contractors, and Project Owners. This diverse respondent pool ensures a comprehensive perspective on construction claim management issues. Prior to participation, all respondents were briefed on the study's objectives and assured of the confidentiality of their responses, addressing ethical considerations. Informed consent was obtained electronically before the dissemination of the questionnaire, and participation was strictly voluntary. This approach ensures that the study upholds ethical standards while gathering robust and reliable data.

3.4 Questionnaire Design

The questionnaire is structured with multiple fields to capture a holistic view of construction claim management. Fields such as "Job Role" and "Status of Project Completion" offer context on the respondent's perspective and the project's state. "Reasons for Project Status" and subsequent claim-related questions provide in-depth insights into the nature and resolution of claims. For ordinal data, a 1-5 Likert scale is employed, facilitating quantifiable responses for subjective topics like the impact of claims on project completion or organizational preparedness. Each field is meticulously designed to align with the study's objectives.

3.5 Data Analysis

The collected data will undergo a rigorous analytical process using Excel to generate meaningful insights. Primarily, descriptive statistics—mean, mode, and median—will be employed to summarize the central tendency, dispersion, and shape of the dataset's distribution. These metrics will offer valuable insights into the general trends and behaviors within the construction sector, especially regarding claim management and project completion statuses. Frequency distribution will be crucial for our categorical data, such as "Job Role" and "Reasons for Project Status." This will reveal the most common issues faced across different roles in construction projects and assist in identifying potential areas for improvement. These frequency distributions will be visualized through Excel-generated bar graphs and pie charts for a clearer comparative analysis. We intend to conduct regression analysis to explore potential relationships and dependencies among variables. For instance, understanding the impact of "construction claims" on the "completion of a project," as measured on the Likert scale, may yield insights into root issues affecting project timelines. Excel's Data Analysis Toolpak will be utilized for this purpose, enabling us to understand variable interactions and their potential influence on project outcomes. This multi-faceted approach ensures a comprehensive analysis, blending both numerical and categorical data, to facilitate actionable recommendations for enhanced construction claims management.

3.6 Validity and Reliability

Ensuring the validity and reliability of this research has been of paramount importance, and several steps have been taken to uphold these fundamental criteria. First, in terms of validity, the questionnaire was carefully designed to mitigate the risk of ambiguity and bias. The questions were constructed based on existing literature and validated theories in the field, thereby enhancing the content validity. Additionally, a pilot test was conducted among a smaller audience to identify any discrepancies, ambiguities, or challenges in comprehending the questionnaire. Reliability is ensured through the meticulous selection of our sampling method and the scale used for ordinal data. The sampling strategy was designed to be representative of the different roles within the construction sector, enhancing the generalizability and, therefore, the external reliability of the study. Furthermore, the

data collection process was standardized; the questionnaire was distributed uniformly among all participants, and ethical considerations were strictly adhered to, minimizing the likelihood of discrepancies or inconsistencies that could affect internal reliability. We will use internal consistency tests such as Cronbach's Alpha, easily computed in Excel, to measure how well the set of variables in our survey measures the intended construct. This reinforces the reliability of our scales and, by extension, the trustworthiness of the study's outcomes. These precautionary measures collectively fortify the validity and reliability of our research, thereby enriching its contribution to the existing body of knowledge.

3.7 Ethical Considerations

Ethical considerations were taken into account throughout the entire research process to safeguard the integrity of the study and protect the participants. Respondents were informed of the study's purpose and assured of the confidentiality and anonymity of their responses, with all identifiable information strictly secured. Prior to participating, informed consent was obtained, ensuring that all participants were volunteering willingly. Data was securely stored and will only be used for the purposes of this research, accessible solely by the research team. Additionally, all findings will be reported honestly, adhering to principles of academic integrity and responsible research conduct. These measures establish a robust ethical framework for the study.

3.8 Limitations

This study, while comprehensive in its approach, does bear limitations that must be acknowledged. The data collection is based on self-reported questionnaires, which can be subject to response bias. The study relies primarily on a quantitative approach, which may not capture the complexities and nuances of each individual construction project or claim. The focus on Excel-based data analysis techniques, while efficient, may not offer the depth that specialized statistical software could provide. The sample size and demographic may not be fully representative, limiting the generalizability of the findings. These limitations should be considered when interpreting the results.

3.9 Summary

This methodology outlines a robust framework for investigating the impact of construction claims on project completion. Utilizing a primary data quantitative approach, the study employs a cross-sectional design with a carefully crafted questionnaire distributed to a diverse group of professionals in the construction sector. The data collected will be rigorously analyzed using Excel-based techniques, emphasizing descriptive statistics, frequency distribution, and regression analysis. This research aims to produce actionable insights, with high levels of validity and reliability, into the relationship between construction claims and project outcomes.4.0 Result and Discussion

In this study, our research objectives were to investigate and gain insights into the factors influencing project completion within the construction sector. Specifically, we aimed to understand the reasons behind project status, the impact of construction claims, the presence of project requirements, the role of recruited engineers, and the existence and potential amendments to construction plans. Our research questions revolved around these key areas to provide a comprehensive view of the challenges and dynamics within the construction industry. To achieve these objectives, we employed various data analysis methods, including descriptive statistics and regression analysis. Descriptive statistics were utilized to summarize and interpret the data, providing insights into the central tendencies, variabilities, and distributions of the variables under investigation. Regression analysis allowed us to explore the relationships between project completion status and the selected independent variables, helping us assess how these factors collectively contribute to project outcomes. These analytical methods enabled us to draw meaningful conclusions and recommendations from the data, shedding light on strategies for enhancing project completion rates in the construction sector.

4. DATA ANALYSIS

4.1 Demographic

Names: The list includes Arabic names, indicating a Middle Eastern or Arabic speaking region. Some names included are: أحمد (Ahmed), علي (Ali), طارق (Tarek), مصطفى (Mostafa), حسن (Hassan), and many more.

4.1.1 Job role

The data provides numerical values for job roles. However, we don't have a clear legend to determine the exact roles these numbers represent. The values range from 1-4.

4.1.2 Status of project completion

This seems to represent the progress of a project, possibly with 1 representing a low status (like just started) and higher numbers indicating a closer state to completion. The values range from 1-3.

4.1.3 Reasons for project status

Reasons are numerically coded from 1-4. Without context, we can't determine what these reasons are, but they likely relate to challenges or circumstances faced in the project.

4.1.4 Claims due to partial delivery or abandonment

Values range from 1-2, which likely indicates a binary response such as Yes (1) and No (2) or vice versa.

4.1.5 Nature of these claims & resolution

Numerical values ranging from 1-5 describe the nature and resolution of the claims. These could represent different categories or severity levels.

4.1.6 Impact of construction claims on project completion

Rated on a scale of 1-5, with 5 presumably being the highest impact and 1 being the lowest.

4.1.7 Procedures for handling construction claims

Values range from 1-4, possibly indicating different procedures or protocols.

4.1.8 Project requirements, delivery, and engineer recruitment

These are binary indicators, likely Yes (1) and No (2) or vice versa, regarding whether there were primary and secondary requirements specified, whether there was a partial delivery, and if engineers were specifically recruited.

4.1.9 Engineer's role after incompletion & construction plan existence and amendment

Again, binary responses indicating whether a specific scenario occurred or not.

4.1.10 Suggestions to improve project completion rates

A numerical scale ranging from 1-5, possibly indicating the level of importance or relevance of a particular suggestion.

4.1.11 Preparedness for handling incomplete projects

Rated on a scale of 1-5, indicating the level of preparedness of the organization.

