

**EVALUATING THE CAUSES AND EFFECTS OF
CONSTRUCTION DISPUTES IN PRIVATE
SECTOR PROJECTS**

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**EVALUATING THE CAUSES AND EFFECTS OF CONSTRUCTION
DISPUTES IN PRIVATE SECTOR PROJECTS**

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**A project report submitted in partial fulfilment of the
requirements for the award of Bachelor of Science
(Honours) Quantity Surveying**

**Lee Kong Chian Faculty of Engineering and Science
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May 2024

DECLARATION

I hereby declare that this project report is based on my original work except for citations and quotations which have been duly acknowledged. I also declare that it has not been previously and concurrently submitted for any other degree or award at UTAR or other institutions.

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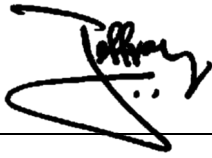
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APPROVAL FOR SUBMISSION

I certify that this project report entitled “**EVALUATING THE CAUSES AND EFFECTS OF CONSTRUCTION DISPUTES IN PRIVATE SECTOR PROJECTS**” was prepared by **KELLY LIM KAH YEE** has met the required standard for submission in partial fulfilment of the requirements for the award of Bachelor of Science (Honours) Quantity Surveying at Universiti Tunku Abdul Rahman.

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ABSTARCT

Construction projects have historically posed challenges within the private sector, leading to increased project costs, eroding stakeholder relationships, time overruns and so forth. This project delves into a comprehensive evaluation of the disputes, aiming to understand better what causes them and how they impact projects financially and operationally. A combination of quota and snowball sampling methods was utilized and 143 responses were collected. This research employs questionnaires to gather insights from clients, consultants and contractors in privately funded projects. After that, the collected data was subjected to reliability analysis, normality test and descriptive statistics. The causes of construction disputes were evaluated and ranked using frequency, severity and importance scores. The result shows that the top five important causes of construction disputes in private sector projects are lack of communication, payment delays, the owner's arbitrary changes in the design, change of scope, and shortage in supply (Materials and Labour). Additionally, the Spearman Correlation Test revealed that the variables "Erosion of profit" and "Unfair Risk Allocation" had a most significant correlation of 0.418. Moreover, the delay in the progress of work and tension in communication have surfaced as foremost concerns, demonstrating the highest correlation count of 13. Furthermore, factor analysis successfully discovered 7 underlying factors from 25 causes of construction disputes in privately funded projects. The seven underlying principal factors are project vision misalignment, financial challenges, quality control concerns, contractual issues, site operational fragmentation, operational oversight challenges, and ethical and legal non-compliance. This research comprehensively analyzes construction disputes in privately funded projects, offering valuable insights into the causes and effects. By collecting data from a wide range of stakeholders and employing statistical analysis, it provides practical suggestions for enhancing construction projects. The findings have significant value for professionals in the industry, politicians and academics who want to improve project outcomes and reduce disputes in the private sector construction industry.

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LIST OF SYMBOLS / ABBREVIATIONS

α	Coefficient Alpha
<i>F.S.</i>	Frequency Score
<i>S.S.</i>	Severity Score
<i>IMP.S.</i>	Importance Score
AIAC	Asian International Arbitration Centre
CFA	Confirmatory Factor Analysis
CIDB	Construction Industry Development Board
CIPAA	Construction Industry Payment And Adjudication Act 2012
CLT	Central Limit Theorem
EFA	Exploratory Factor Analysis
GDP	Gross Domestic Product
KMO	Kaiser–Meyer–Olkin
SPSS	Statistical Package for Social Sciences
UTAR	Universiti Tunku Abdul Rahman

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Dehdasht, et al. (2022) discover that the construction industry has been prominent in the economic sector as well as in the creation and implementation of policies. For example, the construction industry helps the economy create a significant amount of employment. More than 100 million people work in the construction sector around the world, which contributes 6% of the world's gross domestic product (Market Prospects, 2021). There are 1.2 million individuals employed in the Malaysian construction industry, representing 9.5% of the total employment. Due to its linkages to more than 120 different industries, 90% of which are small and medium-sized businesses, it directly contributes 4.6% to the country's GDP and has a multiplier effect of 2.03 (CIDB, 2022). Khan, Liew and Ghazali (2014) state that the development of the country depends in significant measure on the wealth and higher standard of living that the construction industry contributes.

In Malaysia, the private sector remained to act as a key contributor to the growth of the construction industry in the fourth quarter of 2022. Figure 1.1 depicts that the work performed by the private sector was worth RM20.0 billion but at the same time, the public sector contributed only RM12.0 billion. Moreover, the private sector continued to be the primary driver of growth in the first quarter of 2023 which augmented by 10.6%. Figure 1.2 below shows that a total of RM19.8 billion or 61.4% of the total value of construction work completed was carried out by the private sector. Both the residential and non-residential building sub-sectors continued to be substantial contributors to the private sector, with residential buildings contributing 32.5% and non-residential buildings contributing 38.4% respectively.

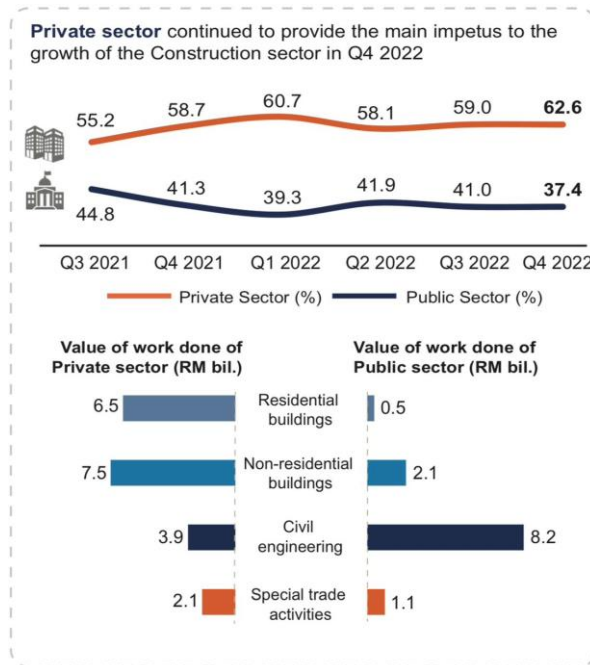


Figure 1.1: Statistics of Contribution of Private Sector to the Construction Sector in Q4 2022.

Source: Department of Statistics Malaysia, 2023.

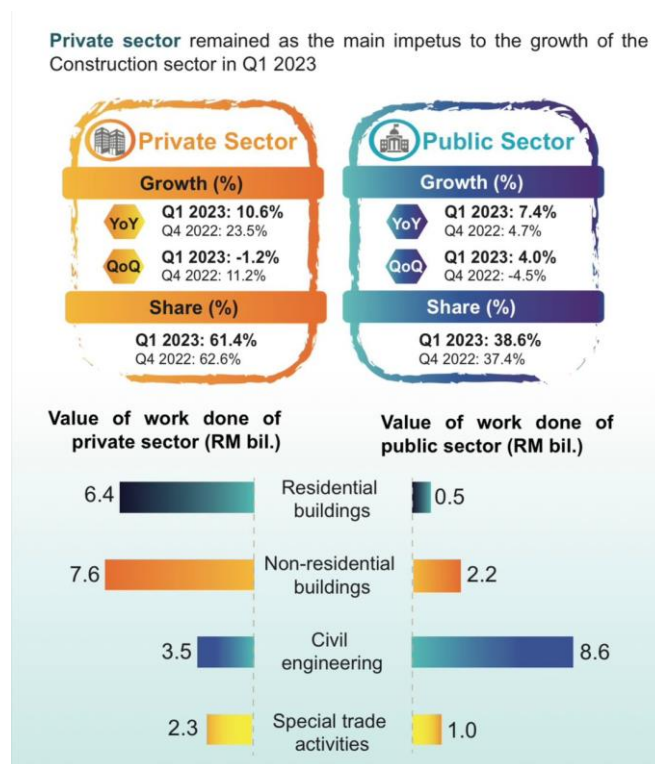


Figure 1.2: Statistics of Contribution of Private Sector to the Construction Sector in Q1 2023.

Source: Department of Statistics Malaysia, 2023.

Cakmak (2022) explores that disputes are one of the most significant issues that prevent a construction project from performing thoroughly. The research used qualitative methodology to enable the collection of in-depth and comprehensive data on this topic. Thirty-eight interviews with professionals and specialists involved in construction disputes were engaged. The main drawbacks are that the results are restricted to the Turkish construction industry and that the interviewees are from a single nation. The results of this research shed light on how various stakeholders perceive the factors that contribute to construction disputes, making an effort to resolve disputes once they arise, taking appropriate measures to minimise the effects and ultimately making a significant contribution to the successful completion of construction projects. Disputes are unavoidable in the construction sector due to different perspectives among the parties involved. Figure 1.3 below shows that the average cost of disputes decreased globally from 2020 to 2021 by 3%, but they still stand at exceptionally high levels compared to years earlier. After progressively falling for three years, the average amount of time it took to settle disputes significantly increased by roughly 15%. Based on the CIDB Construction Law Report 2020, there are about 1,602 construction cases have been heard in Malaysia at all levels of court and there will be 1,388 construction lawsuits adjudicated in 2020 (CIDB, 2021). Each year, numerous construction disputes are actively brought to the courts which indicates that there are numerous problems that the construction parties have yet to resolve. Therefore, this necessitates the use of dispute resolution techniques. Nevertheless, construction disputes in private sector projects have significant ramifications for all participants engaged in the project such as increased management and administrative costs, time and expense overruns, loss of professional reputation, an extended or more complicated award process, an imperfection in their relationship and a breakdown in cooperation. Figure 1.4 illustrates that cost must be diverted if a dispute occurs and not a small amount of money is involved. Cost overruns will occur as a result of needing preventative solutions in place covered in the initial budget. Additionally, a large amount of money will be spent as the cost of materials is uncertain and is affected by the market flow, which typically rises in an upward manner in relation to inflation. Thus, the focus of this research is on the effects that

construction disputes have on private sector projects and the causes that lead to construction disputes in privately funded projects.

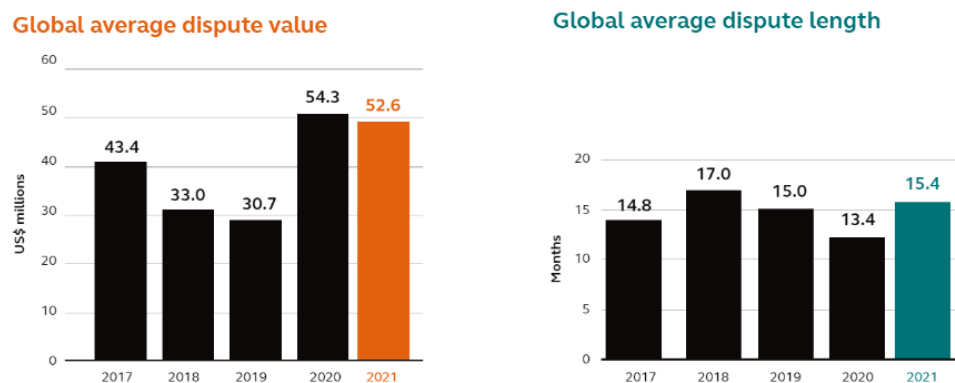


Figure 1.3: Statistics of Global Average Dispute Value and Global Average Dispute Length.

Source: Arcadis, 2021.

Impact of Disputes

Region	Average Disputes Cost per Project (in \$ mn)	Dispute Cost to Capex Value Ratio
Americas	61.5	5.7%
Europe	136.0	19.7%
Asa	93.5	1.5%
Middle East	134.0	6.8%
Africa	104.0	5.6%
Oceania	90.3	2.6%
Global	100.0	5.6%

Estimated Impact Globally* (€bn) **€125bn**

Figure 1.4: Statistics of Impact of Disputes in Different Regions.

Source: Tangara, 2022.

1.2 Problem Statement

There has been a significant amount of study concerning construction disputes. Amoah and Nkosazana (2022) observed that construction projects in South Africa frequently encounter disputes, which can be triggered by a variety of factors such as the term and conditions of the contract are unclear, inability to deliver the project on time, ineffective communication and more. In addition, Love, et al. (2010) demonstrate the implicit complexity of disputes and the interconnectedness of the elements that can cause construction disputes in Australia. Aryal and Dahal (2018) state that construction disputes in Nepal lead to strained relationships between parties involved and that are the primary obstacles to finishing the project on time, within budget and fulfilling the aims and objectives of the project. Furthermore, Hietanen-Kunwald and Haapio (2021) define dispute prevention as encompassing not just the avoidance of arbitration or litigation but also the full range of dispute aggravation and the management team, starting with the recognition and elimination of dispute's underlying causes by providing two sample cases in Canadian.

According to Haron, Masrom and Kamal (2020), construction disputes in Malaysia can be classified into five main categories rooted in the contract condition. The classification of factors that lead to construction disputes in private sector projects from the research enables the technical team to understand better the conditions that could lead to subsequent contract disputes and avoid them. Goh, Wong and Low (2023) demonstrate that the dispute could impact the effectiveness of both small and large-scale projects. Their research is based on construction projects in Sarawak, the largest state in Malaysia. Moreover, Chong and Rosli (2010) show the principle behind the processes for resolving disputes in the Malaysian construction industry. They listed the variables that should be considered while choosing the procedures.

Based on the previous studies mentioned above, the conclusion that can be drawn out is that most of the research mainly focused on the causes and effects of construction disputes and the possible solution to eliminate or minimize the construction disputes but with very limited studies focused on the construction disputes in private sector projects. It is undoubtedly that private sector projects contribute a lot to the construction industry. For instance, the advantages of private sector involvement in the construction

industry are increased by attempts to encourage competition, notably by putting appropriate market pressure, removing needless entry barriers and creating and maintaining sufficient competition laws.

Furthermore, a minimum level of construction disputes in the construction sector is needed to accomplish the nation's primary goal of building business. It is because there are construction disputes that have a negative impact on the building sector and, ultimately, the country's economy and reputation. For instance, the poor project delivery performance of the construction industry affects other sectors like manufacturing, which makes materials used in the construction industry. It is challenging but possible to minimize construction disputes through effective management and improved communication among parties involved in the construction industry because of its unique characteristics. Thus, additional scientific research is needed to identify the latest unconscious factors which generate construction disputes in private sector projects. It is essential to look for more effective means to handle construction disputes outside the courtroom due to the increased expense, delay and risk of litigation. After these factors and effects have been evaluated, efficient dispute mitigation strategies can be discovered and steps towards increasing the efficiency of privately funded construction projects may be implemented.

1.3 Research Aim

This research aims to appraise the effects of construction disputes and the contributing factors to discover the underlying factors of disputes in the context of private sector projects.

1.4 Research Objectives

The following research objectives are developed in an effort to accomplish the research aim that was just mentioned:

- I) To determine the effects of construction disputes in privately funded projects.
- II) To evaluate the issues that can contribute to construction disputes in private sector projects.

- III) To uncover the underlying factors of the disputes causes in private sector projects.

1.5 Research Methodology

A quantitative research methodology was utilised to accomplish this research's aims. For the purpose of improving the survey's response rate, as no special software is required, a Google Forms-created questionnaire was distributed to the respondents via email and social media platforms such as WhatsApp, Instagram and WeChat. The questionnaire survey was evaluated analytically and descriptively using Cronbach's Alpha Reliability Test, Shapiro-Wilk Test, Importance Score, Kruskal-Wallis Test, Spearman's Correlation Test and Factor Analysis. The specific research methods as well as research goals are depicted in detail in Figure 1.5.

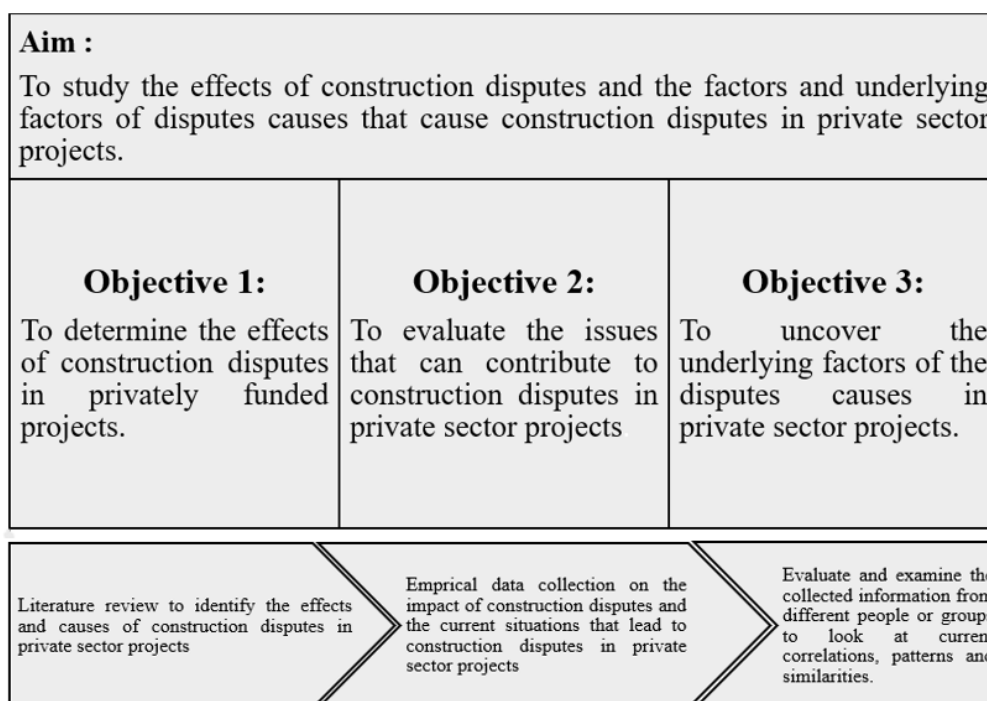


Figure 1.5: Research Plan.

1.6 Research Scope

This research exclusively sampled Malaysian construction professionals located in the Klang Valley region, which is the central nerve for construction endeavors in Malaysia, where a significant majority of projects are implemented (Department of Statistics Malaysia, 2022). For example, the

participants for this research may have recently been involved in privately funded construction projects such as clients, consultants and contractors.

1.7 Outline of the Report

There are five chapters in this report, which are the introduction, literature review, research methodology, results and discussion as well as conclusion and recommendation. The report's structure is as follows:

Chapter 1: Introduction

This chapter is the introductory part which discusses the entire content of the report. Chapter 1 covers the contribution of the construction industry to the national and local economy as well as contribution of the private sector to the construction sector. Additionally, the problem statement, research aim and objectives, research methodology and work plan, research scope and chapter outline have all been clearly delineated.

Chapter 2: Literature Review

At first, the term 'construction disputes' is explained in Chapter 2. Subsequently, this chapter analyses, evaluates and synthesises previously published literature and material about the construction disputes. When comparing and contrasting the findings of several researchers' works, an in-depth analysis of the current situation that cause the construction disputes and the effect of construction disputes in private sector project are presented.

Chapter 3: Research Methodology

This section explains the research techniques and mechanisms. Quantitative research procedures were applied throughout the course of this research. In order to acquire the necessary information, compiling a series of questionnaires and distributing them to the intended respondents is required. The types of research, research methods, research processes, sampling design, data gathering methods and data analysis methods are reported in this chapter.