4.2 Descriptive Statistics of Project Information

Table 4.1: Descriptive Statistics of Project Information

Status of Project Completion		**Reasons for Project Status**
Mean	1.946666667	2.633333333
Standard Error	0.06539275	0.085355772
Median	2	3
Mode	2	3
Standard Deviation	0.800894355	1.045390436
Sample Variance	0.641431767	1.092841163
Kurtosis	-1.432262297	-1.15985445
Skewness	0.096850432	-0.145806468

For the 'Status of Project Completion', the mean value is 1.9467, which indicates that on average, projects are nearing halfway to completion, assuming a scale where higher values indicate further progress. The median and mode values both equal 2, suggesting that most projects are halfway or slightly above halfway to completion. The standard deviation of 0.8009 implies a moderate spread around the mean, meaning projects vary in their completion status but not wildly so. This observation is supported by a relatively low kurtosis of -1.4323, indicating a flatter distribution with fewer outliers. The skewness of 0.0969 shows a slight positive skew, meaning there are slightly more projects that are less than halfway completed. On the other hand, for 'Reasons for Project Status', the mean value is 2.6333. Without additional context on the scale used, it's hard to interpret this value precisely. The median and mode are both 3, suggesting that a specific reason (possibly coded as '3') is the most common among projects. The standard deviation of 1.0454 indicates a wider variation in reasons compared to project completion statuses. The negative skewness of -0.1458 means there are slightly more projects with reasons coded above the mean. The kurtosis of -1.1599 implies a flatter distribution with fewer extreme values or outliers.

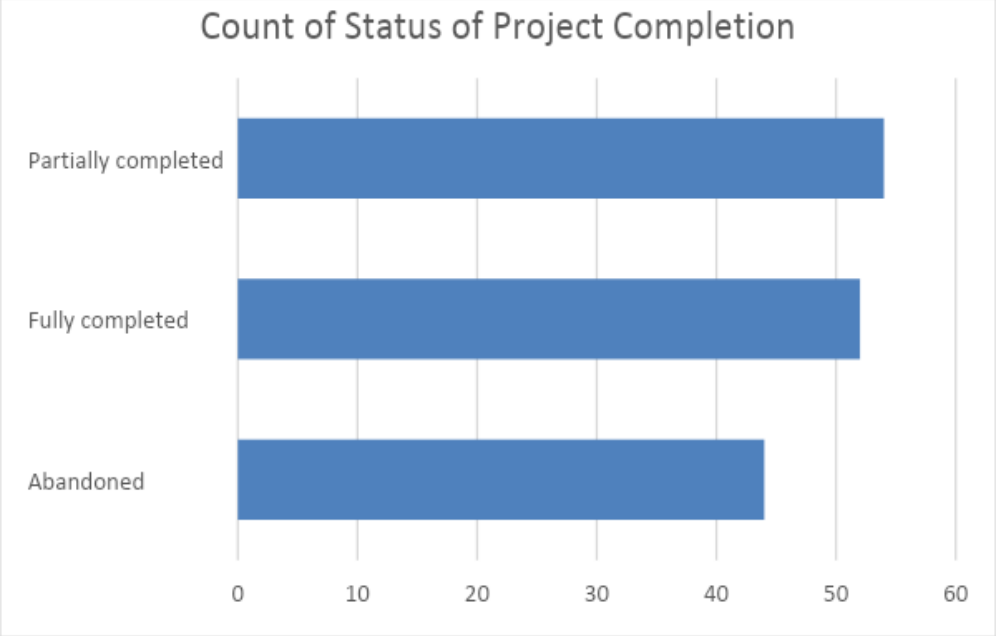

Figure 4.1: Status of Project Completion

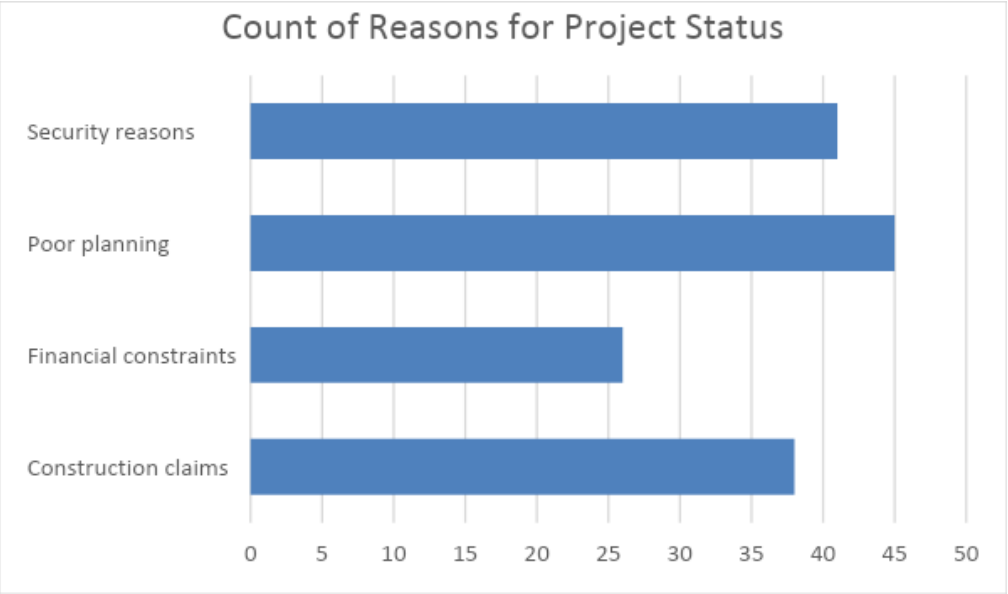

Figure 4.2: Reasons for Project Status

4.3 Descriptive Statistics of Construction Claims

Table 4.2: Descriptive Statistics of Construction Claims

Have there been any claims filed due to the partial delivery or abandonment of the project?		*If yes, what were the nature of these claims?*	*How were these claims resolved?*	*On a scale of 1-5, how much do construction claims impact the completion of a project?*	*What procedures does your organization have in place for handling construction claims?*
Mean	1.52	2.546666667	2.533333333	2.846666667	2.48
Standard Error	0.040928814	0.085966887	0.087555245	0.116908985	0.089602653
Median	2	3	3	3	3
Mode	2	3	3	1	3
Standard Deviation	0.501273546	1.052875045	1.072328375	1.431836792	1.097403892
Sample Variance	0.251275168	1.108545861	1.149888143	2.0501566	1.204295302
Kurtosis	-2.020581708	-1.184526673	-1.24274695	-1.29579755	-1.30991962
Skewness	-0.080875085	-0.089688674	-0.038002228	0.106726534	-0.0256438

The mean values offer important insights into this aspect of the dataset. Firstly, the average response to "Have there been any claims filed" is approximately 1.52, suggesting that, on average, claims related to partial project delivery or abandonment are relatively infrequent across these projects. Moving on to the nature of these claims, with a mean of around 2.55, it indicates that the nature of these

claims tends to be somewhat above the midpoint of the scale. This suggests that the claims often involve issues of moderate complexity or significance. Regarding the effectiveness of claims resolution methods, the mean for "How were these claims resolved" is approximately 2.53. This implies that, on average, the methods employed for resolving these claims are moderately effective. In terms of the impact of these claims on project completion, the mean score for "Scale of impact" is about 2.85. This suggests that, on average, construction claims have a moderate impact on the completion of the projects. When looking at the procedures organizations have in place for handling construction claims, the mean is approximately 2.48. This indicates that, on average, organizations have moderate procedures established for dealing with such claims.

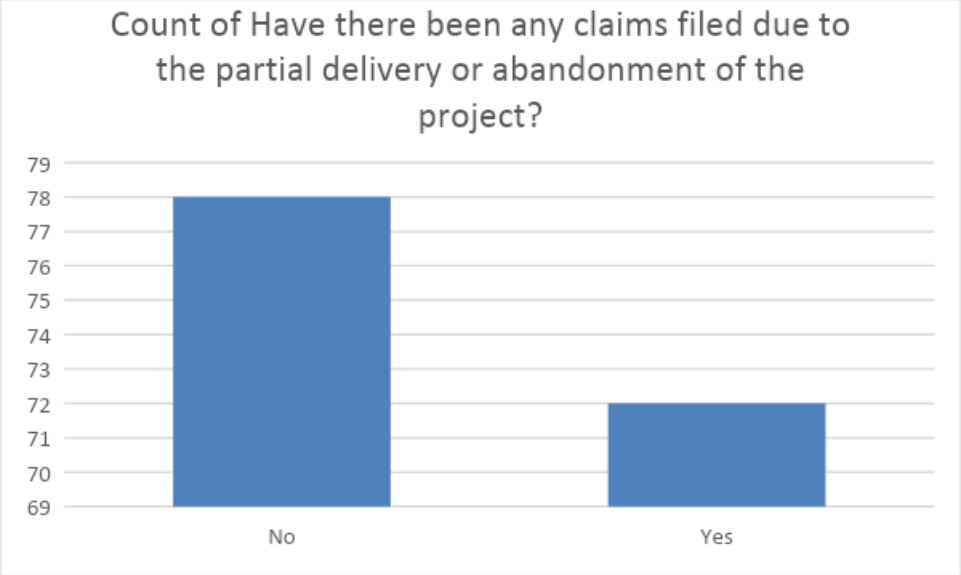

Figure 4.3: Partial Delivery or Abandonment of the Project

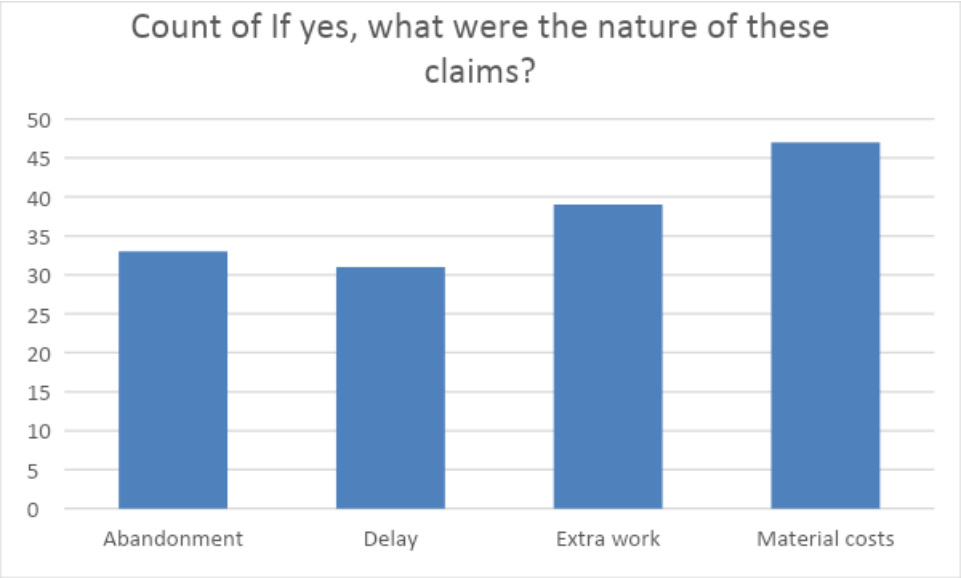

Figure 4.4: What Were the Nature of These Claims?

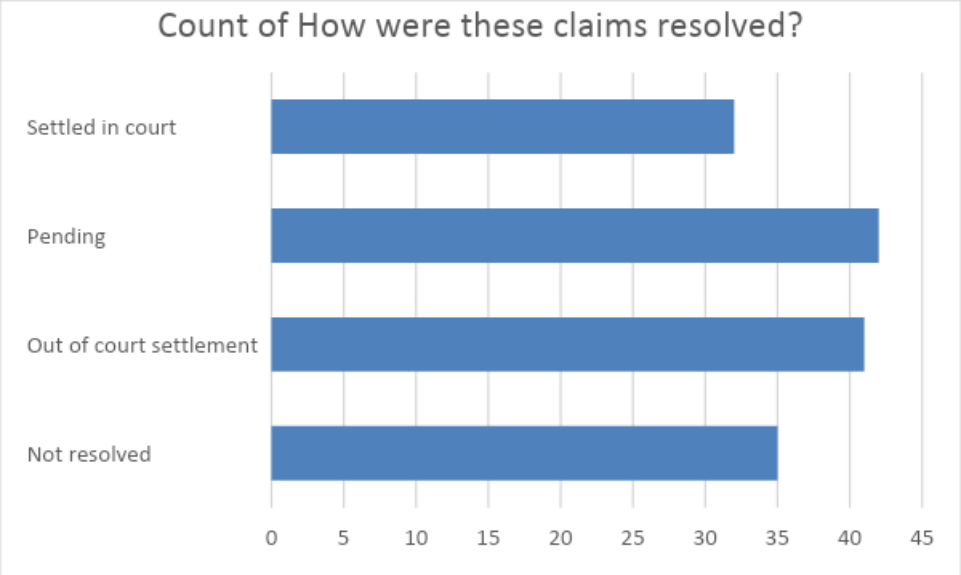

Figure 4.5: (Horizontal Bar Chart) How Were these Claims Resolved?

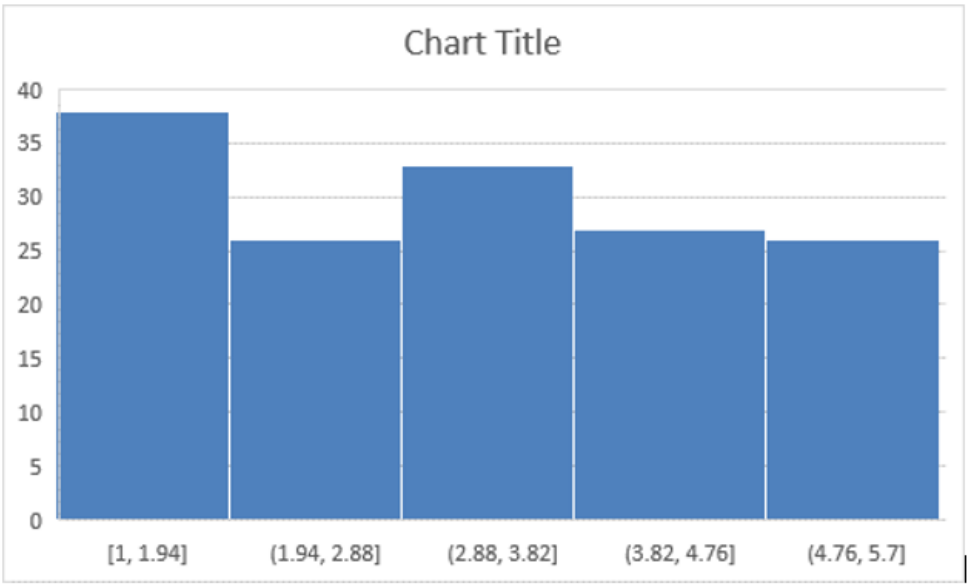

Figure 4.6: (Bar Chart) Claims Impact the Completion of a Project

Figure 4.7: Organization Handling Construction Claims

4.4 Descriptive Statistics of Requirements and Delivery

Table 4.3: Descriptive Statistics of Requirements and Delivery

Were there primary and secondary requirements specified for project completion?		*Was there a partial delivery of the project?*
Mean	1.453333333	1.486666667
Standard Error	0.040782795	0.040947029
Median	1	1
Mode	1	1
Standard Deviation	0.499485194	0.501496641
Sample Variance	0.249485459	0.251498881
Kurtosis	-1.990859792	-2.024267205
Skewness	0.189384182	0.053892738

The data presents a comparative analysis of two essential dimensions of project management: the specification of 'Primary and Secondary Requirements for Project Completion' and the 'Partial Delivery of the Project'. For the 'Primary and Secondary Requirements', the mean value is 1.4533. Given that the mode and median are both 1, this suggests that, on average, most projects had their primary and secondary requirements clearly specified. The standard deviation of 0.4995 shows that there is some variation around this mean, but the value indicates that the majority of the projects are close to the average. The negative kurtosis of -1.9909 and a skewness of 0.1894 reveal a distribution that is flatter than a normal distribution (platykurtic) with a slight rightward or positive skew. This means there are a few projects that did not have these requirements specified. Regarding the 'Partial Delivery of the Project', the mean stands at 1.4867. Again, the median and mode are both 1, suggesting that a majority of the projects were not partially delivered. The standard deviation of 0.5015 suggests a similar variability around the mean as the previous dimension. The kurtosis and skewness, being -2.0243 and 0.0539 respectively, indicate a distribution that is flatter than a normal one with a very slight positive skew.