Chapter 4: Result and Discussions

The analysis and understanding of the data obtained from the questionnaire and the subsequent analysis results related to that interpretation are presented in Chapter 4. This chapter centres around examining the data collected from participants, aiming to enhance the understanding of the research subject and fulfil the research's goals.

Chapter 5: Conclusion and Recommendation

The primary objective of this chapter is to conclude the research findings as a whole. The contribution of this research discussed in Chapter 5 in order to raise awareness of construction disputes in private sector projects. Moreover, this chapter outlined the research's limitations and suggest some recommendations for future research.

1.8 Summary

Since the beginning of the development of the construction industry, through the ages and up to the current, disputes have arisen. The dispute might worsen, leading to court resolutions or mediation and costing the participants involved much money and time. Before implementing crucial preventive solutions to construction disputes in private sector projects, it is essential to have a comprehensive grasp of the current situation that led to construction disputes. Thus, this research is being conducted mainly to increase construction practitioners' awareness of the seriousness of construction disputes in order to reduce the issue. In a nutshell, minimising the problems in the construction industry is necessary since it is fundamental to any country's prosperity.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Several journals and publications that discuss construction disputes in private sector projects have been evaluated in this chapter. First and foremost, this chapter begins with a brief introduction to disputes in the construction industry. In order to give an in-depth knowledge of the research topic, the literature review encompass a comprehensive exploration of global and regional disputes within the construction sector. Additionally, this chapter covers the effects of construction disputes in private sector projects. Next, this chapter explores and discusses the current situations that cause construction disputes by analyzing the earlier related researches.

2.2 Definition

Table 2.1: Definition of Construction Disputes.

Terms	Definitions	Authors
Disputes	“Disputes are associated with distinct justiciable issues and require resolution such as mediation, negotiation arbitration.”	Cakmak and Cakmak (2014, pp. 183)
Construction Disputes	“Construction disputes arise as a result of disagreements between the parties involved in a contract.”	Gerardi (2021)

Cakmak and Cakmak (2014) explore the distinctions between conflict and dispute must be clarified among construction industry individuals. Conflict arises wherever there are different viewpoints. Managing a disagreement to the point where no dispute arises because of the conflict is possible. On the other hand, disputes are a major barrier to a construction project's accomplishment. Disputes have specific justiciable issues and must be settled by mediation, negotiation, arbitration and more.

According to Gerardi (2021), although construction disputes do not constitute a breach of contract if left unresolved, they may result in termination, a breach of contract or even claims that jeopardise the contractor's performance bonds. Therefore, parties to a contract must take the necessary actions to lessen the likelihood of disputes arising between them.

2.3 Construction Dispute in Foreign Countries

Fedigan (2021) mentions that there are 307 technology and construction dispute cases reported by the British and Irish Legal Institutes over three years, and it consists of 59 cases of defects-related cases. Most disputes involved structural weaknesses or inadequacies in structural design that resulted in structural problems. In about 12 cases, the faults due to poor skills of workers were also evident in the United Kingdom. Furthermore, based on the information from the Hong Kong International Arbitration Centre, there were 344 construction dispute cases in Hong Kong last year, which has an increase of 67 cases compared to 2021 and an 8% increase from 2020 (Yiu, 2023). Moreover, Glover and Tan (2023) state that payment concerns and disagreements over the amounts and quality of work performed are the two main sources of construction disputes in Singapore. Besides that, duration-related issues constitute one of the other frequent categories of disputes in Singapore. For instance, these typically are about the liquidated damages imposed by the employer against the contractor and as a result, there may be disagreements on whether or not the contractor was entitled to any extensions of time. In short, because of the complicated and unpredictable nature of the construction industry, as well as the degree of dependence on contractors, disputes can frequently develop. All those involved in the sector must be adaptable and open-minded to deal with the changes that are currently occurring in order to reduce the likelihood of construction disputes in private sector projects.

2.4 Construction Disputes in Malaysia

The Director of the Asian International Arbitration Centre (AIAC) has appointed 904 adjudicators throughout the years 2021 and 2022 of CIPAA dispute administration. The AIAC had 1,042 cases registered with it over the past two years of managing CIPAA issues, with 917 cases moving forward with the appointment of adjudicators. Kuala Lumpur has the highest number of construction dispute cases, 246 cases, followed by Selangor, with 236 numbers of construction dispute cases. Across the states, 47% of all cases reported from the years 2021 and 2022 come from the Klang Valley. In Malaysian construction dispute cases, employers and main contractors constituted a large proportion of the respondents. In addition, the continually increasing number of contractors and subcontractors who serve as respondents demonstrate their active participation in dealing with disputes (AIAC, 2023). The framework for resolving construction disputes in Malaysia has changed due to the development of alternative dispute resolution techniques. It is crucial to give the necessary encouragement and directions to avoid and resolve any construction disputes between the parties involved since Malaysian privately funded construction projects are crucial to the growth and development of the socio-economy.

2.5 Effects of Construction Disputes in Private Sector Project

2.5.1 Cost overruns

First and foremost, cost overrun is a pervasive consequence of construction disputes since they necessitate the allocation of extra funds for everything from legal fees to costs associated with expert consultations (Amoah and Nkosazana, 2022; Elhag, Eapen and Ballal, 2019; Irfan, et al., 2019; Malik and Ali, 2019; Mashwama, Thwala and Aigbavboa, 2019). Senaratne and Farhan (2022) state that the incurred costs might not only originate directly from the dispute itself and also due to the ripple effect that permeates the project, resulting in financial losses due to the obstructive nature of disputes. According to Trangkanont (2017), construction disputes lead to cost overruns and generate economic and societal disturbances within the community. Additionally, Mashwama, Aigbavboa and Thwala (2016) mention that the hidden cost, direct cost and indirect cost emerged as significant factors

contributing to the overall expenses of disputes. Aryal and Dahal (2018) discover that construction disputes can affect the direct costs ranging from 0.5% to 5% of the contract value for a project. In contrast, indirect costs can inflict greater harm on the involved parties. Furthermore, construction disputes frequently lead to setbacks and discord in completing the project which costs money. Most of the consequences of disputes on the cost performance of construction projects in Abuja hold significant importance (Shittu, Tsado and Salaudeen, 2021).

2.5.2 Delay in the progress of work

Shittu, Tsado and Salaudeen (2021) discover that a delay in the progress of work will take place when the underlying causes of disputes remain unidentified and not promptly addressed within a timely manner. If a construction dispute arises, it could result in half of the work which directly causing a significant delay in the construction schedule (Amoah and Nkosazana, 2022; Mashwama, Thwala and Aigbavboa, 2019; Malik and Ali, 2019; Trangkanont, 2017). Besides that, Aryal and Dahal (2018) use the case study of the Belahiya-Butwal six-lane Road construction project to explain the concept of delay as this project experienced delays in replacing electricity poles and has resulted in the project surpassing its fourth deadline. Suppose a dispute necessitates changes to the original contract. In that case, a variation order will arise which can disrupt the workflow and needs to be added to the existing allocated time for the project (Senaratne and Farhan, 2022). Other than that, Elhag, Eapen and Ballal (2019) state that construction disputes in the Middle East take the longest time to resolve and these delays compel companies to hire experts from external regions to expedite the process of finding solutions. Irfan, et al. (2019) mention that all stakeholders will prioritize time constraints as it is straightforward to view a project in terms of its tangible progression.

2.5.3 Tension in communication

According to Senaratne and Farhan (2022), construction disputes will disrupt the equilibrium and the delicate balance in the relationship between the parties when either party fails to fulfil their obligation. Construction disputes can

exacerbate tension within a team, steaming from communication issues, the blame nature and additional workloads (Mashwama, Aigbavboa and Thwala, 2016; Mashwama, Thwala and Aigbavboa, 2019; Malik and Ali, 2019). In addition, Amoah and Nkosazana (2022) discover that construction disputes will adversely impact the communication between the client and contractor and trigger delays, negatively influencing the smooth execution of the contract. In addition, construction disputes may result in more strain and stress for individuals involved in the project since they already have busy schedules but still need to devote time and effort to dealing with others and resolving construction disputes (Shittu, Tsado and Salaudeen, 2021).

2.5.4 Breakdown in cooperation between parties

Construction disputes have the potential to foster a culture of assigning blame and engaging in finger-pointing as each party endeavours to deflect responsibility onto others. This dynamic of blame will result in a breakdown in cooperation among the parties involved (Aryal and Dahal, 2018). Shittu, Tsado and Salaudeen (2021) discover that the relationship between the parties will endure irreparable harm, rendering forthcoming cooperation and collaboration notably more intricate and arduous to attain in circumstances where the absence of effective dispute management. Other than that, the participant involved in the construction project that with the escalation of disputes might begin to scrutinise each other's motivations and intentions which can give rise to feelings of suspicion and scepticism, thereby undermining the trust necessary for practical cooperation (Mashwama, Aigbavboa and Thwala, 2016). Furthermore, Mashwama, Thwala and Aigbavboa (2019) mention that during alternative dispute resolution, all the members might solidify their own views, complicating the process of reaching a compromise and obstructing the attainment of outcomes that would be mutually advantageous.

2.5.5 Erosion of profit

Mashwama, Thwala and Aigbavboa (2019) mention the significance of proactive construction management to avoid disputes as the management plays a pivotal role in shaping the profitability of the project. Aryal and Dahal (2018)

state that a construction project might increase in profit if the seamless execution and unhindered progress of project is ensured and without any construction disputes. Disputes especially in privately funded projects bear a significant impact on the concerns of numerous stakeholders, not only curtail profits but also carry a considerable financial burden. Besides that, Mashwama, Aigbavboa and Thwala (2016) discover that the profitability of the project is adversely affected by the influence of additional expenditure and unforeseen costs. Moreover, the time and resources allocated to resolving disputes may have been used to pursue new projects or business expansion which means that construction disputes represent a lost chance for growth that can subsequently affect the project's overall profitability (Shittu, Tsado and Salaudeen, 2021).

2.5.6 Loss of professional reputation

Aryal and Dahal (2018) discover that construction projects encompass diverse participant groups and each group holds distinct concerns and goals contributing to construction disputes. Thus, the construction industry has developed a reputation for being marked by contention and legal disputes that can tarnish the reputation of all involved parties. Furthermore, clients could link disputes with an absence of their needs, thereby diminishing their view of the professional's dependability (Malik and Ali, 2019). Unsatisfied clients have the potential to share unfavourable experiences and this action will exert a detrimental influence on the professional's reputation through the power of word-of-mouth (Mashwama, Aigbavboa and Thwala, 2016). In addition, Shittu, Tsado and Salaudeen (2021) mention that an accumulation of disputes over time can gradually damage the professional's credibility, creating a more challenging environment for establishing trust with both customers and partners.

2.5.7 Rework

Malik and Ali (2019) determine that one of the consequences of construction disputes in Pakistan is rework and relocation costs for labour, materials and tools. Rework may be required due to delays, misunderstandings and modifications to guarantee that the project aligns with its original specifications, quality criteria and contractual responsibilities (Mashwama,

Aigbavboa and Thwala, 2016). In other words, the necessity for rework could arise to achieve the agreed-upon quality requirement especially in cases of disputes concerning work quality (Aryal and Dahal, 2018). If parties are unable to peacefully resolve the construction disputes, it could lead to suspension or cessation of work and could result in rework when the disputes are eventually addressed (Mashwama, Thwala and Aigbavboa, 2019).

2.5.8 Wastage and under-utilization of man-power and resources

According to Mashwama, Thwala and Aigbavboa (2019), construction disputes in privately funded projects can lead to inefficiencies and waste since the valuable labours and materials become idle during this period. Construction workers might grapple with uncertainty over the continuation of their tasks upon the emergence of a dispute since construction disputes can cloud the project's trajectory. This lack of clarity can trigger misallocation of resources (Mashwama, Aigbavboa and Thwala, 2016). Additionally, schedules for construction projects are frequently rigid and delays resulting from disputes can result in lost opportunities such as optimal weather conditions or other project-related favourable circumstances being lost (Shittu, Tsado and Salaudeen, 2021). Moreover, Senaratne and Farhan (2022) mention that disputes in construction have the potential to stymie the flow of supplies of tools and materials where the suppliers might postpone deliveries or redirect resources to another alternative project.

2.5.9 Poor work quality

Elhag, Eapen and Ballal (2019) discover that certain contractors may become risk-averse in a dispute-prone scenario and refrain from quality assurance measures due to the fear that deviations from contested plans would spark new disputes. Besides that, Irfan, et al (2019) mention that contractual duties might become more pressing in the wake of disputes and this pressure could result in contractors taking shortcuts, leading to rushed decisions and compromised quality to avoid further issues. Furthermore, Trangkanont (2017) states that disputes can result in reduced supervision and monitoring of construction tasks, potentially causing inspections and quality control procedures to be minimized or neglected due to the distracting nature of the disputes.

2.5.10 Challenges associated with insurance coverage procedures

According to Malik and Ali (2019), in the event of construction disputes, insurance coverage complexities can arise, with insurance companies potentially obligated to provide legal defence for insured parties based on policy terms. Disputes can wield an impact on insurance rates, influencing factors like indemnity payments and the expenses associated with resolving claims (Mashwama, Thwala and Aigbavboa, 2019).

Table 2.2: Literature Map for Effects of Construction Disputes in Private Sector Projects.

Ref	Effects	Amoah and Nkosazana (2022)	Aryal and Dahal (2018)	Elhag, Eapen and Ballal (2019)	Irfan, et al. (2019)	Malik and Ali (2019)	Mashwama, Aigbavboa and Thwala (2016)	Mashwama, Thwala and Aigbavboa (2019)	Shittu, Tsado and Salaudeen (2021)	Senaratne and Farhan (2022)	Trangkanont (2017)	Total
1	Cost overruns	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10
2	Delay in the progress of work	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	9
3	Tension in communication	✓				✓	✓	✓	✓	✓		6
4	Break down in cooperation between parties		✓				✓	✓	✓	✓		4
5	Erosion of profit		✓				✓	✓	✓			4
6	Loss of professional reputation		✓			✓	✓		✓			4
7	Rework		✓			✓	✓	✓				4
8	Wastage and under-utilization of man-power and resources						✓	✓	✓	✓		4
9	Poor work quality			✓	✓						✓	3
10	Challenges associated with insurance coverage procedure					✓		✓				2

2.6 Causes of Construction Disputes in Private Sector Projects

2.6.1 Behavioural Factors

2.6.1.1 Lack of communication

Most disputes arising in the construction sector may be linked back to a breakdown in communication between the parties involved. (Amoah and Nkosazana, 2022; Aryal and Dahal, 2018; Do, Nguyen and Nguyen, 2022; Goh, Wong and Low, 2022; Laubscher and Gaum, 2019; Naji, Mansour and Gunduz, 2020). For instance, Francis, Ramachandra and Perera (2022) discover that lack of communication is a major issue in construction disputes in the United Kingdom. Their research is done after a documentary review before semi-structured interviews with the chosen specialists to gather data for the chosen projects. Besides that, Haron, Masrom and Kamal (2020) use a case study of *Maya Maju (M) Sdn Bhd v Putrajaya Homes Sdn Bhd* to present that a lack of communication among members of the project will lead to construction disputes. According to Muhammuddin, Suhaimi and Hanid (2022), construction projects are recognised for being complicated and competitive and frequently require the cooperative efforts of several professional parties over a lengthy amount of time. Thus, good communication is essential since the construction process involves various stages of reciprocal information exchange between all the participants involved in the project.

El-Sayegh, et al. (2020) mention that a lack of communication among stakeholders during construction leads to misinterpretations about the nature of the work, leading to disputes between the participants. Additionally, the project team may get in opposite directions and impede one another due to miscommunication, which also results in construction disputes (Viswanathan, et al., 2020). Wang, et al. (2023) demonstrate that communication between the contractor and designer is essential to prevent construction disputes. In other words, construction disputes might arise regarding how effectively project team members communicate and coordinate their activities (Vo, Nguyen and Nguyen, 2020). Cakmak (2022) states that contractor engagement from the beginning of construction can improve stakeholder relationships and communications, which should prevent or lessen the impact of disputes. Furthermore, effective communication among participants can help to prevent

disputes about the quality and modifications of the designs (Assaf, et al., 2019). For example, when the customer fails to provide the designer with specific demands for the project, it may result in an ambiguous design and make it difficult for the contractor and subcontractor to complete the task successfully.

2.6.1.2 Payment delays

According to Alrasheed, Soliman and AlMesbah (2023), delays in payment was the most regular cause of construction disputes. Their research proves that payment delays had the highest percentage that caused construction disputes in privately funded projects, which is 34.85% compared to 18.18% of the incompleteness of contract documents and 12.12% of project delays. Francis, Ramachandra and Perera (2022) mention that in the majority of construction projects in New Zealand, there are disputes about payments between clients and contractors over both interim and final payments. Disputes will occur when payment delays are due to the client which prevents the completion of some project goals (Assaf, et al., 2019; Laubscher and Gaum, 2019; Viswanathan, et al., 2020; Vo, Nguyen and Nguyen, 2020). Moreover, Cakmak (2022) discover that it is challenging for contractors to monitor the cash flows to suppliers and subcontractors if they get late or incomplete payments for the job performed. In other words, the contractor's cash flow will be disrupted if payments are not made on time, affecting the work programme or even causing the project to be stopped (Muhammuddin, Suhaimi and Hanid, 2022). Amoah and Nkosazana (2022) state that the construction disputes due to payment delays are mainly because of the lack of specific instructions regarding the methods for documenting and paying compensation.

2.6.1.3 Financial failure

Muhammuddin, Suhaimi and Hanid (2022) discover that financial failure is also one of the factors that cause construction disputes in private sector projects. Clients with inadequate financial standing face the risk of being unable to pay contractors for the project and contractors with insufficient finances could struggle to pay for the workers and building materials (Goh, Wong and Low, 2022). According to Amoah and Nkosazana (2022), the

client may misinterpret the financial institutions such as banks or insurance companies that provide project funding or the contractor might argue with construction material suppliers and industry specialists. Furthermore, Francis, Ramachandra and Perera (2022) state that financial failure will exist in large and medium-sized projects and interrupt the contractor's entire programme, resulting in significant disputes between the participants. Contractors who are having financial difficulties might be driven to submit claims. Mistakes that lead to disputes in these circumstances may arise as contractors try to recover losses (Assaf, et al., 2019). In addition, El-Sayegh, et al. (2020) mention that construction will be left away if the owner cannot fund the project in the required time frame and the project may even come to an end for an extended period until the owner is prepared to pay it, which in the period will leads to disputes. The financial stability and effectiveness of a contractor's financial management system must be ensured (Aryal and Dahal, 2018). Alrasheed, Soliman and AlMesbah (2023) recommend that the main contractor must pay careful attention to the company's financial standing of the client while the client needs to check the financial record of the contractor submitted when submitting a bid for a project in order to avoid construction disputes due to financial failure.

2.6.1.4 Adversarial culture

Some of the authors such as Amoah and Nkosazana (2022); Cakmak (2022); Do, Nguyen and Nguyen (2022); Naji, Mansour and Gunduz (2020); Viswanathan, et al. (2020) define adversarial culture as one of the issues that cause disputes in construction. An adversarial culture is when parties involved in a construction project approach their relationships with opposing views and a win-lose mindset. An example of adversarial culture in the construction industry is that the client lacks control over stakeholders with their own personal interests when there is ambiguity in the contract. Thus, the contractor will take the chance to profit financially at the client's expense when there is a discrepancy in the materials specifications (Ikuabe and Aigbavboa, 2019). In other words, the adversarial culture displayed by main contractors has an overwhelming effect on the construction project cost such as the clients end up giving undue financial benefits to the contractors (Ikuabe, Oke and Aigbavboa,

2020). According to Yin, et al. (2020), the adversarial culture encompasses various actions such as deviating from the term of a contract, engaging in fraud by withholding crucial information needed for the project and not carrying out the tasks that are not explicitly outlined in the contract but should be fulfilled by the contractor.

2.6.1.5 Behavioural adaptations of individual

Laubscher and Gaum (2019) describe how behavioural adaptations of individuals can lead to construction disputes in private sector projects. Disputes among team members may result if individuals adopt uncooperative attitudes or demonstrate behaviours that damage trust such as breaking promises, hiding information or taking hidden acts. According to Vo, Nguyen and Nguyen (2020), poor negotiation skills, a lack of preparation on either party's side or on both parties' parts and the expectation of both parties for dominance of the negotiation process can be classified as the behavioural adaptations of individual factors that contribute to a dispute in construction. A human being's capacity to make decisions, form connections, solve problems and negotiate may suffer from their views, attitude and behaviour. Being emotionally intelligent implies constantly recognising, comprehending, processing, and affecting one's own emotions as well as those of others in order to impact how one perceives, interprets and behaves (Love, et al., 2010).

2.6.2 Design Factor

2.6.2.1 Change of scope

Change of scope in construction projects is one of the factors that result in disputes (Alrasheed, Soliman and AlMesbah, 2023; Aryal and Dahal, 2018; Do, Nguyen and Nguyen, 2022; Haron, Masrom and Kamal, 2020; Laubscher and Gaum, 2019; Naji, Mansour and Gunduz, 2020; Vo, Nguyen and Nguyen, 2020). The primary cause of disputes was scope changes that resulted in consequential costs surpassing the initial project cost (Goh, Wong and Low, 2022). Francis, Ramachandra and Perera (2022) analyse 28 construction projects in Sri Lanka and found that 14 large-scale projects were troubled by a change of scope follow by 9 medium-scale projects and 5 small-scale projects. According to Ahmed and El-adaway (2023), discrepancies in the bill of

quantities may result in disputes about the nature of the work to be done and the related expenses, as well as disputes regarding the technical requirements and the quantity of materials to be utilised. Moreover, Muhammuddin, Suhaimi and Hanid (2022) state that a change of scope in the construction projects leads to a substantial influx of claims being submitted, resulting in disputes.

Furthermore, Amoah and Nkosazana mention that clients and designers frequently alter the agreed-upon scope of works without considering the effects on the project. Subsequently, upon realising the consequences of these changes, someone may not be willing to accept the associated adjustments in terms of quantity and cost, leading to disputes. Besides that, Cakmak (2022) discovers that experts prove that disputes are more likely to occur concurrently with changes in the scope of work, particularly in the traditional procurement methods as contractors are not involved in the design phase. Scope changes emerge due to various factors, including the client's experience, their specific requirements, geographical location, the needs of stakeholders involved and the market economy (Love, et al., 2010). In addition, it is essential for clients to ensure that the winning contractor possesses a thorough comprehension of the project's scope before giving the letter of award to the contractor (Assaf, et al., 2019). Viswanathan, et al. (2020) suggest that a well-documented variation clause is necessary for any additions, substitutions or omissions from the initial scope of works in order to prevent disputes.

2.6.2.2 Design errors

Error in design is a significant contributing factor to disputes in the construction industry (Aryal and Dahal, 2018; Cakmak, 2022; Do, Nguyen and Nguyen, 2022; Haron, Masrom and Kamal, 2020; Vo, Nguyen and Nguyen, 2020). Before entering the design phase, it is essential for the client to have a clear understanding of their requirements and expectations and it is crucial for the consultants to thoroughly examine the design (Alrasheed, Soliman and AlMesbah, 2023). According to Ahmed and El-adaway (2023), design errors may cause the clients and contractors to hold different opinions on the costs and decisions of who will be responsible for implementing the necessary improvements; these may raise disputes. Additionally, Francis, Ramachandra

and Perera (2022) mention that design errors can cause significant delays and extra expenses that result in disputes between the contractor and consultant and their research proves that design errors have been the cause of disputes in a substantial number of building projects, which have 25 out of 44 cases.

Muhammuddin, Suhaimi and Hanid (2022) discover that design errors arise when there are conflicting or contradictory items present in the design. These inconsistencies can lead to confusion and difficulties during a project's construction or implementation phase. The complexity of the construction projects can make it challenging to foresee all potential issues during the design phase and as a result, errors may arise (Assaf, et al., 2019). Amoah and Nkosazana (2022) suggest that the main contractor can start to communicate with the design consultants during the planning stage as this can anticipate and address potential construction-related issues early on in the process and this collaboration can aid in identifying cost-effective design, allowing for more efficient and budget-friendly solutions to be integrated into the project. On the other hand, Wang, et al. (2023) suggest that sufficient time should be allocated during the design stage to allow for a more careful and detailed evaluation of the design, identify potential issues and make the necessary improvement to ensure that the final design is well-optimised for construction and meets the project's objectives effectively.

2.6.2.3 Nonavailability of information

According to Goh, Wong and Low (2022), insufficient information on drawings can elevate the financial risk for contractors, potentially resulting in disputes. They also point out that such incomplete information might result in estimation errors, further influencing the outcome of the tender bidding process for the contractor. Wang et al. (2023) state that the design specifications offer precise details on implementing the design. Incomplete design information may result in disputes between the project owner and the contractor over differing interpretations of the intended design, leading to disputes regarding design changes and modifications (Amoah and Nkosazana, 2022; Aryal and Dahal, 2018; El-Sayegh, 2020; Laubscher and Guam, 2019; Naji, Mansour and Gunduz, 2020). Moreover, Assaf, et al. (2019) mention that when essential information in design is missing, it can be challenging to

design the project in a way that will ensure the success and the achievement of goals. Therefore, the main contractor and consultant must constantly monitor the market to stay informed about the specific construction materials according to the design. Furthermore, Francis, Ramachandra and Perera (2022) discover that insufficient planning in the design information can affect the work programme and eventually compromise the project quality which all of this lead to construction disputes.

2.6.2.4 Unrealistic expectations

Unrealistic expectations about the construction project's design that lack practical feasibility can lead to disputes since the construction team must seek alternatives or explain the limitations of implementing such designs (Amoah and Nkosazana, 2022). Goh, Wong and Low (2022) discover that 120 contractors involved in residential building projects in Saudi Arabia identify the unrealistic expectations of clients from the design perspective as one of the significant causes that lead to construction disputes. Moreover, disputes may emerge when the construction team attempts to modify the unrealistic design expectations to accommodate the financial limitations while still meeting the client's expectations (Aryal and Dahal, 2018; Francis, Ramachandra and Perera, 2022; Naji, Mansour and Gunduz; 2020; Vo, Nguyen and Nguyen, 2020). Do, Nguyen and Nguyen (2022) state that the client's unrealistic demand regarding the cost and quality of design will require the need to adjust the cost and work programme. Additionally, Viswanathan, et al. (2020) mention that when a client's requirements are not realistically achievable, it will result in disputes as there are two different perspectives of the project's goals, one from the client's viewpoint and the other from the contractor's standpoint.

2.6.2.5 The owner's arbitrary changes in the design

Vo, Nguyen and Nguyen (2020) mention that the owner's arbitrary changes in the design can influence the contractor's resource plan and escalate the risk to contractors especially considering that profits in small-scale projects are low. According to Assaf, et al. (2019), even if the customer and the contractor are in line about the need for the change order, there is still a possibility that the

time and cost of the claim will be disputed. For example, the client may request changes that result in a variety of consequences, including but not limited to the need for more excavation, an increase in the price of materials and modifications to the design of the footing. Besides that, if the owner implements modifications to the design, the changes might not be in accordance with the original contract terms, resulting in disputes concerning the additional work needed and the compensation for these adjustments (El-Sayegh, et al., 2020). Aryal and Dahal (2018) suggest that excessive client interference and frequent significant changes to the project design during the construction phase should be avoided as they can lead to significant project delays.

2.6.3 Technical Factor

2.6.3.1 Delays and extension of time

Delays or extension of time is also one of the factors that contribute to construction disputes in private sector projects in which the work is not finished within the scheduled timeframe and are often claimed for an extension of time (El-Sayegh, et al., 2020; Goh, Wong and Low, 2022; Laubscher and Gaum, 2019; Vo, Nguyen and Nguyen, 2020). Construction project delays may be due to the contractor's failure to completing the shop drawings on time or their inability to start the project on time due to financial constraints (Assaf, et al., 2019). In addition, delays or extensions of time in construction projects will arise due to inadequate labour organisation, clients not being satisfied with the work completed and ineffective productivity and control measures (Wang, et al., 2023). Amoah and Nkosazana (2022) mention that contractors can lead to a delay in construction projects and when faced with the impact of the delay, lead to disputes with clients. According to Cakmak (2022), construction disputes can arise when delays in projects are claimed as reasons for an extension of time.

Furthermore, Ahmed and El-adaway (2023) discover an instance where the main contractor employs subcontractors by use inappropriate standards, personal connections and other elements without concerning the subcontractors' skills, expertise and capability to carry out the assigned task. Such a practice often leads to disputes as the subcontractors are highly likely

to breach their contractual duties, leading to delays, increased expenses and various other issues. Moreover, the delay in the work programme can be approached and analysed from various points such as clients' characteristics, the level of design complexity involved and the conditions at the construction site (Francis, Ramachandra and Perera, 2022). Viswanathan, et al. (2020) mention that failure to complete a project on schedule will impact all parties involved and hinder the accomplishment of project objectives. Thus, Alrasheed, Soliman and AlMesbah (2023) suggest that vigilantly adhering to the project schedule, effectively in resource management and implementing penalties as necessary in order to avoid disputes.

2.6.3.2 Technical inadequacies of the contractor

Technical inadequacies of contractors can be identified as a crucial factor that contributes to construction disputes (Ahmed and El-adaway, 2023; Amoah and Nkosazana, 2022; Francis, Ramachandra and Perera, 2022; Love, et al., 2010). According to Haron, Masrom and Kamal (2020), contractors unable to carry out the tasks in a proficient manner due to technical inadequacies of the contractor is the factor that causes construction dispute to arise. Assaf, et al. (2019) discover that certain contractors might choose to underbid the tender to increase the likelihood of winning the contract and they believe that they can cover their profit at the later claims. However, the contractor will face challenging situations, potentially leading to disputes when the client rejects the claims as unjustified. Additionally, Naji, Mansour and Gunduz (2020) mention that technical inadequacies during the construction process may lead to errors and mistakes, resulting in additional costs for rectification and rework which the client may refer the issue to arbitration. Besides that, Muhamuddin, Suhaimi, and Hanid (2022) state that the contractor's technical inadequacies can result in various problems that may trigger disputes with the client. Aryal and Dahal (2018) suggest that clients must ensure that the contractors are not chosen solely on the basis of the lowest quotations. It is essential that the chosen contractor possesses adequate experience and technical expertise to undertake the project successfully.

2.6.3.3 Poor quality of work

If the contractor does not complete the construction project according to the agreed-upon standards especially the quality of work, it might lead to disputes about whether the contractor met the contractual obligations (Cakmak, 2022; Goh, Wong and Low, 2022; Laubscher and Gaum, 2019; Viswanathan, 2020). In other words, construction disputes arise due to poor quality of work occur when the contractor's work fails to meet the criteria outlined in the agreement (Assaf, et al., 2019). According to Francis, Ramachandra and Perera (2022), poor work quality was coupled with poor construction materials. For instance, the contractor initiates the work on-site without obtaining the engineer's endorsement for specific materials that result in construction disputes. Furthermore, Alrasheed, Soliman and AlMesbah (2023) suggest selecting the main contractor firm with impressive historical performance and enforcing rigorous quality assessments to minimise construction disputes due to the quality of work. Besides that, Amoah and Nkosazana (2022) discover that clients should hire highly skilled construction experts to properly undergo and supervise the project, ensuring adherence to schedules, budget constraints and quality standards.

2.6.3.4 Contractor's noncompliance with the design

As the construction project operates as a sequence of tasks, it is essential to recognize that the caliber of the design output has the potential to impact the progression of construction. The level of contractor's compliance with the design can also have repercussions on the viability of the client's requirement (Vo, Nguyen and Nguyen, 2020). Additionally, Alrasheed, Soliman and AlMesbah (2023) discover that if the contractor makes changes or does not comply with the design without proper authorization, it can affect the functionality, safety and aesthetics of the final product which potentially leads to disputes between the contractor and the client about the quality of the work.

2.6.3.5 Unsuitable leadership style of project manager

According to El-Sayegh et al. (2020), a project manager's unsuitable leadership style will lead to poor decision-making during construction, negatively impacting project outcomes. This may be due to an unqualified and

unskilled individual without the necessary credentials holding the role of project manager. In other words, an unsuitable leadership style in a construction project can lead to several problems that affect the project's success and client's satisfaction which can be the basis for disputes among the clients, contractor and consultant.

2.6.4 Contractual Factor

2.6.4.1 Ambiguous contract drafting, terms and provisions

Contract drafting issues such as unclear language, vague terms and contradictions can result in construction disputes (Amoah and Nkosazana, 2022; Assaf, et al., 2019; Cakmak, 2022). Vo, Nguyen and Nguyen (2020) state that deciding which clause takes precedence can be challenging if different sections of the contract contain contradictory provisions, resulting in disputes over which terms apply in particular circumstances. According to Laubscher and Gaum (2019), improper or poorly drafted contracts can result in construction disputes over rights, obligations and responsibilities. Additionally, Wang, et al. (2023) discover that construction disputes relate to contract documents containing ambiguous or obscure language that potentially enable parties to exploit others for financial gain. Contracts that are overly rigid may fail to take into account unforeseen events or modifications in the project's environment. If the parties involved cannot come to an agreement on addressing the unexpected occurrences, this lack of adaption may result in disputes (Viswanathan, 2020).

2.6.4.2 Different interpretations of the contract provisions

Haron, Masrom and Kamal (2020) mention that the concerns about the interpretation and comprehension of construction contracts have garnered significant attention over the years. It is common for a contractor to ignore some clauses of the contract that may be open to misunderstanding. Regrettably, such oversight can impact the project's budget and overall progress because of the time constraints during the bidding phase (Assaf, et al., 2019). Ahmed and El-adaway (2023) state that different interpretations of the contract provisions are identified as a factor contributing to construction disputes in the United States. Furthermore, Francis, Ramachandra and Perera

(2022) discover that in a collection of nine projects, precisely eight of them chose to deviate from utilising any standard form of contract and every single one of these projects encountered issues of different interpretations of the contract term and condition. Contractors frequently encounter challenges in fully grasping or inadvertently missing specific provisions within the contract due to the contract's extensive terms and conditions (Wong, et al., 2023). Alrasheed, Soliman and AlMesbah (2023) suggest engaging in proactive measures such as posing inquiries during pre-tender meetings to dispel uncertainties and addressing potential issues, as well as appointing qualified contract specialists in order to avoid different interpretations of the contract provisions.

2.6.4.3 Unfair Risk Allocation

According to Ahmed and El-adaway (2023), the consultant should incorporate elements like the contract's time frame, a dispute resolution process and strategies for managing risks when drafting the agreement between the client and the main contractor. Goh, Wong and Low (2022) discover that unfair risk allocation is one of the factors that leading to construction disputes in Sarawak, Malaysia. Contract risk management involves aiding clients in gaining a clearer comprehension of the fundamental aspects of contractual responsibilities and risk mitigation (Amoah and Nkosazana, 2022). In addition, recognising, distributing and actively addressing risk is pivotal in mitigating construction disputes (Love, et al., 2010). Francis, Ramachandra and Perera (2022) state that unfair risk allocation in construction contracts, which is another major contributor to disputes, is a result of the presence of exculpatory clauses on the unpredictability of work circumstances, delays, liquidated damages and the adequacy in contract documents. Moreover, Do, Nguyen, and Nguyen (2022) show that the contract's risk allocation provision needs to be carefully examined because it significantly impacts the quality of the construction project. Since owners have a wide range of options when choosing a contractor, unfair risk allocation commonly happens in unstable contracts.

2.6.4.4 Inadequate and incomplete contract documentation

Alrasheed, Soliman and AlMesbah (2023) discover that there are disputes about inadequate and incomplete contract documentation in Kuwaiti's construction industry, highlighting that among 27 projects, 15 are private sector projects. Additionally, Cakmak (2022) states that clients, especially those not from a construction background, will seek consultancy services to create the documents such as drawings, specifications, bills of quantities and cost estimates but often lack the opportunity to validate the precision and soundness of documents. Conversely, contractors claimed that discrepancies within contract documents resulted in significant issues and complicated disputes. Besides that, Francis, Ramachandra and Perera (2022) mention that inadequate and incomplete contract documentation stems from consultant underperformance, regardless of the impact of the project variables aside from the standard form of the contract document. When the contract document contains conflicting and erroneous information, it necessitates meticulous refinement before parties can reach an agreement. Accuracy and sufficient information are paramount in contracts, particularly the need for careful consideration to ensure that statements within the contract align harmoniously with the project's scope of work (El-Sayegh, et al., 2020). Naji, Mansour and Gunduz (2020) recommend that clear and comprehensive documentation is crucial to minimise the potential source of construction disputes and can guarantee a smoother project execution.

2.6.4.5 Breaches of Contracts

Ahmed and El-adaway (2023) discover a breach of contract that refers to a scenario in which a bidder or owner does not adhere to the legal prerequisites associated with the bidding procedure. For instance, this might encompass disregarding procurement rules or neglecting to secure necessary licenses or permits. Furthermore, it can be challenging to uphold contractual responsibilities and failing to meet these obligations may result in a breach of the agreement, which may spark additional problems (Muhammuddin, Suhaimi and Hanid, 2022). Wang, et al. (2023) mention that a breach of contract may lead to contract termination, directly contributing to disputes within construction projects.

2.6.5 External Factor

2.6.5.1 Inconsideration of environmental issues and site conditions

Amoah and Nkosazana (2022) suggest that contractors must consider the potential ramifications of increasing sea levels and extreme weather events as climate change becomes more pressing. Besides that, Goh, Wong and Low (2022) state that late giving site possession to contractors is also one factor leading to construction disputes in Turkey. Moreover, Ahmed and El-adaway (2023) discover that when the actual site circumstances at the construction site deviate from what was anticipated or indicated in the contract documents, the bidder who secured the project may pay additional expenses or project delays, potentially resulting in construction disputes. In other words, when the contractor confronts unexpected and distinctly unusual physical conditions that are typically experienced and commonly understood to be part of the work at the project's site (El-Sayegh, et al., 2020). For example, the land's natural contours impact site preparation, grading, drainage systems and even the design of the structure itself (Francis, Ramachandra and Perera, 2022). Additionally, Wang, et al. (2023) mention that insufficient site analysis may result in unsafe circumstances and other problems that are frequently contentious and subject to disputes. This factor stands out as a primary source of disputes when environmental conditions deviate from what was outlined in the contract, resulting in extra costs and tasks.