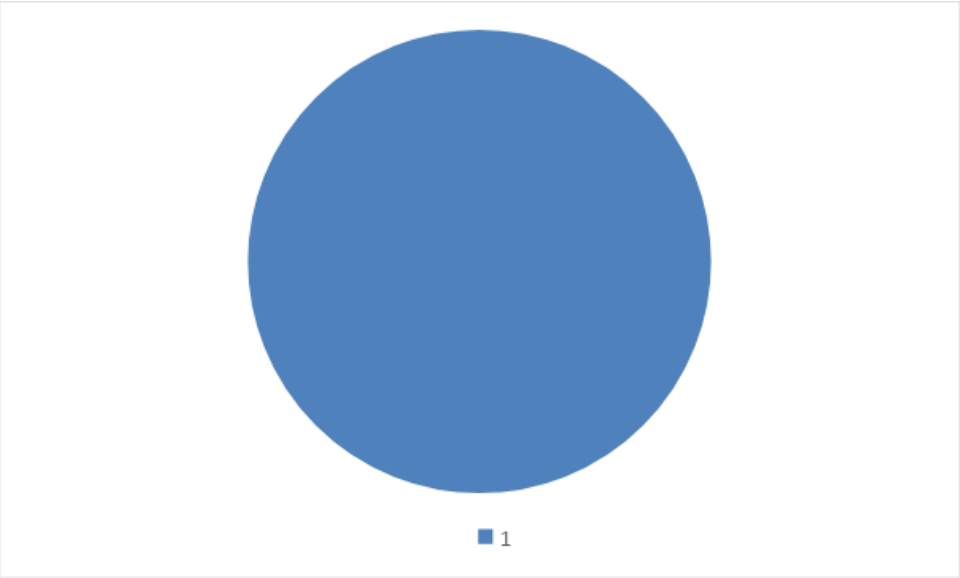

Figure 4.8: Were There Primary and Secondary Requirements Specified for Project Completion?

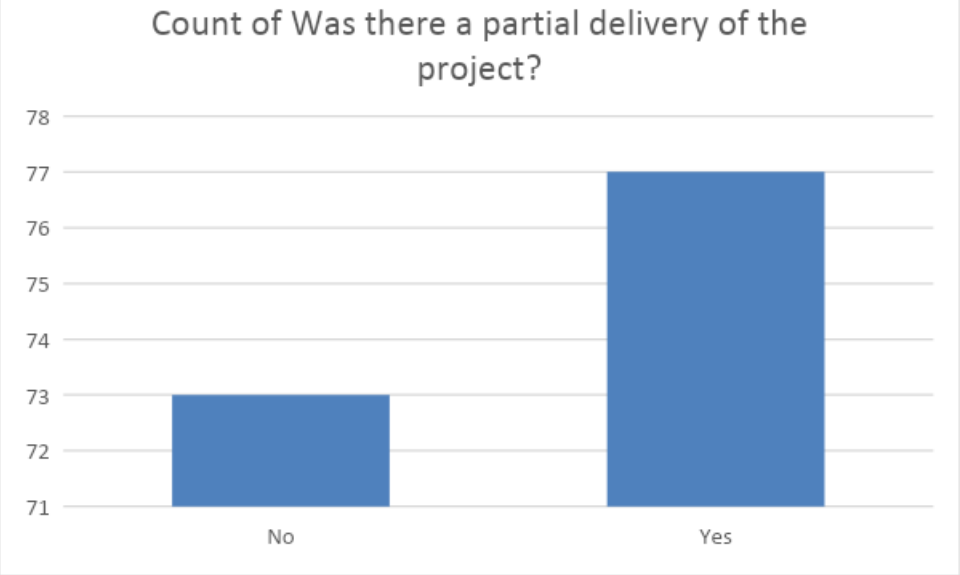

Figure 4.9: Was There A Partial Delivery of the Project?

4.5 Descriptive Statistics of Abandonment and Partial Completion

Table 4.4: Statistics of Abandonment and Partial Completion

Were there any engineers specifically recruited for this project?		*What was their role after the project was left incomplete?*
Mean	1.433333333	1.513333333
Standard Error	0.04059586	0.040947029
Median	1	2
Mode	1	2
Standard Deviation	0.497195715	0.501496641
Sample Variance	0.247203579	0.251498881
Kurtosis	-1.952340188	-2.024267205
Skewness	0.271794649	-0.053892738

The data showcases a descriptive analysis related to project management, specifically focusing on the recruitment of engineers for a project and their subsequent roles when the project was left incomplete. For the recruitment of engineers, the mean value is 1.4333. With both the mode and median standing at 1, it indicates that, on average, most projects did not specifically recruit engineers for their implementation. The standard deviation of 0.4972 reveals that while there is some variation around this mean, a significant portion of the projects align closely with this average. The kurtosis value of -1.9523 suggests a distribution that is flatter than a normal distribution (platykurtic). The positive skewness of 0.2718 means that there's a slight leaning towards projects that might have specifically recruited engineers, but these remain in the minority. As for the roles of these engineers after the project was left incomplete, the mean value is 1.5133. Interestingly, both the mode and median are at 2, hinting that in most cases where projects were left incomplete, the predominant role of engineers shifted to another category, presumably coded as '2'. The standard deviation and kurtosis values, being 0.5015 and -2.0243 respectively, are similar to the previous dimension. The negative skewness of -0.0539 indicates a minor tilt towards projects where the engineers' roles remained consistent or perhaps reverted to a default position.

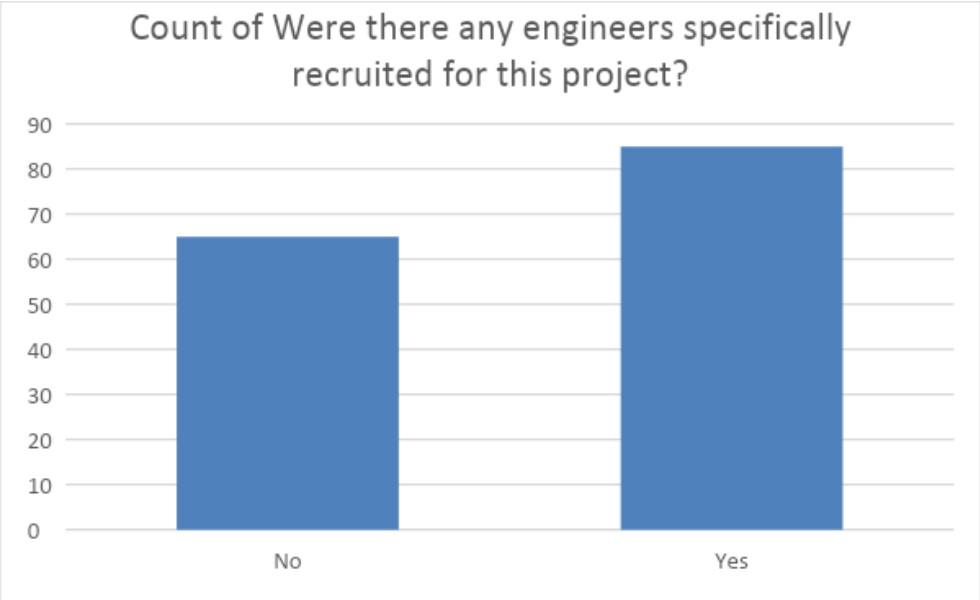

Figure 4.10: Were There Any Engineers Specifically Recruited For This Project?