2.6.5.2 Inadequate administration and management

Ineffective site management is a primary contributor to construction related disputes initiated by the contractor (Cakmak,2022; Naji, Mansour and Gunduz, 2020; Wang, et al., 2023). According to El-Sayegh, et al. (2020), the contractor's poor site management and monitoring can delay the construction process and accidents might happen. Haron, Masrom and Kamal (2020) discover that contractors must well manage the construction site and are responsible for ensuring no complaints about the ongoing construction project from the residents, especially regarding noise and pollution.

2.6.5.3 Changes in legal and economic factors

Issues related to land use restrictions, zoning regulations and property rights can lead to disputes about project viability, design alternatives and property access (Cakmak, 2022). Amoah and Nkosazana (2022) mention that changes in local, regional, or national rules significantly impact project needs, approvals and timelines, all contributing to construction disputes. According to Goh, Wong and Low (2022), economic pressure will lead to competitive bidding tactics which might result in unrealistic cost estimates or contractual terms. This will lead to construction disputes when the actual costs or circumstances differ from the initial bid. Moreover, Laubscher and Gaum (2019) discover that economic factors like labour strikes and supply chains can result in project delays, additional expenses and disputes over who is accountable for these delays. Besides that, Haron, Masrom and Kamal (2020) describe the case of *Muhammad Radhieddeen bin Abdul Khalid v Saujana Triangle Sdn Bhd* to explain that the defendant could not finish and hand over the construction project on time because of the economic reason that out of control such as the increase in the construction materials due to inflation.

2.6.5.4 Shortage in supply (Materials and Labour)

Alrasheed, Soliman and AlMesbah (2023) mention that construction disputes can emerge regarding the responsibility for shortages, as clients may claim inadequate contractor planning while contractors could attribute shortages to uncontrollable external factors, ultimately leading to disputes due to the challenge of determining accountability. Furthermore, Assaf, et al. (2019) discover that the lack of contract-specified materials might be a significant basis of construction disputes in Saudi Arabia. For instance, when contractors submit bids for a project, their pricing relies on the accessibility of materials within the market. If a particular material is not procurable, the contractor must explore substitutes to meet the client's requirements. However, these additional costs of substituted materials might strain project budgets, resulting in disputes over who should bear the financial burden of these higher charges. When unskilled labour must be utilised because of labour shortages, there is a risk of compromising the quality of the final construction. Disputes may occur

about whether the contractor should rectify the issues at their own expenses or if the client should accept the compromised quality (Viswanathan, et al., 2020).

2.6.5.5 Poor site safety conditions

According to Wang, et al. (2023), construction disputes may arise due to poor safety management or the contractor's disregard for safety concerns. Poor site safety will lead to accidents, several injuries and fatalities, potentially giving rise to construction disputes.

Table 2.3: Summary for Causes of Construction Disputes in Private Sector Projects.

Ref	Causes	Alrasheed, Soliman and AIMesbah (2023)	Ahmed and El-adaway (2023)	Amoah and Nkosazana (2022)	Aryal and Dahal (2018)	Assaf, et al. (2019)	Cakmak (2022)	Do, et al. (2022)	El-Sayegh, et al. (2020)	Francis, et al. (2022)	Goh, Wong and Low (2022)	Haron, Masrom and Kamal (2020)	Laubscher and Gaum (2019)	Love, et al. (2010)	Muhammuddin, et al. (2022)	Naji, Mansour and Gunduz (2020)	Viswanathan, et al. (2020)	Vo, Nguyen and Nguyen (2020)	Wang, et al. (2023)	Total
Behavioural Factor																				
1	Lack of communication		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	15
2	Payment delays	✓		✓	✓	✓	✓			✓	✓		✓		✓		✓	✓	✓	9
3	Financial failure	✓		✓	✓	✓			✓	✓	✓				✓					8
4	Adversarial culture		✓				✓	✓								✓	✓			5
5	Behavioral adaptations of individuals												✓	✓			✓		✓	3
Design Factor																				
6	Change of scope	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	16
7	Design errors	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓			✓			✓	✓	12
8	Nonavailability of information		✓	✓	✓	✓			✓	✓	✓	✓	✓			✓			✓	9
9	Unrealistic expectations			✓	✓	✓		✓		✓	✓					✓	✓	✓	✓	8
10	The owner's arbitrary changes in the design				✓	✓			✓								✓	✓	✓	4

Table 2.3: Summary for Causes of Construction Disputes in Private Sector Projects (Cont'd).

Ref	Causes	Alrasheed, Soliman and AlMesbah (2023)	Ahmed and El-adaway (2023)	Amoah and Nkosazana (2022)	Aryal and Dahal (2018)	Assaf, et al. (2019)	Cakmak (2022)	Do, et al. (2022)	El-Sayegh, et al. (2020)	Francis, et al. (2022)	Goh, Wong and Low (2022)	Haron, Masrom and Kamal (2020)	Laubscher and Gaum (2019)	Love, et al. (2010)	Muhammuddin, et al. (2022)	Naji, Mansour and Gunduz (2020)	Viswanathan, et al. (2020)	Vo, Nguyen and Nguyen (2020)	Wang, et al. (2023)	Total
Technical Factor																				
11	Delays and extension of time	✓	✓	✓		✓	✓		✓	✓	✓		✓				✓	✓	✓	12
12	Technical inadequacies of the contractor		✓	✓	✓	✓				✓		✓		✓	✓	✓		✓		9
13	Poor quality of work	✓		✓		✓	✓			✓	✓		✓				✓			8
14	Contractor's noncompliance with the design	✓																✓		2
15	Unsuitable leadership style of project manager								✓											1
Contractual Factor																				
16	Ambiguous contract drafting, terms and provisions			✓		✓	✓						✓				✓	✓	✓	7
17	Different interpretations of the contract provisions	✓	✓			✓				✓		✓							✓	6
18	Unfair Risk Allocation		✓	✓				✓		✓	✓			✓						6
19	Inadequate and incomplete contract documentation	✓					✓		✓	✓						✓				5
20	Breaches of Contracts		✓													✓			✓	3

Table 2.3: Summary for Causes of Construction Disputes in Private Sector Projects (Cont'd).

Ref	Causes	Alrasheed, AIMSbah (2023)	Soliman and Ahmed and El-adaway (2023)	Amoah and Nkosazana (2022)	Aryal and Dahal (2018)	Assaf, et al. (2019)	Cakmak (2022)	Do, et al. (2022)	El-Sayegh, et al. (2020)	Francis, et al. (2022)	Goh, Wong and Low (2022)	Haron, Masrom and Kamal (2020)	Laubscher and Gaum (2019)	Love, et al. (2010)	Muhammuddin, et al. (2022)	Naji, Mansour and Gunduz (2020)	Viswanathan, et al. (2020)	Vo, Nguyen and Nguyen (2020)	Wang, et al. (2023)	Total	
External Factor																					
21	Inconsideration of environmental issues and site conditions		✓	✓					✓	✓	✓									✓	6
22	Inadequate administration and management						✓		✓			✓				✓				✓	5
23	Changes in legal and economic factors			✓			✓				✓	✓	✓								5
24	Shortage in supply (Materials and Labour)	✓				✓												✓			3
25	Poor site safety conditions																	✓			1

2.7 Summary

In summary, this chapter deeply explains the construction disputes in privately funded projects. The definition, effects and causes of construction disputes were thoroughly elaborated. Additionally, the key findings from different existing research papers about construction disputes' effects and causes were summarised in Tables 2.2 and 2.3. After a thorough review of the previous research on construction disputes, the factors contributing to construction disputes can be categorised into five groups: behavioural factors, design factors, technical factors, contractual factors and external factors. Figure 2.1 below depicts the critical aspects of both the effects and causes of construction disputes in private sector projects as outlined by previous researchers. Understanding these problems can help to identify solutions to minimise the possibility of disputes, ensuring the success and efficiency of private construction projects.

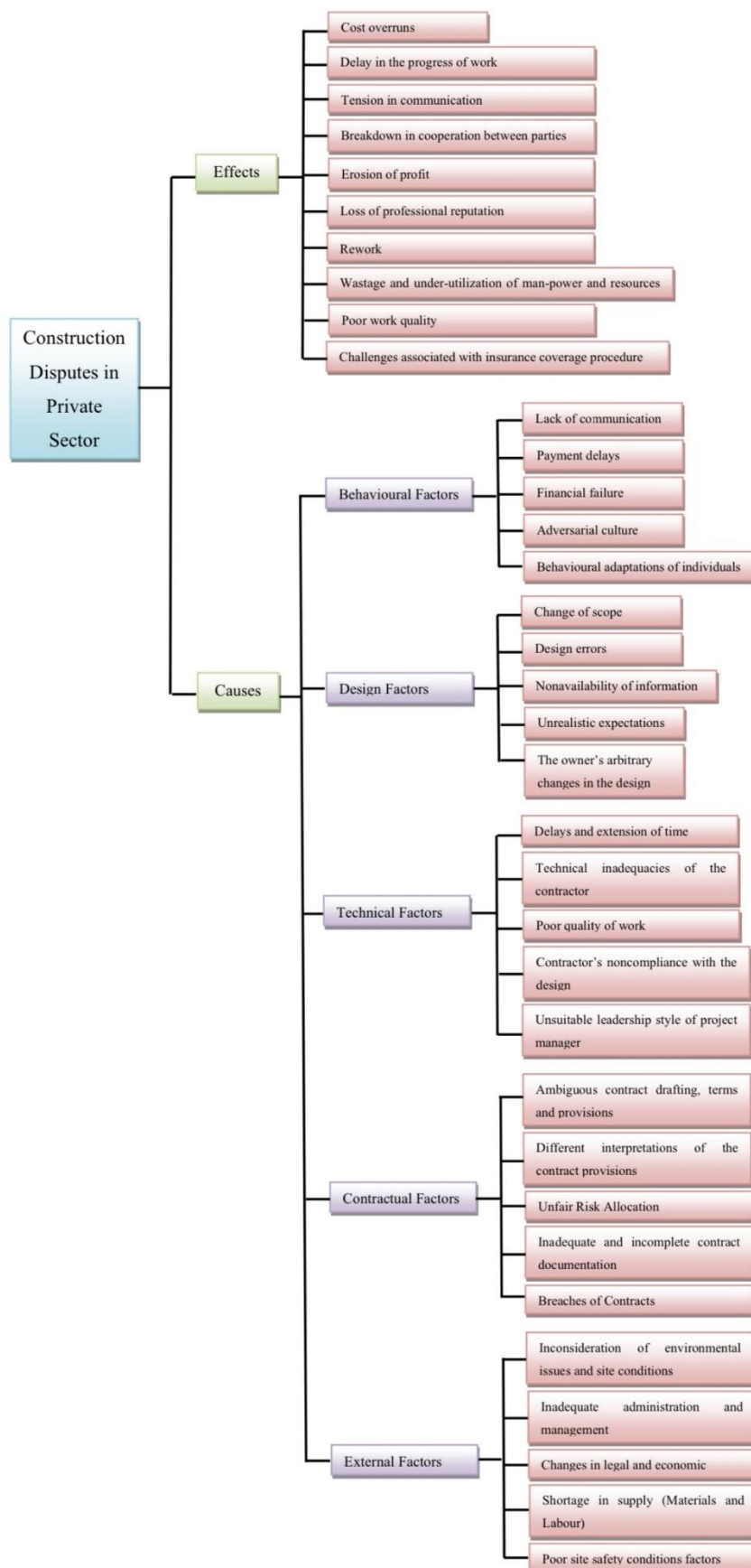


Figure 2.1: Framework of Effects and Causes of Construction Disputes in Private Sector Project.

CHAPTER 3

METHODOLOGY AND WORK PLAN

3.1 Introduction

This chapter mainly covered the methodical approaches used to carry out this research. Through the utilisation of scientific analysis and techniques to the gathered data, research can uncover concealed underlying information. Hence, this chapter unveils the utilised research approach, encompassing elements of the research framework, sampling design, data gathering technique and the approach to data analysis.

3.2 Research Methodology

Research methodology could be approached in two distinct ways, namely the qualitative approach and the quantitative approach. Interestingly, these two methodologies can be simultaneously employed within a particular research study.

Aspers and Corte (2019) describe qualitative research as an iterative process whereby an enhanced comprehension of the scientific community is attained by establishing novel and meaningful distinctions. These distinctions emerge due to delving deeply into the phenomenon under investigation, bringing researchers closer to the subject matter. In other words, qualitative research helps us understand people's experiences in a detailed way, revealing unique insights that value cannot provide.

In contrast, quantitative research systematically gathers numerical data and uses statistical techniques to analyse it. The primary goal is to generate objective and empirical data that can be quantified and conveyed in numerical terms (Mcleod, 2023).

3.2.1 Selection of Quantitative Research

The quantitative methodology was utilised throughout the course of this research. First and foremost, quantitative research adheres to a deductive approach that commences with formulating a hypothesis or research question, which subsequently serves as the basis for accumulating numerical data to

validate the stated hypothesis. Furthermore, the time horizon for the quantitative research method involves cross-sectional. A cross-sectional study design is a particular strategy that concentrates on gathering data from several groups or individuals from a single moment in time. The goal of this kind of research is to present an instantaneous picture of the participants under research. Hence, the main reason for choosing the quantitative approach is because of its speed and efficiency, allowing for the cost-effective collection of a large number of responses in a short period of time. Last but not the least, quantitative analysis is a mono method where closed-ended questions with specified response alternatives are used to facilitate straightforward quantification and lends itself well to subsequent statistical analysis.

3.3 Research Design

The overall plan that outlines how this research was conducted, organised and executed was discussed in this subtopic. According to Bhat (2018), the four critical characteristics of research design are neutrality, reliability, validity and generalisation. These characteristics collectively shape the integrity and effectiveness of the chosen research approach. The procedure of conducting this research was depicted and elucidated in Figure 3.2.

The first step in this research was identifying the background of the problem, formulating a concise problem statement, outlining research objectives and defining the research's scope. Subsequently, the following step was to collect more information from previous research about the effect and causes of construction disputes in private sector projects. In step 3, the researcher selects the sampling design, which encompasses the selection of the sampling method, determination of sample size, identification of the targeted respondents and the adoption of an appropriate research design tailored to execute this research effectively. Data was collected proportionately from three groups: clients, consultants and contractors. The sample size aims to include at least 125 participants, with a minimum of 41 respondents from each group. Next, the researcher proceeded to formulate the methodology for data collection. In this research, primary data was garnered through a questionnaire survey. The questionnaire was divided into four sections where Section A focused on obtaining personal details from the targeted participants. In the

meantime, the five-point Likert scale was used in Sections B, C and D. Furthermore, the Statistical Package for Social Sciences (SPSS) was used to analyse the collected quantitative data. Based on the findings, the summaries, recommendations and conclusions are drawn out in the final step.

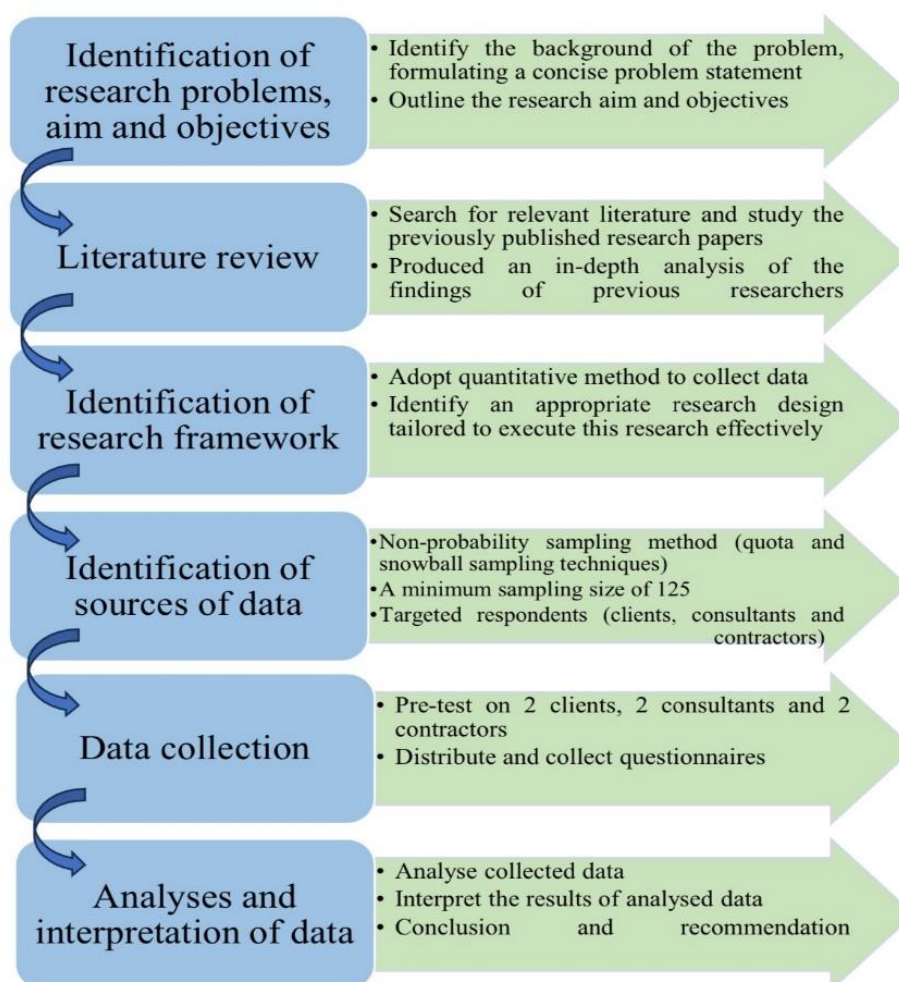


Figure 3.1: Flowchart for Research.

3.4 Sampling Design

3.4.1 Sampling Method

As illustrated in Figure 3.2, sampling methods can be categorized into two main types: probability sampling and non-probability sampling. Random selection is the key component of probability sampling which enables robust statistical conclusions to be drawn about the entire group. On the other hand, non-probability sampling entails non-random selection which facilitates the collection of data in a straightforward manner.

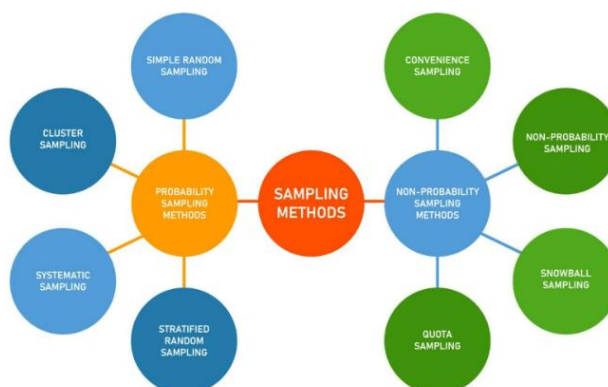


Figure 3.2: Type of Sampling Methods.

Source: Mcleod, 2023.

For this research, the non-probability sampling method has been employed. Specifically, the quota sampling method and snowball sampling method are used. According to Fleetwood (2018), quota sampling is a technique that involves the selection of subgroups, which greatly streamlines the process for researchers to achieve their intended outcomes. This process of subgroup formation serves as a filtering mechanism that a particular trait or characteristic can guide. In addition, the concept of snowball sampling is due to the resemblance of a snowball gaining size as it rolls downhill. In this method, the respondent's count can grow exponentially when the first participant enlists two others and each of those enlists an additional pair and so forth (Frost, 2022). This research used snowball sampling to increase the sample size after the initial participants were chosen via quota sampling. Every initial participant was asked to recommend two other professionals who met the research's requirements and were in their network. These new members then recommended more contacts to others.

3.4.2 Sampling Size

In this study, the Central Limit Theorem (CLT) was utilised to calculate the precise required sample size. Typically, sample sizes ranging from 30 to 50 are considered adequate for the CLT to apply, ensuring a normal distribution of sample means (Ganti, 2023). In this research, there are three targeted sampling groups: client, consultant and contractor. Consequently, each group

necessitates a minimum of 30 respondents, totaling at least 90 participants. However, a minimum sampling size of 125 is imperative for this research, aligning with the Rule of 5 and meeting the fundamental criteria for carrying out the Factor Analysis to streamline the 25 factors that cause construction disputes in privately funded projects.

3.4.3 Target Respondents

This research targeted construction practitioners within the Klang Valley area. In the fourth quarter of 2022, the Klang Valley region accounted for more than 60% of the total work value, where Selangor alone contributed RM7.7 billion while Wilayah Persekutuan delivered RM4.7 billion (Department of Statistics Malaysia, 2023). Specifically, respondents were drawn from individuals who have recent involvement in private sector construction projects, including the roles such as clients, consultants and contractors. As mentioned previously, the sample size of this research is at least 125 respondents, which implies a requirement of acquiring a minimum of 41 respondents from each sampling group.

3.5 Data Collection Method

3.5.1 Designation of Questionnaire

The questionnaire was structured into four sections, each designed to capture pertinent data aligned with the research goals. Section A was dedicated to gathering the targeted respondents' personal information. Meanwhile, Sections B, C and D utilised the Five-point Likert Scale. In section B, the questionnaire inquires about respondents' degrees of agreement regarding the effect of construction disputes in private sector projects. Respondents were provided with options including 'strongly disagree', 'disagree', 'neutral', 'agree' and 'strongly agree' to express their viewpoints. Continuing to Section C, participants were prompted to rate how frequent the factors that lead to construction disputes in privately funded projects using categories such as 'never happened', 'rarely', 'sometime', 'often', and 'always'. Additionally, Section D required the respondents to rate how severe the causes of construction disputes in private sector projects by providing the options of 'not severe', 'little', 'moderate', 'very' and 'extremely'.

3.5.2 Pre-Test

A pre-test is a preliminary stage where a small group of participants are given the questionnaire before the main data collection. The goal of this pre-test is to detect and address any possible concerns related to the questionnaire's phrasing, context and arrangement. This test also involves obtaining feedback from participants regarding their comprehension of the questions and their overall experience with the survey. The questionnaire distributed to 2 clients, 2 consultants and 2 contractors involved in privately funded projects to ensure it is understandable and improved before being distributed to the entire sample group.

3.6 Data Analysis

After the questionnaire had been given to the intended respondents and the expected response rate had been reached, the collected information was systematically and thoroughly assessed. Several key techniques that contribute to the overall success and credibility of research are applied to analyse the collected data. In this research, the employed techniques include Cronbach's Alpha Reliability Test, Normality Test (Shapiro-Wilk Test), Important Score, Kruskal-Wallis Test, Spearman's Correlation Test and Factor Analysis.

The method mentioned above was conducted using the Statistical Package for Social Sciences (SPSS) to derive dependable results and insights. SPSS offers a flexible platform for researchers and analysts to conduct data analysis, arrive at well-informed conclusions and derive significant insights from their collected data.

3.6.1 Cronbach's Alpha Reliability Test

According to Frost (2022), Cronbach's Alpha Reliability Test serves as a technique to assess the internal consistency and reliability of a group of survey items. This statistical measure aids in evaluating whether a set of items consistently gauges the same characteristic. Collins (2007) mentions that the general formula of this approach is illustrated in equation (3.1) below:

$$\alpha = \frac{N(c)}{V+(N-1)(c)} \quad (3.1)$$

Where,

N = amount of items

C = mean covariance between the pairs of items

V = mean item variance

The variables have a high degree of internal consistency if the alpha value is close to 1. Conversely, if the alpha value is closer to 0, it indicates low internal consistency, implying that the variables are not strongly correlated and may not accurately measure the same construct (Bujang, Omar and Baharum, 2018). Table 3.1 outlines the range of Cronbach's alpha reliability coefficient.

Table 3.1: Rule of Thumb for Results of Cronbach's Alpha.

Cronbach's Alpha	Internal Consistency
$\alpha \geq 0.900$	Excellent
$0.900 > \alpha \geq 0.800$	Good
$0.800 > \alpha \geq 0.700$	Acceptable
$0.700 > \alpha \geq 0.600$	Questionable
$0.600 > \alpha \geq 0.500$	Poor
$\alpha < 0.500$	Unacceptable

3.6.2 Normality Test – Shapiro-Wilk Test

The Shapiro-Wilk test is a hypothesis test used to evaluate whether the collected data conforms to a normal distribution (Malato, 2023). The null hypothesis (H_0) posits that the variable adheres to a normal distribution while the alternative hypothesis (H_1) asserts that the variable does not conform to a normal distribution (Choueiry, 2021). The normal distribution, recognised as a symmetrical bell-shaped curve, consistently emerges in a wide range of natural phenomena and statistical situations.

3.6.3 Important Score

According to Brownlee (2020), the importance score is a quantitative metric used in many contexts to assess the relevance or impact of specific factors. This approach is employed to analyze the data obtained from sections C and D of the questionnaire. Each cause of construction disputes in private sector projects is examined in two dimensions: how frequently these causes occur

and how severe these causes are. The Importance Score (IMP.S.) offers a comprehensive assessment of an element by taking into account both its frequency and severity, as shown by the formula (3.2) below (Akogbe, Feng and Zhou, 2013):

$$IMP.S. = F.S \times S.S \quad (3.2)$$

3.6.4 Kruskal-Wallis Test

The Kruskal-Wallis test is a non-parametric statistical analysis, implying that it does not rely on the assumption of collected data having a normal distribution (Lomuscio, 2021). In this research, the Kruskal-Wallis test centers on contrasting the viewpoints of the three targeted subgroups: clients, consultants and contractors. This test helps to detect the differences between the groups, even if the data's distribution is not in line with the requirements of traditional parametric tests. According to Ali and Bhaskar (2018), the general formula of this approach is illustrated in equation (3.3) below:

$$H = \left[\frac{12}{N(N+1)} \sum_{i=1}^k \frac{R_i^2}{n_i} \right] - 3(N+1) \quad (3.3)$$

where

N = total size of the sample

k = number of groups used for comparison

n_i = the number of observations in the i th sample

R_i = the sum of the ranks related to i th group

The significance level is often set at 0.05, and the derived p-value compares favourably or unfavourably to this number. Two hypotheses are formulated for this test as below:

Null hypothesis (H_0) : There is no significant difference between the groups.

Therefore, the null hypothesis will be rejected, $p > 0.05$.

Alternative hypothesis (H_1) : There is a significant difference between the groups.

Therefore, the alternative hypothesis is accepted, $p < 0.05$.

3.6.5 Spearman's Correlation Test

Gupta (2021) mentions that Spearman's Correlation Test is to quantify the intensity and direction of the connection between two variables. It basically determines how well a monotonic function can represent the relationship between two variables. The coefficient from Spearman's rank correlation goes from -1 to +1. A +1 value means there is a perfect positive pattern where one variable goes up, and the other goes up too; a 0 value means there is no consistent pattern where the variables are not moving together in any particular way while a -1 value indicates a negative pattern where when one variable goes up, the other goes down.

3.6.6 Factor Analysis

Tavakol and Wetzel (2020) discover that factor analysis is a powerful tool for streamlining complex variables by uncovering hidden dimensions. By identifying these underlying factors, factor analysis enables the researcher to grasp the essential structure of the data and gain insights into the fundamental themes that tie everything together.

Factor analysis can be divided into Confirmatory Factor Analysis (CFA) and Exploratory Factor Analysis (EFA). EFA is typically regarded as a method that sparks the development of new theories rather than rigorously testing existing ones. Unlike CFA which relies on an empirical framework to predefine a specific factor structure (Rawat, 2021). The EFA technique is used in this research because it helps explore the underlying factors and identify patterns to narrow down the 25 factors that lead to construction disputes in private sector projects.

Additionally, two statistical measures can be used to evaluate whether the data is suitable for factor analysis by Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity. The KMO value range between 0 to 1. KMO values higher than 0.90 suggest that the sample size is sufficient for factor analysis. When KMO values range from 0.89. to 0.70, the adequacy is

moderate, and values from 0.69 to 0.50 indicate a fair level of adequacy. However, there is a need for corrective measures if the KMO values are below 0.50 which signifies inadequate sampling. On the other hand, Bartlett's Test of Sphericity helps determine if the dataset's variables are correlated meaningfully. If the p-value from Bartlett's test is low, less than 0.05, the factor analysis is likely appropriate; a high p-value indicates that the dataset might not be suitable for factor analysis as the variables might not exhibit meaningful correlations (Shrestha, 2021).

3.7 Summary

In this chapter, a systematic overview of how the research was conducted, from the initial data collection stages through to the subsequent data analysis steps were presented. This chapter also discusses the quota and snowball sampling techniques used in selecting the samples. The characteristics of the sample are also stated in this chapter. This research employed a quantitative research approach to investigate its objectives. The data collection process involved distributing questionnaires and targeting to get at least 125 responses. The targeted respondents were the construction practitioners in Klang Valley. Specifically, the respondents were the clients, consultants and contractors involved in private sector projects. The deliberate inclusion of these various roles aimed to capture a comprehensive understanding of the industry's dynamics within the specified geographical region. Moreover, this chapter also delineated the six data analysis methods, including "Cronbach's Alpha Reliability Test" to assess reliability, "Shapiro-Wilk Test" to assess normality, rank the various causes by determining the "Importance Score", implementation of the "Kruskal-Wallis Test" for comparing groups, the "Spearman's Correlation Test" for exploring relationships between variables and finally, the utilisation of "Factor Analysis" to identify underlying patterns.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Introduction

In this section, the results of data collected from quantitative research were presented. The implications of the findings were examined, recognising their importance in advancing comprehension of the effects and causes of construction disputes in private sector projects and explored to achieve the research objectives. The collected data was reorganised, processed and tabulated using SPSS.

4.2 Outcome of Pre-Test

The pre-test survey received a 100% response rate from 2 clients, 2 consultants and 2 contractors. This thorough response indicates that the pre-test properly involved representatives from all participant categories, increasing the outcomes' reliability. The success of the pre-test survey indicates that the questionnaire is well-organized and does not need any modifications. This conclusion is derived on the feedback given by respondents, which indicates that the questions are unambiguous, relevant and easily understood. The considerable involvement and positive results observed in the initial stage, indicating that the survey tool is dependable and suitable for more comprehensive application (Fisher, 2020).

4.3 Questionnaire Response Rate

Based on the positive results shown in the pre-test, the questionnaires were sent to the intended participants through email and different social media such as Instagram and WhatsApp. A total number of 390 questionnaires were distributed to employed respondents within the Klang Valley area. Throughout five weeks, 143 valid responses were obtained, yielding a response rate of 36.67%. According to Yap, et al. (2020b), since the response rate exceeds 30%, it is considered adequate for conducting a valid statistical analysis. It surpasses the ratio of free parameters required to generate credible answers.

4.4 Profile of Respondents

In terms of the nature of individuals' involvement, the majority fall into the category of consultants (36.3%), followed closely by contractors (34.3%) and clients (29.4%). When examining the educational backgrounds of individuals, a significant percentage of persons possess degrees (34.9%), followed by those with diplomas (24.5%), high school qualifications (22.4%) and postgraduate degrees (18.2%). Besides that, the majority of respondents (39.1%) have fewer than 5 years of professional experience. Approximately 20.3% of individuals fall into each of the groups covering 5 to 10 years, 11 to 20 years and more than 20 years. Regarding the nature of projects which have construction disputes, residential projects appear to be the most prevalent, accounting for 69.9% of the total. Commercial projects closely follow at 68.5%, while industrial projects make up 57.3%. The statistics in Table 4.1 offer a thorough summary of the demographics and traits found in the dataset, facilitating deeper inquiry.

Table 4.1: Demographic Profile of Respondents.

Parameter	Categories	Total	Frequency %
Nature	Client	42	29.4
	Consultant	52	36.3
	Contractor	49	34.3
Highest Education Level	High School	32	22.4
	Diploma	35	24.5
	Degree	50	34.9
	Postgraduate (PhD, Master)	26	18.2
Years of Working Experience	Less than 5 years	56	39.1
	5 to 10 years	29	20.3
	11 to 20 years	29	20.3
	More than 20 years	29	20.3
Type of Projects	Residential	100	69.9
	Commercial	98	68.5
	Industrial	82	57.3

4.5 Scale Reliability

Table 4.2 illustrates the results of a reliability analysis conducted on three variables related to construction disputes in private sector projects. Each variable is assessed according to its item count and its matching alpha value, which reflects the internal consistency or reliability of the scale. According to Mat Nawi, et al. (2020), the majority of the researchs concur that a conbrach alpha value of 0.9 indicates a good level of reliability. In this research, the variable “Effects of Construction Disputes in Private Sector Project” demonstrates a high level of consistency. As well, the variable “Frequency of Causes of Construction Disputes in Private Sector Projects” exhibits good internal consistency, guaranteeing precise measurement of the frequency of causes. Likewise, the variable measuring the severity of causes of construction disputes in private sector projects demonstrates strong internal consistency, which increases confidence in its effectiveness in assessing the severity of these causes. Therefore, this research effectively achieved the required dependability criteria.

Table 4.2: Summary of Reliability Analysis on Constructed Items.

Variables	Number of items	Alpha Value
Effects of Construction Disputes in Private Sector Project	10	0.910
Frequency of Causes of Construction Disputes in Private Sector Projects	25	0.882
Severity of Causes of Construction Disputes in Private Sector Projects	25	0.908

4.6 Normality Test – Shapiro-Wilk Test

The SPSS analysis resulted in a p-value of 0.000. Therefore, the null hypothesis (H_0) was rejected, indicating that the sample data diverged from a normal distribution. In turn, the alternative hypothesis (H_1) was considered to be valid. Lomuscio (2021) mentions that the Kruskal-Wallis test is an effective choice when data does not follow a normal distribution. As a result, non-parametric tests were employed for all statistical analyses in this research in order to ensure effective handling of the data’s characteristics.

4.7 Causes of Construction Disputes in Private Sector Projects

4.7.1 Ranking of Causes Based on Frequency Scores

Table 4.3 displays the frequency at which 25 issues that can contribute to construction disputes in private sector projects. The table categorises these causes in largest to smallest according to their respective frequency score (F.S.), while considering perspectives from clients, consultants and contractors. According to the frequency score, the analysis reveals that the top five most commonly encountered causes in privately funded construction projects are lack of communication, payment delays, inadequate and incomplete contract documentation, technical inadequacies of the contractor and poor quality of work.

The clients' top five causes in terms of frequency are the unsuitable leadership style of the project manager, changes in legal and economic factors, unfair risk allocation, ambiguous contract drafting, terms and provisions, and technical inadequacies of the contractor. On the other hand, consultants typically struggle with communication problems, which are closely followed by substandard of work quality. The third place is occupied by inadequate and incomplete contract documentation, while the breach of contract and contractor's noncompliance with the design constitutes the fourth and fifth worries, respectively. However, contractors consider payment delays to be their primary cause of construction disputes in privately funded projects, with the nonavailability of information being ranked as the second most frequent cause. In addition, changes in scope, unrealistic expectations and the owner's arbitrary changes in the design constitute the subsequent top factors impacting contractors' operations.

Table 4.3: Frequency Score and Ranking.

Causes	Overall (N=143)			Client (N=42)			Consultant (N=52)			Contractor (N=49)		
	F.S	SD	Rank	F.S	SD	Rank	F.S	SD	Rank	F.S	SD	Rank
Lack of communication	4.490	0.615	1	4.381	0.623	10	4.558	0.539	1	4.510	0.681	8
Payment delays	4.483	0.626	2	4.381	0.661	11	4.462	0.641	6	4.592	0.574	1
Inadequate and incomplete contract documentation	4.449	0.590	3	4.381	0.661	12	4.500	0.577	3	4.449	0.542	13
Technical inadequacies of the contractor	4.448	0.577	4	4.452	0.593	5	4.385	0.599	15	4.510	0.545	6
Poor quality of work	4.434	0.564	5	4.357	0.533	14	4.519	0.610	2	4.408	0.537	16
Breaches of Contracts	4.434	0.576	6	4.310	0.643	20	4.481	0.542	4	4.490	0.545	9
Change of scope	4.434	0.588	7	4.333	0.612	17	4.404	0.634	13	4.551	0.503	3
Unfair Risk Allocation	4.420	0.562	8	4.476	0.594	3	4.385	0.599	16	4.408	0.497	14
Behavioral adaptations of individuals	4.413	0.535	9	4.381	0.582	8	4.404	0.534	11	4.449	0.503	10
Shortage in supply (Materials and Labour)	4.413	0.536	10	4.381	0.582	9	4.404	0.534	12	4.449	0.503	11
Changes in legal and economic factors	4.413	0.548	11	4.476	0.552	2	4.423	0.605	9	4.347	0.481	19
Different interpretations of the contract provisions	4.413	0.609	12	4.381	0.697	13	4.462	0.641	7	4.388	0.492	17
Unrealistic expectations	4.413	0.643	13	4.357	0.656	16	4.327	0.648	22	4.551	0.614	4
The owner's arbitrary changes in the design	4.406	0.560	14	4.286	0.554	23	4.365	0.561	18	4.551	0.542	5
Design errors	4.406	0.560	15	4.429	0.547	7	4.346	0.623	20	4.449	0.503	12

Nonavailability of information	4.399	0.641	16	4.310	0.715	21	4.308	0.612	23	4.571	0.577	2
Contractor's noncompliance with the design	4.392	0.544	17	4.286	0.508	22	4.481	0.610	5	4.388	0.492	18
Inconsideration of environmental issues and site conditions	4.392	0.557	18	4.452	0.593	6	4.385	0.565	14	4.347	0.522	20
Delays and extension of time	4.392	0.582	19	4.333	0.612	18	4.327	0.585	21	4.510	0.545	7
Adversarial culture	4.378	0.591	20	4.333	0.650	19	4.442	0.539	8	4.347	0.597	21
Poor site safety conditions	4.378	0.591	21	4.286	0.673	24	4.423	0.605	10	4.408	0.497	15
Ambiguous contract drafting, terms and provisions	4.357	0.574	22	4.524	0.634	4	4.269	0.598	25	4.306	0.466	22
Unsuitable leadership style of project manager	4.350	0.547	23	4.500	0.552	1	4.288	0.572	24	4.286	0.500	24
Inadequate administration and management	4.322	0.589	24	4.357	0.618	15	4.346	0.590	19	4.265	0.569	25
Financial failure	4.322	0.612	25	4.262	0.665	25	4.385	0.599	17	4.306	0.585	23

4.7.2 Ranking of Causes Based on Severity Scores

Table 4.4 illustrates a comprehensive list of severity scores (S.S) and rankings for the causes, along with a comparative analysis of different respondent groups. The data indicates that lack of communication has the greatest score in terms of severity, followed by the owner's arbitrary changes in the design, delays and extension of time, shortage in supply (Materials and Labour) and payment delays.