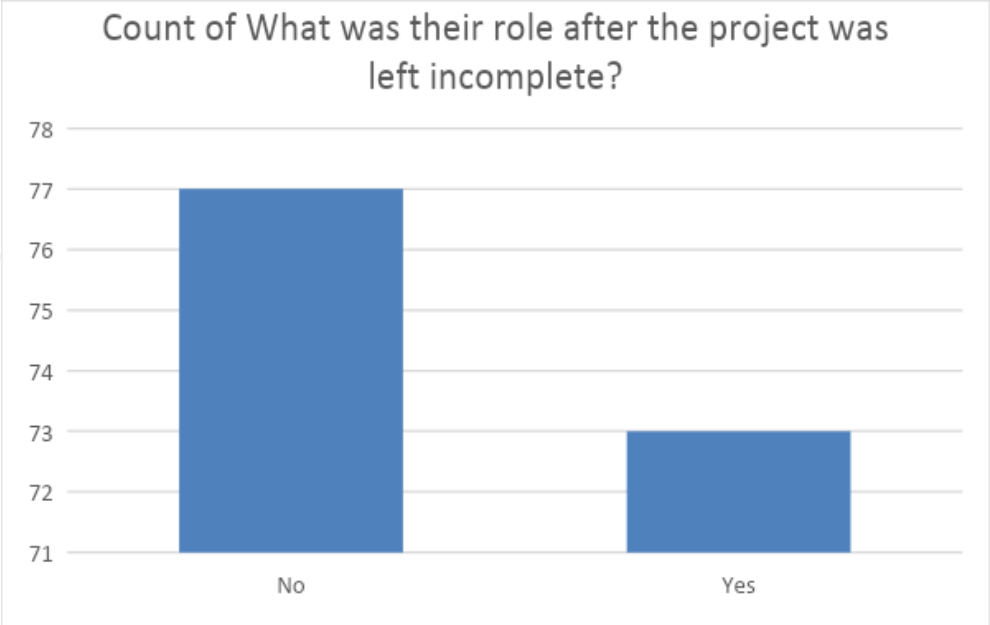

Figure 4.11: What Was Their Role After The Project Was Left Incomplete?

4.6. Descriptive Statistics of Construction Plan

Table 4.5: Descriptive Statistics of Construction Plan

Was there a construction plan before the project started?		*Was the plan amended after the project was partially completed or abandoned?*
Mean	1.446666667	1.52
Standard Error	0.040727903	0.040928814
Median	1	2
Mode	1	2
Standard Deviation	0.498812908	0.501273546
Sample Variance	0.248814318	0.251275168
Kurtosis	-1.979603838	-2.020581708
Skewness	0.216730775	-0.080875085

Interpreting the descriptive statistics for the variables related to the presence of a construction plan before the project started and any amendments made to the plan after partial project completion or abandonment, we find that the mean score for "Was there a construction plan before the project started" is approximately 1.45, while for "Was the plan amended after the project was partially completed or abandoned," it's around 1.52. Both means are close to the lowest value on the scale, indicating that, on average, respondents reported a lack of a construction plan before the project commenced and limited amendments to the plan after project incompletions. The standard deviation values are relatively low for both variables, suggesting that there is limited variation in responses, and they tend to cluster around the mean values. Kurtosis values below zero indicate platykurtic distributions, meaning they have lighter tails and are less peaked compared to a normal distribution. The skewness values suggest that the data for both variables is relatively symmetrically distributed around the mean.

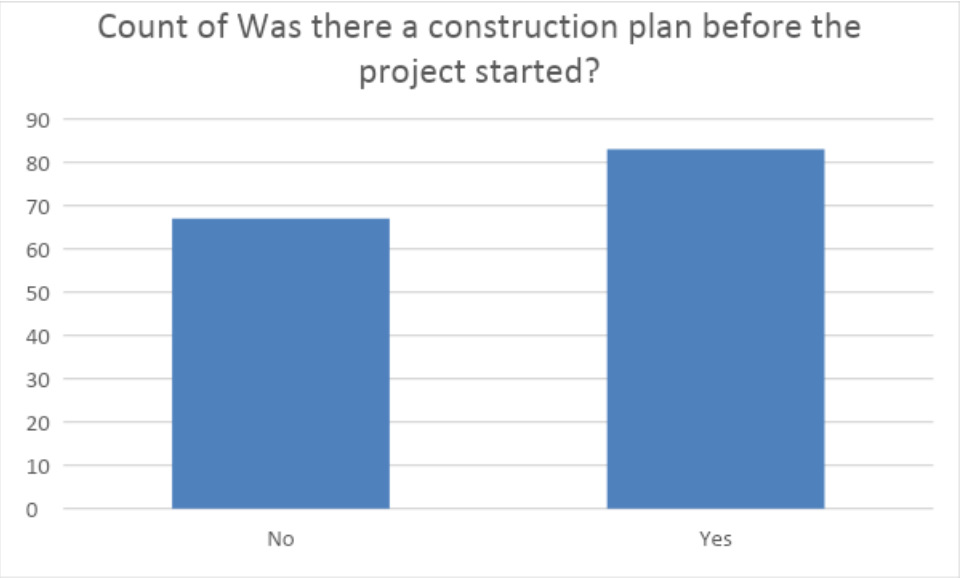

Figure 4.12: Was There A Construction Plan Before The Project Started?

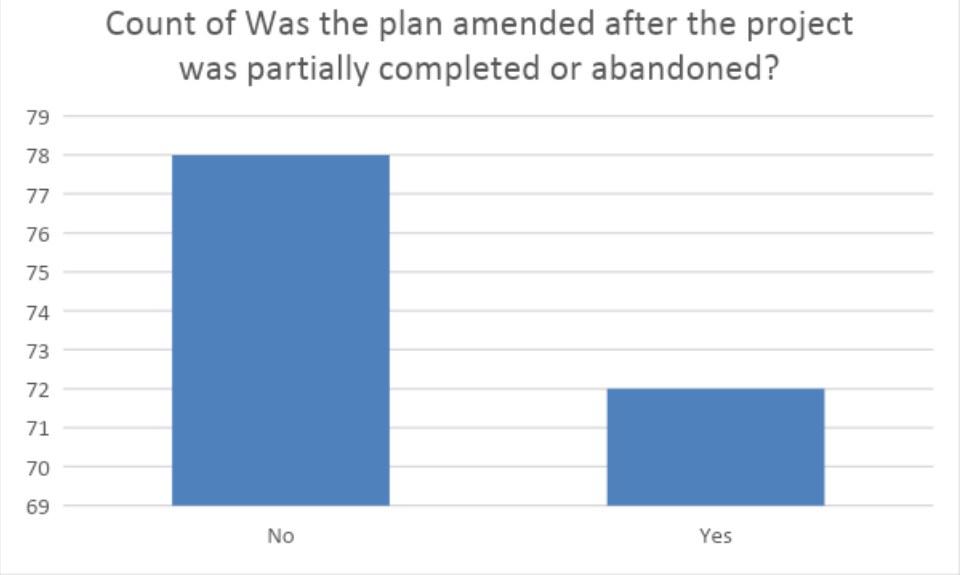

Figure 4.13: (Bar Chart) Was The Plan Amended After The Project Was Partially Completed Or Abandoned?

4.7 Descriptive Statistics of General Quest

Table 4.6: Descriptive Statistics of General Questions

What is your suggestion to improve project completion rates in the construction sector?		*On a scale of 1-5, how would you rate the preparedness of your organization for handling incomplete projects?*
Mean	3.313333333	2.886666667
Standard Error	0.111181037	0.125331477
Median	3	3
Mode	5	1
Standard Deviation	1.361684047	1.534990836
Sample Variance	1.854183445	2.356196868
Kurtosis	-1.101583555	-1.504422742
Skewness	-0.278331273	0.046234472

Interpreting the descriptive statistics for the variables related to general questions, we find that the mean score for "What is your suggestion to improve project completion rates in the construction sector?" is approximately 3.31, indicating that, on average, respondents provided moderately constructive suggestions for enhancing project completion rates in the construction sector. The mean score for "On a scale of 1-5, how would you rate the preparedness of your organization for handling incomplete projects?" is around 2.89, suggesting that respondents, on average, rated their organization's preparedness relatively low, indicating room for improvement. The standard deviation values are relatively high for both variables, indicating a significant degree of variability in responses, particularly for the preparedness rating. Kurtosis values below zero indicate platykurtic distributions, meaning they have lighter tails and are less peaked compared to a normal distribution. The skewness values suggest that the data for both variables is not strongly skewed and is relatively symmetrical around the mean.

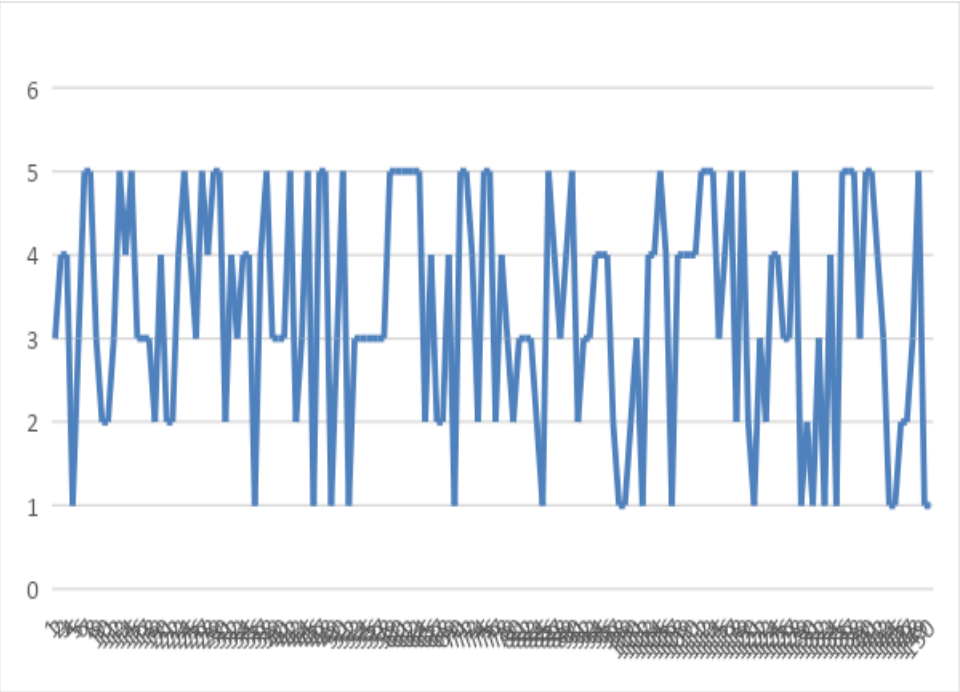

Figure 4.14: Line Graph or A Time-Series Plot (Phython). What Is Your Suggestion To Improve Project Completion Rates In The Construction Sector?

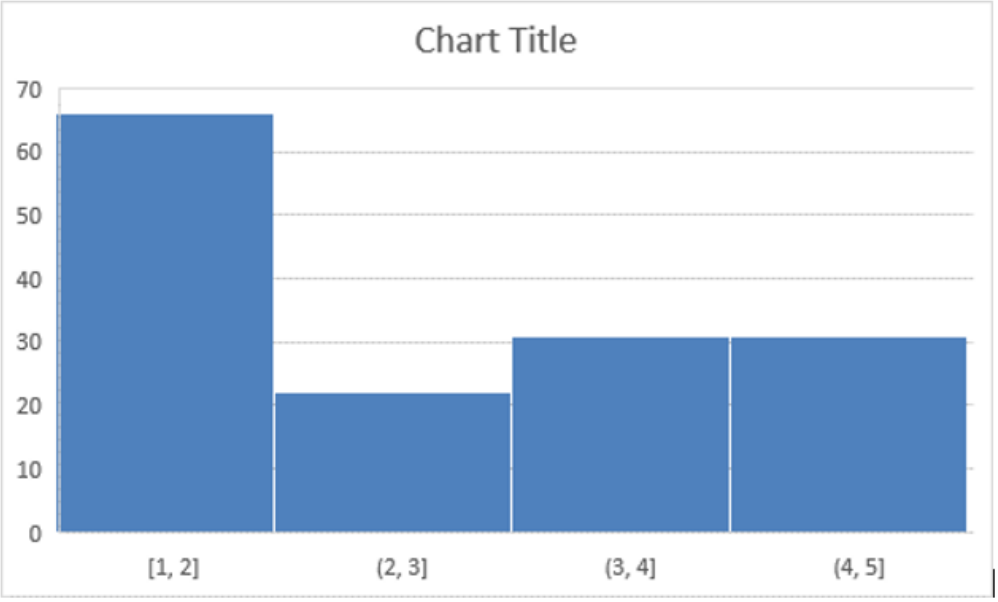

Figure 4.15: On A Scale Of 1-5, How Would You Rate The Preparedness Of Your Organization For Handling Incomplete Projects?

4.8 Regression of Status of Project Completion

Table 4.7: Regression of Status of Project Completion

Regression Statistics				
Multiple R	0.250448814			
R Square	0.062724608			
Adjusted R Square	-0.026867892			
Standard Error	0.811582212			
Observations	150			
ANOVA				
	df	***SS***	***MS***	***F***
Regression	13	5.994799916	0.461138455	0.700110032
Residual	136	89.57853342	0.658665687	
Total	149	95.57333333		
	Coefficients	***Standard Error***	***t Stat***	***P-value***
Intercept	2.022390176	0.620952206	3.256917612	0.001422098
Reasons for Project Status	0.007652066	0.067539779	0.113297174	0.909962031
Have there been any claims filed due to the partial delivery or abandonment of the project?	-0.1505445	0.136982164	-1.099008045	0.273706282
If yes, what were the nature of these claims?	0.043256022	0.064303486	0.672685483	0.502288758
How were these claims resolved?	0.043263032	0.065604376	0.659453456	0.510719754
On a scale of 1-5, how much do construction claims impact the completion of a project?	-0.032566775	0.047126584	-0.691048923	0.49071265
What procedures does your organization have in place for handling construction claims?	0.02251202	0.063475381	0.3546575	0.723395541
Were there primary and secondary requirements specified for project completion?	-0.074526468	0.134550258	-0.553893164	0.580561525
Was there a partial delivery of the project?	0.104532113	0.135806523	0.76971349	0.442804721
Were there any engineers specifically recruited for this project?	-0.179390394	0.136519228	-1.314030242	0.191048117
What was their role after the project was left incomplete?	0.030284734	0.137337001	0.220514016	0.825801548
Was there a construction plan before the project started?	-0.144766261	0.137525613	-1.052649451	0.294368365
Was the plan amended after the project was partially completed or abandoned?	0.243334947	0.138188135	1.760896085	0.080503596
What is your suggestion to improve project completion rates in the construction sector?	-0.013933275	0.04995891	-0.27889469	0.780749282