When it comes to comparing various professional groups, the main issue that stands out is a lack of communication. This problem is ranked highest by contractors in their respective rankings. In addition, the owner's arbitrary changes in the design are ranked second overall and highest among clients, while they are ranked twenty-one among consultants and fifth among contractors. The delays and extension of time ranked third overall and second among contractors, emphasizing its significant influence on construction. Moreover, the shortage of supply (materials and labour) is regarded as the fourth most severe concern overall. However, consultants believe these shortcomings to be less detrimental, ranking fifteenth in the score. The payment delays are ranked fifth overall and are the second most severe cause among consultants, highlighting their importance in guaranteeing project perfection.

Table 4.4: Severity Score and Ranking.

Causes	Overall (N=143)			Client (N=42)			Consultant (N=52)			Contractor (N=49)		
	S.S	SD	Rank	S.S	SD	Rank	S.S	SD	Rank	S.S	SD	Rank
Lack of communication	4.517	0.580	1	4.548	0.550	3	4.423	0.667	11	4.592	0.497	1
The owner's arbitrary changes in the design	4.503	0.568	2	4.643	0.577	1	4.346	0.590	21	4.551	0.503	5
Delays and extension of time	4.476	0.555	3	4.500	0.595	7	4.346	0.556	20	4.592	0.497	2
Shortage in supply (Materials and Labour)	4.476	0.579	4	4.524	0.552	4	4.404	0.603	15	4.510	0.582	9
Payment delays	4.476	0.579	5	4.405	0.627	17	4.442	0.574	2	4.571	0.540	4
Poor site safety conditions	4.469	0.554	6	4.524	0.552	5	4.423	0.572	5	4.470	0.544	13
Change of scope	4.469	0.579	7	4.452	0.593	10	4.423	0.605	8	4.531	0.544	7
Ambiguous contract drafting, terms and provisions	4.462	0.554	8	4.571	0.590	2	4.462	0.576	1	4.367	0.487	23
Contractor's noncompliance with the design	4.455	0.553	9	4.500	0.552	6	4.442	0.574	3	4.429	0.540	20
Unrealistic expectations	4.455	0.602	10	4.500	0.595	8	4.442	0.639	4	4.429	0.577	21
Nonavailability of information	4.441	0.577	11	4.405	0.587	16	4.404	0.634	16	4.510	0.505	8
Design errors	4.434	0.564	12	4.429	0.547	11	4.423	0.637	9	4.449	0.503	10
Changes in legal and economic factors	4.434	0.564	13	4.429	0.547	12	4.288	0.605	24	4.590	0.497	3
Unfair Risk Allocation	4.427	0.550	14	4.381	0.582	20	4.404	0.569	12	4.490	0.505	11
Different interpretations of the contract provisions	4.420	0.536	15	4.476	0.552	9	4.423	0.572	6	4.367	0.487	24
Behavioral adaptations of	4.420	0.549	16	4.405	0.544	14	4.327	0.585	23	4.531	0.504	6

individuals												
Poor quality of work	4.420	0.562	17	4.405	0.544	15	4.423	0.637	10	4.429	0.500	15
Technical inadequacies of the contractor	4.413	0.535	18	4.381	0.539	19	4.423	0.572	7	4.429	0.500	16
Adversarial culture	4.406	0.547	19	4.333	0.526	24	4.404	0.569	13	4.469	0.544	14
Financial failure	4.406	0.596	20	4.405	0.627	18	4.385	0.565	17	4.429	0.612	22
Inconsideration of environmental issues and site conditions	4.399	0.558	21	4.429	0.547	13	4.346	0.623	22	4.429	0.500	17
Unsuitable leadership style of project manager	4.392	0.544	22	4.333	0.570	25	4.404	0.569	14	4.429	0.500	18
Inadequate and incomplete contract documentation	4.392	0.570	23	4.357	0.577	22	4.385	0.631	18	4.429	0.500	19
Breaches of Contracts	4.357	0.574	24	4.381	0.582	21	4.365	0.627	19	4.327	0.516	25
Inadequate administration and management	4.357	0.586	25	4.357	0.618	23	4.269	0.598	25	4.449	0.542	12

4.7.3 Ranking of Causes Based on Importance Scores

Table 4.5 illustrates the rankings of the importance of causes that contribute to construction disputes in private sector projects. The IMP.S ranges from 20.281 to 18.830.

The primary cause contributing to construction disputes in private sector projects is the lack of communication, as demonstrated by its highest ranking with an IMP.S. of 20.281. Banaeianjahromi and Smolander (2019) highlight the adverse effects of inadequate communication between upper management and employees. This inadequacy hindered the ability to have clear and mutual understanding inside the organization. For example, workers concerned about potential negative consequences such as dissatisfaction from their superiors or job instability will choose not to express their opinions. Therefore, the insufficient communication resulted in workers being uninformed about existing projects, which could lead to resistance against organizations and projects. In addition, Gamil and Rahman (2023) discover that increasing the frequency and effectiveness of communication can have a crucial impact on enhancing the coordination of project operations, therefore reducing the occurrence of disputes and disagreements.

With a significance score of 20.065, payment delays are ranked as the second fundamental cause of construction disputes. According to Edirisinghe, et al. (2020), clients with limited financial constraints may exhibit difficulty providing payments to contractors, posing a potential threat to the project's effective accomplishment. Ansah (2011) mentions that contracts may include terms that specify interest rates or penalties for late payments. Disputes may arise concerning the suitability of these provisions and the correct sum to be paid due to the delay. Furthermore, payment delays may significantly affect the cash flow of the individual or organisation awaiting payment. This disruption can greatly impede their ability to meet their financial obligations, such as making regular payments to employees and suppliers (Bolton, et al., 2022).

The owner's arbitrary changes in the design is ranked as the third most significant cause of construction disputes in private sector projects (IMP.S = 19.840). There are scenarios where modifications to the design may potentially give rise to concerns regarding legal responsibility. If such changes

result in potential hazards or non-compliance with rules, disputes may arise regarding the responsible party for rectifying the issue and taking the associated legal obligations (Bouchaut, et al., 2021). Moreover, any changes made to the design could substantially impact the final product's quality and performance. Aslam, et al. (2019) state that contractors may argue that the initial design was carefully developed to comply with specific standards or specifications and any changes could potentially compromise these benchmarks. As a result, arguments may exist on whether the updated design is suitable and effective.

Ranked as the fourth cause of construction disputes, with a significance score of 19.815, is the alteration of project scope. Alterations in project scope refer to any modifications, additions or omissions made to the initial plans of a construction project (Rybka, Bondar-Nowakowska and Polonski, 2015). Gamage (2022) highlights that inadequate documenting of changes in project scope can greatly intensify conflicts and lead to misunderstandings about the nature and extent of the scope. This might lead to conflicts on many issues such as responsibilities, financial obligations and timelines of the project.

The fifth cause contributing to construction disputes in private sector projects is the shortage of materials and labour, which carries an importance score of 19.752. The findings of Alshihri, Al-gahtani and Almohsen (2022) show that the shortage of human resources and insufficiencies in resources might result in postponements in project schedules. According to Sayed and Ali (2017), contractors may encounter difficulties procuring necessary components or locating skilled labourers to execute jobs, resulting in delays in building operations. Project delays can lead to disputes regarding project schedules, as clients might consider contractors responsible for complying with deadlines, while contractors may argue that delays were caused by causes beyond their control (Babaeian, Hemant and Saghatforoush, 2021).

Table 4.5: Importance Score and Ranking.

Causes	Overall (N=143)		Client (N=42)		Consultant (N=52)		Contractor (N=49)	
	IMP.S	Rank	IMP.S	Rank	IMP.S	Rank	IMP.S	Rank
Lack of communication	20.281	1	19.925	2	20.160	1	20.710	3
Payment delays	20.065	2	19.298	15	19.820	4	20.990	1
The owner's arbitrary changes in the design	19.840	3	19.900	3	18.970	21	20.712	2
Change of scope	19.815	4	19.291	17	19.479	10	20.621	5
Shortage in supply (Materials and Labour)	19.752	5	19.820	5	19.395	11	20.065	10
Unrealistic expectations	19.659	6	19.607	10	19.221	16	20.156	9
Delays and extension of time	19.658	7	19.499	12	18.805	24	20.710	4
Technical inadequacies of the contractor	19.629	8	19.504	11	19.395	12	19.975	11
Poor quality of work	19.598	9	19.193	19	19.988	2	19.523	16
Unfair Risk Allocation	19.568	10	19.609	8	19.312	13	20.233	7
Changes in legal and economic factors	19.567	11	19.824	4	18.966	22	19.953	12
Contractor's noncompliance with the design	19.566	12	19.287	18	19.905	3	19.434	17
Poor site safety conditions	19.565	13	19.390	14	19.563	7	19.704	15
Inadequate and incomplete contract documentation	19.540	14	19.088	20	19.733	6	19.705	14
Design errors	19.536	15	19.616	7	19.222	15	19.794	13
Nonavailability of information	19.535	16	18.986	21	18.972	20	20.615	6
Behavioral adaptations of individuals	19.505	17	19.298	16	19.056	18	20.158	8
Different interpretations of the contract provisions	19.504	18	19.609	9	19.735	5	19.162	21
Ambiguous contract drafting, terms and provisions	19.440	19	20.679	1	19.048	19	18.804	25

Inconsideration of environmental issues and site conditions	19.320	20	19.718	6	19.057	17	19.253	20
Breaches of Contracts	19.318	21	18.882	23	19.560	9	19.428	18
Adversarial culture	19.289	22	18.775	24	19.563	8	19.427	19
Unsuitable leadership style of project manager	19.105	23	19.499	13	18.884	23	18.983	23
Financial failure	19.042	24	18.774	25	19.228	14	19.071	22
Inadequate administration and management	18.830	25	18.983	22	18.553	25	18.975	24

4.8 Kruskal-Wallis Test

The Kruskal-Wallis test was utilized to evaluate the viewpoints of three distinct groups of participants regarding the effects and causes that contribute to construction disputes in private sector projects.

4.8.1 Effects of Construction Disputes in Private Sector Projects

The findings presented in Table 4.6 demonstrate that among the 10 effects of construction disputes in private sector projects, there were statistically significant differences observed in “wastage and under-utilization of manpower and resources”, “delay in the progress of work” and “cost overrun”.

Based on Luangcharoenrat, et al. (2019), the presence of building waste might also result in disputes. They state that waste from building materials refers to a range of resources that cannot be reused, including leftover construction materials and materials that have been damaged during construction or processing. Consultants often prioritize design quality, adherence to regulations and client satisfaction. However, contractors are directly responsible for completing the task. They experience economic consequences when resources are wasted or utilized inefficiently (Gupta, 2024). In other words, consultants prioritize design and compliance, whereas contractors prioritize rapid project completion to safeguard their revenues and reputation. Besides that, the client will also suffer financial loss if the materials are not fully utilized. As evidenced by the findings, consultants identified this factor as the ninth most significant issue. At the same time, contractors regarded it as the second most important concern and clients ranked it as the foremost concern.

Additionally, consultants play a vital role in overseeing many aspects of project planning and execution, such as scheduling and evaluating potential risks. Although they acknowledge the significance of the project schedule, their primary emphasis is on guaranteeing that the project achieves its design objectives and adheres to rules (Atout, 2016). Consequently, they may view delays as less important in comparison to contractors and clients, whose businesses are immediately impacted by delays in the project timeline.

Moreover, clients who have a strong interest in the financial success of projects insist on strict adherence to budgetary limits, recognising that cost

overruns could put the project's overall affordability at risk (Shah, et al., 2023). Meanwhile, contractors entrusted with the execution of projects experience the negative consequences of cost overruns, as they have to deal with increased expenses for labour and materials, which directly impact their financial well-being. Therefore, clients' and contractors' primary objective is to directly address these cost overruns in order to protect their profitability and prevent high costs in order to maintain the project's financial stability. However, consultants tend to prioritise their areas of expertise. Although these variables are crucial for the success of a project, consultants may unintentionally neglect to address concerns related to cost overruns since they may prioritise the financial consequences that directly affect design.

Table 4.6: Kruskal-Wallis Test for Effect of Construction Disputes in Private Sector Projects.

Ref	Effect of Construction Disputes in Private Sector Projects	Overall (N=143)			Client (N=42)			Consultant (N=52)			Contractor (N=49)			Chi-Square	Asymptotic significance
		Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank		
E8	Wastage and under-utilization of man-power and resources	4.504	0.542	1	4.500	0.595	1	4.327	0.474	9	4.694	0.508	2	13.495	0.001* *
E2	Delay in the progress of work	4.503	0.568	2	4.452	0.593	5	4.327	0.550	10	4.735	0.491	1	14.922	0.001* *
E1	Cost overruns	4.490	0.555	3	4.476	0.594	4	4.365	0.525	6	4.633	0.528	3	6.641	0.036*
E9	Poor work quality	4.483	0.555	4	4.500	0.595	3	4.404	0.534	4	4.551	0.542	5	2.178	0.336
E5	Erosion of profit	4.463	0.554	5	4.500	0.593	2	4.423	0.537	2	4.469	0.544	9	0.699	0.705
E7	Rework	4.462	0.566	6	4.429	0.590	7	4.365	0.561	7	4.592	0.537	4	4.441	0.109
E4	Break down in cooperation between parties	4.455	0.553	7	4.381	0.582	8	4.442	0.539	1	4.531	0.544	6	1.629	0.443
E6	Loss of professional reputation	4.454	0.553	8	4.452	0.593	6	4.404	0.534	5	4.510	0.545	7	1.064	0.587
E10	Challenges associated with insurance coverage procedure	4.420	0.549	9	4.357	0.577	9	4.423	0.537	3	4.469	0.544	10	0.839	0.657
E3	Tension in communication	4.413	0.561	10	4.357	0.577	10	4.365	0.561	8	4.510	0.545	8	2.240	0.326

4.8.2 Frequency of Causes of Construction Disputes in Private Sector Projects

The data reported in Table 4.7 shows that the respondent groups consistently aligned in their perceptions regarding the frequency of causes of construction disputes on private sector projects. However, significant disparities only occur around “ambiguous contract drafting, terms and provisions”. Koc, et al. (2020) discover that ambiguous contract language poses a major risk by creating uncertainty or argument on project parameters such as deliverables, schedules and quality standards. This lack of transparency frequently results in divergent expectations between clients, consultants and the construction team. Mainly, clients may become unsatisfied if the outcome does not fulfil their initial expectations. This dissatisfaction can evolve into conflicts regarding project performance and timely completion, further intensifying tensions between the parties involved. As demonstrated by the results, clients recognized this cause as the fourth most significant item. This indicates that clients especially those unfamiliar with construction terminology and processes often find it difficult to understand complex contract language.

Table 4.7: Kruskal-Wallis Test for Frequency of Causes of Construction Disputes in Private Sector Projects.

Ref	Frequency of Causes of Construction Disputes in Private Sector Projects	Overall (N=143)			Client (N=42)			Consultant (N=52)			Contractor (N=49)			Chi-Square	Asymptotic significance
		Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank		
F1	Lack of communication	4.490	0.615	1	4.381	0.623	10	4.558	0.539	1	4.510	0.681	8	2.180	0.336
F2	Payment delays	4.483	0.626	2	4.381	0.661	11	4.462	0.641	6	4.592	0.574	1	2.583	0.275
F19	Inadequate and incomplete contract documentation	4.449	0.590	3	4.381	0.661	12	4.500	0.577	3	4.449	0.542	13	0.718	0.698
F12	Technical inadequacies of the contractor	4.448	0.577	4	4.452	0.593	5	4.385	0.599	15	4.510	0.545	6	1.047	0.593
F13	Poor quality of work	4.434	0.564	5	4.357	0.533	14	4.519	0.610	2	4.408	0.537	16	2.888	0.236
F20	Breaches of Contracts	4.434	0.576	6	4.310	0.643	20	4.481	0.542	4	4.490	0.545	9	2.090	0.352
F6	Change of scope	4.434	0.588	7	4.333	0.612	17	4.404	0.634	13	4.551	0.503	3	2.742	0.254
F18	Unfair Risk Allocation	4.420	0.562	8	4.476	0.594	3	4.385	0.599	16	4.408	0.497	14	0.824	0.662
F5	Behavioral adaptations of individuals	4.413	0.535	9	4.381	0.582	8	4.404	0.534	11	4.449	0.503	10	0.224	0.894

F24	Shortage in supply (Materials and Labour)	4.413	0.536	10	4.381	0.582	9	4.404	0.534	12	4.449	0.503	11	0.224	0.894
F23	Changes in legal and economic factors	4.413	0.548	11	4.476	0.552	2	4.423	0.605	9	4.347	0.481	19	1.778	0.411
F17	Different interpretations of the contract provisions	4.413	0.609	12	4.381	0.697	13	4.462	0.641	7	4.388	0.492	17	0.973	0.615
F9	Unrealistic expectations	4.413	0.643	13	4.357	0.656	16	4.327	0.648	22	4.551	0.614	4	3.879	0.144
F10	The owner's arbitrary changes in the design	4.406	0.560	14	4.286	0.554	23	4.365	0.561	18	4.551	0.542	5	5.692	0.058
F7	Design errors	4.406	0.560	15	4.429	0.547	7	4.346	0.623	20	4.449	0.503	12	0.523	0.770
F8	Nonavailability of information	4.399	0.641	16	4.310	0.715	21	4.308	0.612	23	4.571	0.577	2	5.559	0.062
F14	Contractor's noncompliance with the design	4.392	0.544	17	4.286	0.508	22	4.481	0.610	5	4.388	0.492	18	3.824	0.148
F21	Inconsideration of environmental issues and site conditions	4.392	0.557	18	4.452	0.593	6	4.385	0.565	14	4.347	0.522	20	1.120	0.571
F11	Delays and extension of time	4.392	0.582	19	4.333	0.612	18	4.327	0.585	21	4.510	0.545	7	2.946	0.229

F4	Adversarial culture	4.378	0.591	20	4.333	0.650	19	4.442	0.539	8	4.347	0.597	21	0.691	0.708
F25	Poor site safety conditions	4.378	0.591	21	4.286	0.673	24	4.423	0.605	10	4.408	0.497	15	1.017	0.602
F16	Ambiguous contract drafting, terms and provisions	4.357	0.574	22	4.524	0.634	4	4.269	0.598	25	4.306	0.466	22	6.415	0.040*
F15	Unsuitable leadership style of project manager	4.350	0.547	23	4.500	0.552	1	4.288	0.572	24	4.286	0.500	24	4.749	0.093
F22	Inadequate administration and management	4.322	0.589	24	4.357	0.618	15	4.346	0.590	19	4.265	0.569	25	0.836	0.658
F3	Financial failure	4.322	0.612	25	4.262	0.665	25	4.385	0.599	17	4.306	0.585	23	0.870	0.647

Note:

** . The mean difference is significant at the 0.01 level of significance.

* . The mean difference is significant at the 0.05 level of significance.