The regression analysis aims to understand the impact of various factors on the 'Status of Project Completion' in the construction sector. The data provides a comprehensive look at how different ==aspects, ranging from claims filed due to project abandonment to suggestions for improvement, relate to project completion rates. Starting with the overall model fit, the R2 value is 0.0627. This means that only about 6.27% of the variance in the 'Status of Project Completion' is explained by the predictors in the model. The Adjusted R2 value being negative (-0.0269) suggests that the model may not be a good fit, and some predictors might be redundant. Focusing on individual predictors, none of the variables significantly predict the 'Status of Project Completion' at conventional significance levels (e.g., $p < 0.05$), except for the intercept. However, some variables are worth noting. The 'Reasons for Project Status' has a coefficient of 0.0077, but with a high p-value of 0.910, it suggests that this variable might not be a significant predictor. The variable related to claims filed due to partial delivery or abandonment shows a negative relationship with project completion, but again, it's not statistically significant with a p-value of 0.274. Interestingly, the variable indicating whether a plan was amended after a project was partially completed or abandoned has the highest t-statistic (1.7609) and the lowest p-value (0.0805) among all predictors. This suggests it might be the closest to being a significant predictor, even if it doesn't meet the conventional threshold. The F-statistic of the model is 0.7001 with a corresponding p-value that isn't given, but considering the individual predictors' p-values and the adjusted R2, it's likely that this model isn't significantly better than a model with no predictors.

This list provides a comprehensive reference guide for all abbreviations used throughout the document, including DF (Degrees of Freedom), SS (Sum of Squares), MS (Mean Square), and F (F-statistic). These abbreviations are now accompanied by clear and concise explanations within the thesis text upon their first usage. For instance, Degrees of Freedom (DF) is elucidated as the number of values in the final calculation of a statistic that are free to vary. This clarification aids readers in understanding its relevance in the context of the research. Sum of Squares (SS) is explained as a statistical measure quantifying variability within a dataset and is highlighted for its critical role in the analysis. Furthermore, Mean Square (MS) is detailed as the result of dividing the Sum of Squares (SS) by its corresponding Degrees of Freedom (DF), and its significance in the study is underscored. The F-statistic (F) is also demystified as the ratio of two variances, with its pivotal role in the analysis duly emphasized.

4.9 Regression Of Status Of On A Scale Of 1-5, How Would You Rate The Preparedness Of Your Organization For Handling Incomplete Projects?

Table 4.8: Regression Of Status Of On A Scale Of 1-5, How Would You Rate The Preparedness Of Your Organization For Handling Incomplete Projects?

Regression Statistics				
Multiple R	0.242778404			
R Square	0.058941354			
Adjusted R Square	-0.031012782			
Standard Error	1.558611269			
Observations	150			
ANOVA				
	df	***SS***	***MS***	***F***
Regression	13	20.69273745	1.591749035	0.655237842
Residual	136	330.3805959	2.429269087	
Total	149	351.0733333		
	Coefficients	***Standard Error***	***t Stat***	***P-value***
Intercept	3.910199677	1.192513945	3.278955095	0.001323128
Reasons for Project Status	-0.157563988	0.129707453	-1.214764343	0.22656087
Have there been any claims filed due to the partial delivery or abandonment of the project?	0.285563452	0.263068783	1.085508699	0.279616799
If yes, what were the nature of these claims?	-0.054228107	0.12349228	-0.439121432	0.661270432
How were these claims resolved?	-0.016081524	0.125990587	-0.127640676	0.89862188
On a scale of 1-5, how much do construction claims impact the completion of a project?	0.015380896	0.090504726	0.169945776	0.865305323
What procedures does your organization have in place for handling construction claims?	-0.073463855	0.121901938	-0.60264714	0.547747018
Were there primary and secondary requirements specified for project completion?	-0.199041025	0.258398405	-0.770287361	0.442465451
Was there a partial delivery of the project?	-0.017878002	0.260811011	-0.068547729	0.945450308
Were there any engineers specifically recruited for this project?	0.005875987	0.262179732	0.022412055	0.982152113
What was their role after the project was left incomplete?	0.090436742	0.263750233	0.342887817	0.732212273
Was there a construction plan before the project started?	-0.501810643	0.264112454	-1.899988569	0.059551521
Was the plan amended after the project was partially completed or abandoned?	0.110455865	0.265384802	0.416210212	0.677912267
What is your suggestion to improve project completion rates in the construction sector?	0.000967036	0.095944095	0.010079163	0.991972898

The regression analysis is designed to evaluate the factors that might influence an organization's preparedness to handle incomplete projects, as rated on a scale of 1-5. The given data offers insights into how different elements, from reasons for project status to suggestions for improvement, correlate with an organization's readiness. The overall fit of the model, as indicated by the R2 value of 0.0589, suggests that only approximately 5.89% of the variation in the preparedness rating is accounted for by the predictors. The Adjusted R2 of -0.0310 further emphasizes that the model might not be a great fit, hinting that some predictors might not be adding explanatory value and could be superfluous. Delving into individual predictors, most of them do not show a statistically significant impact on preparedness at conventional significance levels (e.g., $p < 0.05$). The only exception is the intercept, which is significant with a p-value of 0.0013. The variable 'Reasons for Project Status' negatively correlates with preparedness but isn't statistically significant (p-value = 0.2266). Claims filed due to partial delivery or abandonment have a positive coefficient, suggesting that organizations with more claims might feel more prepared, but this is not statistically significant. One variable, 'Was there a construction plan before the project started?', has a coefficient of -0.5018 and a p-value of 0.0596, making it the closest to significance among all predictors. This suggests that having a construction plan might have some impact on the perception of preparedness, albeit not at the conventional threshold. The F-statistic is 0.6552, which implies that the model, given its current predictors, might not significantly predict the outcome better than a model with no predictors.

This list provides a comprehensive reference guide for all abbreviations used throughout the document, including DF (Degrees of Freedom), SS (Sum of Squares), MS (Mean Square), and F (F-statistic). These abbreviations are now accompanied by clear and concise explanations within the thesis text upon their first usage. For instance, Degrees of Freedom (DF) is elucidated as the number of values in the final calculation of a statistic that are free to vary. This clarification aids readers in understanding its relevance in the context of the research. Sum of Squares (SS) is explained as a statistical measure quantifying variability within a dataset and is highlighted for its critical role in the analysis. Furthermore, Mean Square (MS) is detailed as the result of dividing the Sum of Squares (SS) by its corresponding Degrees of Freedom (DF), and its significance in the study is underscored. The F-

statistic (F) is also demystified as the ratio of two variances, with its pivotal role in the analysis duly emphasized.

4.10 Discussion

In this analysis, we explored various aspects related to project completion in the construction sector, including reasons for project status, the impact of construction claims, project requirements, the role of recruited engineers, the presence of a construction plan, and suggestions for improvement. We also conducted regression analyses to understand the relationships between these factors and project completion status.

Hypothesis 1: Identifying the reasons for leaving the project

The mean for "Reasons for Project Status" is approximately 2.63, indicating that, on average, respondents cited reasons around the midpoint of the scale. These reasons could include issues like budget constraints, scope changes, or resource shortages. The relatively low standard deviation (1.05) suggests that responses are clustered around the mean. The kurtosis value of -1.16 indicates a moderate distribution of responses. The skewness value of -0.15 suggests a slight negative skew, indicating that more respondents might have reported higher reasons for leaving the project.

Hypothesis 2: Studying the previous construction plan and amending it

Regarding the presence of a construction plan and whether it was amended after partial project completion or abandonment, the mean for "Was there a construction plan before the project started?" is approximately 1.45, suggesting that, on average, respondents indicated the absence of a plan before the project commenced. The kurtosis value of -1.98 indicates a moderate distribution, and the skewness value of 0.22 suggests a slight positive skew, indicating that more respondents reported the absence of a plan.

The mean for "Was the plan amended after the project was partially completed or abandoned?" is approximately 1.52, indicating that, on average, respondents indicated that the plan was not amended. The kurtosis value of -2.02 indicates a moderate distribution, and the skewness value of -0.08 suggests a slight

negative skew, indicating that more respondents reported that the plan was not amended.

Regression Analysis

The regression analyses presented explore factors affecting project completion in the construction sector and how these factors influence an organization's preparedness for handling incomplete projects. When interpreted collectively, these analyses provide a window into the complexities and challenges faced by the construction sector. For the first regression focusing on the 'Status of Project Completion,' it's evident that the selected predictors collectively account for a small amount of the variation in project completion rates (approx. 6.27% as indicated by the R2). Even more telling is the negative adjusted R2, suggesting the model might not be the optimal representation of the data. This hints at the possibility that there are other unaccounted factors influencing project completion or that the current predictors may not be the most relevant. A noteworthy observation is that while none of the variables was statistically significant at conventional levels, the variable relating to amended plans after partial project completion came closest to significance. This suggests that flexibility and adaptability in planning might have some relevance in project completion. Turning to the second regression, which gauges an organization's preparedness for handling incomplete projects, a similar story unfolds. The model accounts for only about 5.89% of the variation in preparedness ratings. Like the first analysis, the negative adjusted R2 raises concerns about the model's fit. Interestingly, the presence of a construction plan before starting the project was the closest to being statistically significant, hinting that initial planning might have implications on an organization's perceived preparedness. These analyses highlight that the selected predictors do not significantly influence project completion and organizational preparedness in the analyzed dataset. While initial planning and adaptability emerge as potential points of interest, the overarching takeaway is the need for a deeper exploration of factors and a possible reevaluation of what truly drives project completion and preparedness in the construction sector. This could involve integrating qualitative insights, industry-specific expertise, and perhaps more comprehensive quantitative measures to refine understanding and model fit.

5. CONCLUSION AND RECOMMENDATIONS

In this final chapter, we draw conclusions based on the extensive analysis of the data and offer recommendations for improving project completion rates in the construction sector. This chapter summarizes the key findings and provides actionable insights to address challenges in construction project management.

5.1 Summary of Key Findings

Throughout our research, we embarked on a comprehensive analysis of various facets within the construction sector, each shedding light on critical aspects of project completion and management. In terms of project information, our findings unveiled a prevailing trend of partial project completion, predominantly attributed to the challenges faced in project execution. Organizations, as per our observations, have implemented moderately effective procedures for handling construction claims, indicating room for improvement in claim management strategies. In the realm of construction claims, we uncovered that while these claims related to partial delivery or abandonment are relatively infrequent, they tend to involve issues of moderate complexity when they do arise. The impact of such claims on overall project completion was deemed moderate, calling for a closer examination of claim resolution methods to enhance their effectiveness. Moving on to requirements and delivery, respondents' reports indicated a minimal presence of specified requirements for project completion, paired with limited instances of partial project delivery. The implications of these findings underscore the need for greater attention to detail in project planning and execution. Our exploration into abandonment and partial completion revealed that the recruitment of engineers for projects was generally minimal, with limited roles assigned to them after project incompletions. This aspect presents an opportunity to optimize the involvement of engineering resources more effectively. The infrequent presence of construction plans before project commencement, as well as amendments made post-partial completion or abandonment, emphasizes the importance of robust construction planning as an

essential component of project success. In response to general questions posed to respondents, their moderately constructive suggestions for enhancing project completion rates underscore the importance of addressing root causes of project delays, and the relatively low organizational preparedness rating signals a need for improvements in handling incomplete projects. Our regression analysis, while illuminating some associations between independent variables and project outcomes, underscored the multifaceted nature of project completion in the construction sector, where numerous factors, beyond those considered, come into play.

5.2 Conclusions

Based on our extensive data analysis, we can draw several key conclusions that provide valuable insights into the construction sector's dynamics and challenges. Firstly, the construction industry grapples with significant hurdles in achieving full project completion. Our findings consistently point towards a prevalent trend of partial project completion. This partial completion can be attributed to a multitude of challenges, including unforeseen obstacles, resource limitations, and inadequate project planning. To address this issue, organizations must invest in comprehensive project management strategies that prioritize effective planning, risk mitigation, and resource allocation. Our analysis reveals that construction claims related to partial project delivery or abandonment are not a common occurrence, but when they do arise, they can exert a moderate impact on overall project completion. It is imperative for stakeholders in the construction sector to recognize the significance of proactive claims management. While the impact may be moderate on average, the potential for severe disruption underscores the need for organizations to enhance their proficiency in resolving construction claims swiftly and efficiently. Our data indicates that there is room for improvement in the effectiveness of current claim resolution methods.

In terms of resource management, our findings suggest that organizations in the construction sector tend to recruit engineers for their projects, which aligns with industry standards. However, the limited roles provided to these engineers after project incompletions raise questions about optimizing the utilization of these valuable resources. Organizations should consider reevaluating their approach to harnessing engineering expertise throughout the project lifecycle, not just during active project phases. Construction planning emerges as a critical area that demands

attention. The infrequent presence of comprehensive construction plans before project commencement is a cause for concern. Robust planning not only serves as a roadmap for successful project execution but also helps in anticipating and mitigating potential challenges. Organizations should prioritize the development of comprehensive construction plans to guide project execution effectively. Our research reflects respondents' valuable suggestions for improving project completion rates within the construction sector. These suggestions underscore the importance of addressing root causes of project delays, fostering collaboration among project stakeholders, and enhancing project management practices. Moreover, organizations should take note of the relatively low rating for their preparedness in handling incomplete projects. This signifies a pressing need for organizations to invest in improving their processes, knowledge, and infrastructure to better cope with projects that face challenges or are left incomplete. Our comprehensive analysis provides critical insights into the challenges and dynamics of project completion within the construction sector. The trends and patterns revealed in our research offer guidance for organizations and industry stakeholders to enhance their strategies, improve their preparedness, and ultimately achieve more successful project outcomes.

5.3 Recommendations

Based on the conclusions drawn from our in-depth analysis of the construction sector, we propose a set of comprehensive recommendations aimed at enhancing project completion rates and addressing the challenges identified. First and foremost, organizations operating in the construction sector should place a renewed emphasis on project planning and requirements. This entails the development of thorough project plans that meticulously outline primary and secondary requirements for project completion. Clear communication of these plans to all stakeholders is crucial to ensure alignment and shared understanding. To effectively mitigate the impact of construction claims, organizations should invest in robust claim resolution methods and strategies. Regular training programs should be implemented to equip project teams with the necessary skills to handle claims efficiently. The utilization of engineers in construction projects should be optimized, with a shift towards a more active role for engineers in addressing challenges and ensuring smoother project execution, particularly in cases of partial completion.

Construction planning should be prioritized, with organizations establishing detailed, flexible, and regularly updated construction plans before project initiation. These plans should be adaptable to changing project conditions. To achieve lasting improvements in project completion rates, organizations should address the root causes of project delays. This may necessitate enhancements in project management practices, more effective resource allocation, and robust risk assessment procedures. Investing in preparedness for handling incomplete projects is crucial. Developing and implementing strategies to manage projects facing partial completion or abandonment is essential to minimize disruptions and maintain project momentum. Continuous monitoring and evaluation of project progress and challenges are essential components of successful project management. Implementing regular reviews and feedback mechanisms can facilitate the early identification of issues and the swift implementation of corrective actions. The construction sector as a whole should invest in research and development efforts to identify innovative solutions and technologies that can streamline project management, reduce delays, and improve overall project outcomes. Industry collaboration among construction stakeholders, including contractors, engineers, and regulatory bodies, is paramount. This collaborative approach fosters knowledge sharing and the adoption of best practices, ultimately leading to improved project completion rates across the sector.

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