4.8.3 Severity of Causes of Construction Disputes in Private Sector Projects

The results shown in Table 4.8 indicate that out of the 25 severity of factors contributing to construction disputes in private sector projects, there were statistically significant differences detected in “the owner’s arbitrary changes in the design” and “changes in legal and economic factors”.

The clients, who are responsible for funding, are directly impacted by any changes made to the design by the owner. These modifications can disrupt project timelines, increase costs and impact the overall quality of the outcome. Therefore, clients prioritize minimizing unnecessary design modifications to ensure the project is completed successfully and on time while staying within budgetary limitations (Aliakbarlou, et al., 2018). Consultants such as architects or engineers frequently supervise the development and maintenance of the project’s design consistency. Nevertheless, they may have a diminished ability to exert influence over alterations that the owner requires. On the other hand, contractors prioritize the efficient execution of the project. Design changes can interrupt contractors’ flow of work, require additional work to be done and cause delays, which can have an impact on the contractors’ schedule and financial situation (Markos and Berhanu, 2020). Contractors recognize the need to follow the owner’s instructions, but their main focus is on reducing disruptions caused by frequent design changes in order to maintain project continuity and profitability.

Legal and economic issues have a substantial impact on construction projects through changes in legislation, market conditions and contractual obligations, which in turn affect project dynamics (Bekr, 2017). Contractors, who are closely engaged in project implementation, scheduling and procurement, understand the immediate consequences of these modifications on their operational effectiveness and project completion. Therefore, contractors are frequently aware of changes in legal and economic considerations, emphasizing their crucial role in achieving effective results in the midst of changing regulatory and market environments. In this research, contractors determined that this factor ranked third in terms of significance. Simultaneously, clients considered it the twelve most significant issues, while consultants deemed it as the second least frequent of causes.

Table 4.8: Kruskal-Wallis Test for Severity of Causes of Construction Disputes in Private Sector Projects.

Ref	Severity of Causes of Construction Disputes in Private Sector Projects	Overall (N=143)			Client (N=42)			Consultant (N=52)			Contractor (N=49)			Chi-Square	Asymptotic significance
		Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank		
S1	Lack of communication	4.517	0.580	1	4.548	0.550	3	4.423	0.667	11	4.592	0.497	1	1.325	0.516
S10	The owner's arbitrary changes in the design	4.503	0.568	2	4.643	0.577	1	4.346	0.590	21	4.551	0.503	5	7.377	0.025*
S11	Delays and extension of time	4.476	0.555	3	4.500	0.595	7	4.346	0.556	20	4.592	0.497	2	5.002	0.082
S24	Shortage in supply (Materials and Labour)	4.476	0.579	4	4.524	0.552	4	4.404	0.603	15	4.510	0.582	9	1.177	0.555
S2	Payment delays	4.476	0.579	5	4.405	0.627	17	4.442	0.574	2	4.571	0.540	4	1.944	0.378
S25	Poor site safety conditions	4.469	0.554	6	4.524	0.552	5	4.423	0.572	5	4.470	0.544	13	0.747	0.688
S6	Change of scope	4.469	0.579	7	4.452	0.593	10	4.423	0.605	8	4.531	0.544	7	0.745	0.689
S16	Ambiguous contract drafting, terms and provisions	4.462	0.554	8	4.571	0.590	2	4.462	0.576	1	4.367	0.487	23	4.254	0.119
S14	Contractor's noncompliance with the design	4.455	0.553	9	4.500	0.552	6	4.442	0.574	3	4.429	0.540	20	0.457	0.796

S9	Unrealistic expectations	4.455	0.602	10	4.500	0.595	8	4.442	0.639	4	4.429	0.577	21	0.428	0.807
S8	Nonavailability of information	4.441	0.577	11	4.405	0.587	16	4.404	0.634	16	4.510	0.505	8	0.675	0.713
S7	Design errors	4.434	0.564	12	4.429	0.547	11	4.423	0.637	9	4.449	0.503	10	0.028	0.986
S23	Changes in legal and economic factors	4.434	0.564	13	4.429	0.547	12	4.288	0.605	24	4.590	0.497	3	6.550	0.038*
S18	Unfair Risk Allocation	4.427	0.550	14	4.381	0.582	20	4.404	0.569	12	4.490	0.505	11	0.740	0.691
S17	Different interpretations of the contract provisions	4.420	0.536	15	4.476	0.552	9	4.423	0.572	6	4.367	0.487	24	1.244	0.537
S5	Behavioral adaptations of individuals	4.420	0.549	16	4.405	0.544	14	4.327	0.585	23	4.531	0.504	6	3.023	0.221
S13	Poor quality of work	4.420	0.562	17	4.405	0.544	15	4.423	0.637	10	4.429	0.500	15	0.153	0.926
S12	Technical inadequacies of the contractor	4.413	0.535	18	4.381	0.539	19	4.423	0.572	7	4.429	0.500	16	0.219	0.896
S4	Adversarial culture	4.406	0.547	19	4.333	0.526	24	4.404	0.569	13	4.469	0.544	14	1.516	0.469
S3	Financial failure	4.406	0.596	20	4.405	0.627	18	4.385	0.565	17	4.429	0.612	22	0.252	0.882
S21	Inconsideration of environmental issues	4.399	0.558	21	4.429	0.547	13	4.346	0.623	22	4.429	0.500	17	0.372	0.830

S15	and site conditions Unsuitable leadership style of project manager	4.392	0.544	22	4.333	0.570	25	4.404	0.569	14	4.429	0.500	18	0.568	0.753
S19	Inadequate and incomplete contract documentation	4.392	0.570	23	4.357	0.577	22	4.385	0.631	18	4.429	0.500	19	0.231	0.891
S20	Breaches of Contracts	4.357	0.574	24	4.381	0.582	21	4.365	0.627	19	4.327	0.516	25	0.436	0.804
S22	Inadequate administration and management	4.357	0.586	25	4.357	0.618	23	4.269	0.598	25	4.449	0.542	12	2.164	0.339

Note:

**. The mean difference is significant at the 0.01 level of significance.

*. The mean difference is significant at the 0.05 level of significance.

4.9 Spearman's Correlation Test

Table 4.9 displays the results obtained from Spearman's correlation test, which was used to examine the relationship that exists between the effects and the causes that lead to construction disputes in private sector projects. According to Leclezio, et al (2015), the interpretation of coefficients is as follows: a relationship is considered to be extremely strong if it is 0.70 and above, strong if it is 0.40 to 0.69, moderate if it is 0.30 to 0.39, weak if it is 0.20 to 0.29, and trivial or nonexistent if it is 0.01 to 0.19. In this research, the variables demonstrated a weak to moderate relationship. However, one of the results revealed that the variables "Erosion of profit" (E5) and "Unfair Risk Allocation" (S18) had a most significant correlation of 0.418.

Yin, et al. (2020) discover that the practice of clients in risk allocation, which involves unfairly distributing risks, such as imposing excessive liabilities on contractors that should rightfully belong to clients or assigning all external risks, such as force majeure events, solely to contractors, greatly increases the probability of disputes. Shash and Habash (2021) mention that the parties involved need to follow specific protocols to resolve disputes, which involve a systematic process that begins with renegotiating the disagreeable component of the task, revising contractual terms, temporarily stopping the disputed scope of work or seeking mediation from an arbitrator. Additionally, Banaitiene and Banaitis (2012) highlight the example of subcontractors or suppliers facing unfair and disproportionate risks without proper compensation or protection, frequently experiencing increased costs, project delays and the possibility of legal disputes. These implications can lead to additional expenses, extended project schedules and the potential for lengthy legal conflicts, which ultimately diminish profit margins.

As indicated by the result, one of the main consequences of construction disputes is the delay in the progress of work (E2). This delay is a major concern and is associated with the highest number of correlations, totaling 13. Lack of comprehensive project information (S8), which is also one of the causes correlated with this effect, emphasized by Shekare et al. (2022), can lead to misunderstandings, conflicts and ultimately, disputes among the parties involved. Disagreements stemming from these misunderstandings can interrupt the flow of project tasks, hinder the ability to make decisions and

redirect resources away from the real job, ultimately causing delays in the project's progress. The decision-making processes are significantly impacted by the leadership style of a project manager (S15). According to Fashina, et al. (2021), insufficient decisiveness or the failure to evaluate all pertinent aspects by the manager might lead to delays. Okpala, Nur and Roslan's (2019) findings ranked project delays as the third significant consequence of construction disputes.

Furthermore, tension in communication (E3) is another significant effect strongly connected with the causes of disputes, with a considerable correlation count of 13. Obonadhuze, et al. (2021) mention that disputes are a common and enduring feature of the construction industry, often coming with communication failures inside working teams or organizations. In other words, the existence of these tensions can create barriers to effective communication, hindering the seamless sharing of information and increasing the likelihood of errors or misunderstandings. Olanrewaju, Tan and Kwan (2017) state that resolving communication challenges is crucial in order to prevent the construction industry from underperforming. Other than that, poor administration and management (S22) might result in inefficient handling of on-site issues or disputes. Without a well-defined procedure for resolving issues or conflicts, tensions can intensify, resulting in communication breakdowns and strained relationships among team members (Zain, et al., 2021).

Table 4.9: Correlation between Effects and Causes of Construction Disputes in Private Sector Projects.

Effects Causes	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	Total Sig.
S1	-	0.220**	-	-	-	-	0.165*	-	-	-	2
S2	-	-	-	-	-	-	0.258**	-	-	-	1
S3	-	-	-	-	-	-	0.239**	0.271**	0.320**	0.221**	4
S4	-	0.217**	-	-	-	-	-	0.199*	0.302**	-	3
S5	-	0.233**	-	-	-	-	-	-	-	-	1
S6	-	0.195*	0.172*	0.197*	-	-	0.183*	0.244**	0.285**	-	6
S7	-	-	0.333**	-	-	-	-	-	-	-	1
S8	-	0.204*	0.213*	-	0.240**	0.227**	-	0.195*	0.179*	0.251**	7
S9	-	0.210*	0.175*	-	-	0.261**	-	0.234**	-	0.262**	5
S10	0.165*	0.263**	0.213*	0.208*	0.220**	-	-	0.250**	0.256**	0.252**	8
S11	0.187*	0.250**	-	0.188*	-	0.239**	-	-	-	0.201*	5
S12	-	-	-	-	0.219**	-	-	-	-	-	1
S13	-	-	-	-	0.278**	-	-	-	-	-	1
S14	-	-	-	-	0.301**	0.185*	-	-	-	0.248**	3
S15	-	0.213*	0.183*	0.183*	-	-	-	-	-	-	3
S16	-	-	0.237**	-	0.225**	-	-	-	-	-	2
S17	-	0.190*	0.288**	-	0.180*	0.166*	-	-	-	-	4

S18	-	-	0.268**	0.326**	0.418**	0.338**	0.197*	-	-	0.179*	6
S19	-	-	0.205*	-	-	0.169*	-	-	-	-	2
S20	-	-	0.245**	0.177*	0.168*	-	-	-	-	-	3
S21	0.168*	0.248**	0.315**	0.248**	0.248**	0.222**	-	0.198*	0.179*	0.227**	9
S22	-	-	0.344**	0.293**	0.292**	0.243**	0.194*	-	-	0.193*	5
S23	-	-	-	-	-	-	0.177*	-	-	-	1
S24	-	0.212*	-	-	-	-	-	-	-	-	1
S25	-	0.187*	-	-	0.316**	0.226**	-	-	-	-	3
Total Sig.	3	13	13	8	12	10	7	7	6	9	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

4.10 Factor Analysis Test

An exploratory factor analysis with varimax rotation was utilized to regroup the 25 causes of construction disputes in private sector projects. Table 4.10 below illustrates that the KMO value of this research is 0.858 and the Bartlett's test of sphericity is 1316.673 with a significance level of 0.000. According to Li, Huang and Feng (2020), a KMO value of 0.5 indicates that the dataset is adequate for factor analysis, whereas a KMO value above 0.8 suggests that the dataset is well suited for factor analysis. In addition, if the significance value is less than 0.05, it indicates that performing a factor analysis could be advantageous for the dataset (Shrestha, 2021).

Table 4.10: Results of KMO and Bartlett's Tests.

Parameter	Value
Kaiser–Meyer–Olkin measure of sampling adequacy	0.858
Bartlett's test of sphericity	
Approximate chi-square value	1316.673
Degree of freedom	300
Significance	0.000

Moreover, this research utilized the Screen Plot and Eigenvalues to determine the number of underlying factors. Kolaventi, Tezeswi and Kumar (2018) discover that only factors having Eigenvalues greater than 1 should be considered for discussion and analysis. Therefore, the Eigenvalues in this research identify and extract the components with values greater than 1. Figure 4.1 depicts the analysis of 25 factors and resulting in the extraction of 7 significant factors. On the other hand, Table 4.11 indicates that 7 underlying variables contribute to 62.793% of variance. Hair, et al. (2019) highlight that it is crucial to exceed the necessary 60% threshold in order to strengthen and verify the accuracy. This validates the dependability of the results obtained by the factor analysis test in this study. Each construction dispute factor is assigned to one of those 7 categories based on the analysis results, with a loading score of at least 0.400 for each factor. The component matrix after rotation is displayed in Table 4.17 and sorted by size in each category.

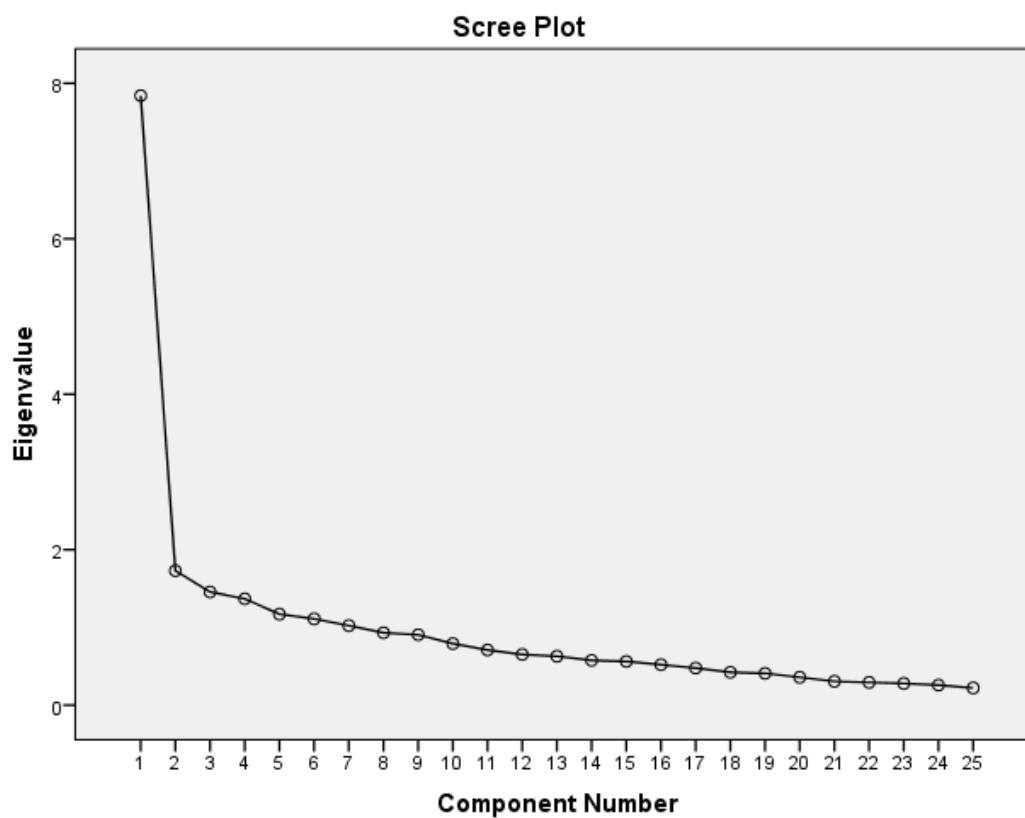


Figure 4.1: Scree Plot for 25 Causes of Construction Disputes in Private Sector Projects.

Table 4.11: Total Variance Explained.

Component	Initial Eigenvalues		
	Total	Percentage of variance (%)	Cumulative percentage (%)
A1	7.841	31.364	31.364
A2	1.729	6.918	38.282
A3	1.456	5.824	44.106
A4	1.368	5.472	49.578
A5	1.170	4.681	54.259
A6	1.111	4.443	58.701
A7	1.023	4.092	62.793

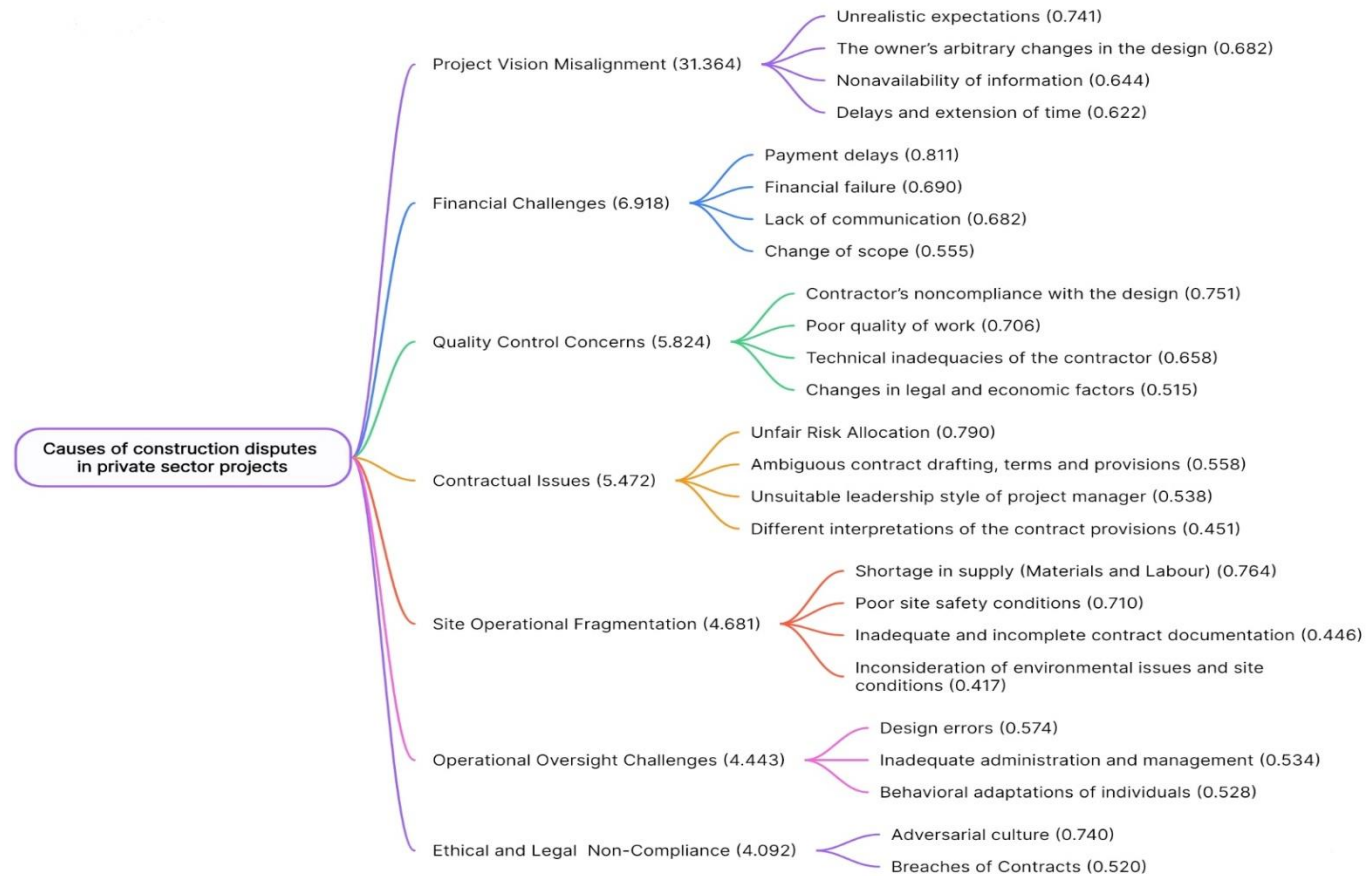


Figure 4.2: Factor Profile for Causes of Construction Disputes in Private Sector Projects.

4.10.1 Extraction of Underlying Factors

Factor 1: Project Vision Misalignment

When there is an issue among team members or stakeholders over the vision of the project, it typically results in different goals and priorities, ultimately leading to disputes (George, 2020). Nunkoo and Sungkur (2021) mention that every party involved should facilitate comprehensive comprehension of the project's purpose, clarify the long-term objectives and delineate the integration of individual contributions within the scope. According to Urton and Murray (2021), this can be accomplished through different methods, including forming a united and collaborative project team, clearly defining and communicating project goals to both the team and external parties, identifying opportunities to improve efficiency during project execution and carefully creating accurate cost estimates. Additionally, an aligned project vision provides a stable basis for teams to adapt and respond to changes in dynamic environments efficiently. It facilitates adaptability and durability, enabling projects to remain on track even when confronted with unforeseen obstacles (Schulze and Pinkow, 2020).

Factor 2: Financial Challenges

Tariq and Gardezi (2022) discover that the top identified global cause of conflict or disputes is financial difficulties on behalf of the owner. Disputes might arise if disagreements regarding financial aspects of a contract, such as payment schedules, change orders or penalties for delays, are not effectively handled and resolved. The findings of Kshaf, Mohamed and El-Dash (2022) indicate that the most significant aspect in reducing disputes, as reported by 88.5% of the contractors and consultants, is the timely progress payments. In the event that the owner does not make timely payment to the contractor or withhold payment for work that has been performed, the contractor has the authority to cease progress on the project or initiate legal action for non-payment. In contrast, the owners prioritised the precision of the project cost estimate as the most crucial issue. Andric, et al. (2019) found that 56.86% of projects were completed over budget, while only 2% stayed within budget; meanwhile, 41.18% were completed under budget. The owner may perceive that the contractor is failing to adhere to the agreed-upon budget, whilst the

contractor may contend that unforeseen charges have emerged or that the owner has requested modifications contributing to the costs (Rauzana, 2016).

Factor 3: Quality Control Concerns

There are several vital aspects that are essential for achieving high quality products in the construction industry, and workmanship is one of the most critical determinants (Johari and Jha, 2019). Silva, et al. (2023) emphasize the crucial significance of the contractor's workmanship quality in construction conflicts. Compromising the quality of workmanship can result in a range of problems, including faults, delays and dissatisfaction with the final product. These issues may lead to arguments among project stakeholders, such as the owner, contractor and subcontractors, regarding who is responsible for the shortcomings and what action should be taken to resolve them. Construction disputes may ultimately occur due to disagreements on compensation, project schedules and the general quality of the construction work. Othman, et al. (2021) suggest that project teams utilize the clash detection approach of Building Information Modelling (BIM) to proactively discover and resolve any disputes and confrontations between various building elements before commencing construction.

Factor 4: Contractual Issues

According to Ali and Salah (2021), contractual documents are a detailed guide that clearly defines the obligations of the parties participating in a project. They also identify the expected quality, plans, expenses and standards for all aspects of the project, whether they are tangible or intangible. Hence, any misinterpretation in these texts provides a valid reason for disputes. Furthermore, unclear or imprecise language in the contract about project scope, schedules, payment terms or other crucial elements might result in misunderstandings and disputes between the involved parties. Shivanthi, Devapriya and Pandithawatta (2019) mention that parties involved in construction projects with different interests may attempt to interpret responsibilities and tasks in varying ways. Inevitably, these different interpretations can grow into disputes as each party strives to safeguard its interests and maintain its understanding of the contract. Kyakulumbye, et al.

(2018) propose utilizing project scope management to guarantee that the project scope specified in the contract establishes clear boundaries and standards on what is covered and not covered in the project.

Factor 5: Site Operational Fragmentation

Riazi, et al. (2020) discover that an extensive amount of adverse effects or issues in the construction industry documented in other global research are a result of the fragmented nature of the sector. Operational fragmentation at construction sites can worsen project complexities, resulting in a series of negative consequences such as increased rework, higher costs, longer construction timelines and an overall decrease in operational efficiency during the construction phase. Furthermore, Serpell and Torres (2023) point out the different ground conditions issue. Inadequate assessment of the site's features can lead to unexpected obstacles such as soil instability and environmental pollution throughout the construction process. Hence, conflicts may occur among stakeholders on the distribution of extra costs and the accountability for handling unforeseen site conditions. Besides that, site operational fragmentation frequently leads to duplicated efforts. As a result, the time it takes to complete construction projects increases, leading to delays. These delays hinder both the advancement of the project and add to unsafe circumstances at construction sites (Adnan, et al., 2020).

Factor 6: Operational Oversight Challenges

According to Fuadie, Rahmawati and Utomo (2017), neglecting to perform checks, reviews and evaluations on the design outcomes might lead to design imperfections. Inadequate supervision during the design phase of a building project might result in undetected flaws or mistakes in the design papers, which may only become apparent during later phases of construction. This can lead to construction using inaccurate or inappropriate plans, resulting in disputes regarding accountability for the mistakes and the expenses required to fix them (Love, et al., 2022). Moreover, behavioural adaptations of individuals, such as making decisions based on personal ego or short-term advantages, can significantly undermine the efficiency of construction projects. This may involve displaying bias while allocating contracts or hiding vital information.

When individuals place their own interests as a higher priority than the overall success of the project, it frequently leads to disputes about project outcomes, allocation of resources and accountability (Ebekoziem, Aigbavboa and Ramotshela, 2023).

Factor 7: Ethical and Legal Non-Compliance

Xie, et al. (2022) highlight that the owner who aims to reduce project costs and improve its economic feasibility will make modifications to the design plans and bill of quantities during the bidding phase, which may lead to differences between the estimated and real numbers, impacting the construction company's implementation. These discrepancies could result in disagreements as the construction company may see that they are being unfairly bound with extra expenses or demands that were not originally considered during the bidding process. Besides that, breaching contractual agreements due to failure to comply with legal requirements might trigger disputes among the parties involved. Aminorlah, et al. (2023) discover that a postponed site handover can cause significant disruptions to the construction project's execution and may result in disputes regarding financial, scheduling and contractual issues between the clients and contractors. It is crucial to emphasize that even if a contract is terminated, not all responsibilities come to an end right away; specific obligations, such as warranties, maintenance and product alternates, may continue for an extended duration until they are fulfilled (Dao, 2017).

4.10.2 Comparison among Different Countries

This section offers a thorough overview of the causes of construction disputes in certain nations, including the United Kingdom, Nepal, Saudi Arabia, Vietnam, Malaysia and Nigeria. Although each research's specific areas of focus and goals may differ, they enhance the comprehension of the factors faced within various national settings. All of this research has been published since 2017.

Table 4.12 depicts that financial challenges and contractual issues are the major factors, identified in four out of the six research. The prevalence of these two causes indicates that it is essential to focus on improving financial and contractual issues in order to enhance the performance of the construction

sector. Additionally, site operational fragmentation is a frequent occurrence, as indicated in four research. Two research have highlighted project vision misalignment, quality control concerns and operational oversight challenges. The occurrence of ethical and legal non-compliance is limited to a single research. Consistent causes across different locations suggest that specific issues may be universal or at least widespread in many socio-economic circumstances. These findings emphasize the critical requirement for specific actions and comprehensive plans to address the complex causes that the construction industry is currently confronting worldwide.

Table 4.12: Comparison with Previous Studies.

Countries	Causes	A1	A2	A3	A4	A5	A6	A7
	Current Study Authors	Project Vision Misalignment	Financial Challenges	Quality Control Concerns	Contractual Issues	Site Operational Fragmentation	Operational Oversight Challenges	Ethical and Legal Non- Compliance
United Kingdom	(Barman and Charoenngam, 2017)			x	x	x	x	
Nepal	(Aryal and Dahal, 2018)		x			x	x	
Saudi Arabia	(Assaf, 2019)		x	x	x	x		
Vietnam	(Vo, Nguyen and Nguyen, 2020)	x	x			x		x
Malaysia	(Goh, Wong and Low, 2022)	x	x		x			
Nigeria	(Titus, Ariffin and Ali, 2023)				x			
	Frequency	2	4	2	4	4	2	1

4.11 Summary

The results are based on an analysis of data collected from 143 construction practitioners employed in the construction industry in Malaysia, particularly in the Klang Valley. The overall response rate was 36.67%. After conducting the reliability test, it was determined that all the data used in this research established good and excellent internal consistency. Furthermore, the calculated p-value was less than 0.050, indicating that the results were based on a dataset that did not follow a normal distribution. Moreover, the importance score underscored the top five significant causes of construction disputes in private sector projects as follows: Lack of communication, Payment delays, The owner's arbitrary changes in the design, Change of scope and Shortage in supply (Materials and Labour).

Additionally, the results of the Kruskal-Wallis analysis revealed significant differences between the three groups of respondents (clients, consultants and contractors) in their views on the effects and causes of construction disputes in private sector projects. Among the 10 impacts, statistically significant variances were noted in "wastage and under-utilization of manpower and resources", "delay in the progress of work" and "cost overrun". In term of the frequency of causes, significant disparities were only evident in the "ambiguous contract drafting, terms, and provisions". Regarding the 25 severity factors contributing to construction disputes in privately funded projects, statistically significant differences were identified in "the owner's arbitrary changes in the design" and "changes in legal and economic factors". Besides that, Spearman's correlation test revealed a positive relationship between effects and causes and indicated the highest coefficient value of 0.418. Lastly, the factor analysis successfully discovered 7 underlying factors from 25 causes of construction disputes in privately funded projects.

CHAPTER 5

CONCLUSION

5.1 Introduction

This chapter includes a detailed overview of the previous chapters and emphasizes the research methods used to achieve the research objectives and reveal the findings. Additionally, it provides a concise summary of the research's implications for the construction industry while simultaneously noting its inherent limitations. This chapter concludes by providing a set of recommendations for future research endeavours.

5.2 Conclusion

To effectively address the issues of disputes in Malaysian privately funded projects, it is crucial to examine the root causes and consequences of such disputes thoroughly. Through a careful analysis of the factors that cause disputes and their impact on the project's outcomes, stakeholders can develop specific measures to reduce risks and promote a culture of cooperation as well as dispute resolution. In other words, conducting a thorough examination of the factors that lead to disputes and their consequences is an essential measure to improve the industry's ability to withstand challenges, maintain its competitiveness and ensure its long-term viability. Thus, the objectives of this research are to examine the effects of construction disputes, analyze the causes and underlying factors that lead to disputes in construction projects within the private sector.

As a result, a comprehensive literature review was carried out, leading to the successful identification of 10 effects of construction disputes and 25 causes that lead to construction disputes in privately funded projects. Subsequently, a survey was conducted in the Klang Valley region to collect data from construction practitioners. In order to streamline the process of acquiring data, a precisely designed closed-ended questionnaire was created as the main instrument for collecting information from the participants. The survey focused on practitioners from three discipline groups, including clients, consultants and contractors. A sum collection of 143 sets of responses were

gathered. Before proceeding with further statistical analysis, a reliability test and a normality test were utilised to verify the dependability and adherence to a normal distribution of the gathered data.

At the end of the research, the stated objectives have been achieved and can be summarised as follows:

Objective 1:

The first objective of this research is to determine the effects of construction disputes in privately funded projects. The participants were given a range of choices to express their level of agreement about the effects. The result identified the top three most significant effects as wastage and under-utilization of manpower and resources, delay in the progress of work and cost overruns. A significant difference in perspectives was noted among the three groups of respondents, where consultants evaluated these three effects slightly lower in contrast.

Additionally, the Spearman Correlation Test revealed that the variables “Erosion of profit” (E5) and “Unfair Risk Allocation” (S18) showed a strong association, with a coefficient of 0.418. Moreover, the delay in the progress of work (E2) and tension in communication (E3) have surfaced as foremost concerns, which have demonstrated the highest correlation counts of 13. These findings emphasize the crucial importance of resolving these effects in understanding and reducing construction disputes effectively.

Objective 2:

Next, the second objective is to evaluate the issues that lead to construction disputes in private sector projects. Section B of the questionnaire required respondents to rank the causes based on their frequency of occurrence, while Section C aimed to evaluate the severity of these causes. The findings suggest that lack of communication has the greatest score in terms of frequency, followed by payment delays, and inadequate and incomplete contract documentation. On the other hand, lack of communication, the owner’s arbitrary changes in design, and delays and extensions of time are the three most significant causes in terms of their severity.

Furthermore, the importance of each cause was determined by calculating the product of the frequency score (F.S.) and severity score (S.S.). A higher Importance Score (IMP.S) signifies a greater issue within the study's setting. The findings indicate that privately funded projects in Malaysia are mostly confronted with a lack of communication. This issue not only occurs frequently, but it also leads to the most severe repercussions. In short, lack of communication, payment delays, the owner's arbitrary changes in design, change of scope, and shortages in supply (materials and labor) comprise the top five causes with the highest importance scores.

Objective 3:

The third objective is to uncover the underlying factors of the disputes. Thus, this research conducted a comprehensive examination of the 25 causes that contribute to disputes using factor analysis. As a result, this investigation uncovered seven underlying principal factors, which are project vision misalignment, financial challenges, quality control concerns, contractual issues, site operational fragmentation, operational oversight challenges, and ethical and legal non-compliance.

Besides that, a detailed review has been carried out to compare these seven factors with those observed in other countries, thereby deepening the comprehension of their importance on a global scale. Financial challenges, contractual issues and site operational fragmentation emerge as primary factors contributing to disputes in various countries. However, ethical and legal non-compliance is relatively less prevalent in comparison.

5.3 Research Implications

Throughout the evolution of the construction industry, disputes have consistently emerged. An in-depth analysis of this research topic allows for the measurement of the financial, time and scope related effects linked to the disputes. This helps stakeholders gain a better understanding of the negative consequences that result from the escalation of disputes. Conducting research to evaluate the causes of disputes in privately funded projects is an essential step in identifying repetitive patterns and problems. This comprehensive research provides valuable insights, enabling parties involved to develop

successful policies targeted at not only addressing the underlying factors but also proactively minimizing disputes from arising. When evaluating the causes of dispute, the importance score is utilized to evaluate the relative significance of several causes. Stakeholders can effectively allocate their resources by paying attention to the highest importance score, enabling them to focus on resolving the most crucial issues.

Additionally, this research analyzed the perspectives and interactions of various individuals involved in private sector construction projects, such as clients, consultants and contractors, greatly enhancing the results of the study. Moreover, the result of the factor analysis test compared with different countries has the potential to provide significant insights into changing trends and best practices in managing disputes. In other words, when placing current findings into a broader geographical framework, research can allow for a more profound comprehension of how findings can differ throughout various places, thereby improving their relevance and usefulness to a broader audience. By doing this comparison analysis, the research identified common causes that contribute to construction disputes worldwide, which are financial challenges and contractual issues.

Besides that, this research can generate awareness for improving contractual procedures to minimize ambiguity, clearly define responsibilities and decrease the probability of disputes arising from contract-related issues. This research also intends to promote enhanced financial planning, increased openness in budgeting and more effective payment management methods to reduce disputes arising from financial matters. Furthermore, this research can foster more collaborative and mutually beneficial connections among project participants to avoid creating tension and long-lasting impacts of disputes on the trust, cooperation and reputation of stakeholders in the private sector. By understanding this research, stakeholders can obtain helpful knowledge about the current issues and take advantage of the numerous opportunities in the construction industry.

5.4 Research Limitations

Despite accomplished the research objectives, it is essential to recognize the limitations involved. First and foremost, this research utilized quantitative

approaches that primarily concentrate on numerical data and statistical analysis, which may offer a restricted understanding of the context. Quantitative surveys often lack the opportunity to explore participants' responses to discover deeper views and experiences. Researchers may fail to capture significant insights that may be clarified through interviews or focus groups due to the absence of real-time follow-up questioning. The reliance on the Five Likert Scale will narrow the focus of research by ignoring unexpected variables. In other words, quantitative methods frequently encounter difficulties in collecting subjective experiences, viewpoints and interpretations, as their primary emphasis is on objective and measurable data.

In addition, the findings derived from research that includes only clients, consultants and contractors may offer a restricted viewpoint on the topic. They may possess inherent biases influenced by their professional interests and ambitions. When excluding other stakeholders such as suppliers, regulatory authorities and so forth from the research may lead to the exclusion of crucial factors or alternate perspectives that could enhance the findings of the topic.

Last but not least, the Spearman correlation analysis is limited to identifying statistical relationships between variables and cannot show causality. Therefore, although it may reveal relationships between the effects and causes that contribute to construction disputes, it is unable to definitively determine cause-and-effect linkages. The Spearman Correlation Test assumes a relationship that consistently moves in one way, although not necessarily at a constant rate. Within the context of construction disputes, it is possible for specific components to demonstrate non-monotonic correlations, which can lead to potentially inaccurate results.

5.5 Recommendations for Future Work

Considering the limitations of quantitative methods in capturing subjective viewpoints, experiences and interpretations, it would be helpful for future research to integrate qualitative methodologies. This would offer a better understanding of the elements that contribute to disputes, going beyond just numerical data. Qualitative methodology can probe the rich experiences of the interviewees. It helps to clarify feedback that is unclear or lacking in detail and

to understand participants' statements concerning their wider experiences and situations. By combining quantitative and qualitative data, researchers might address the limitations associated with depending exclusively on a single scientific approach. This may be done by gathering quantitative data via questionnaires or statistical analysis while supplementing it with qualitative data acquired through interviews.

Besides that, extending the respondent group to include stakeholders beyond clients, consultants and contractors would improve the findings. This extension enables the recognition of effects from diverse perspectives, as well as the identification of the frequency and severity of causes of disputes in privately funded projects. Additionally, increasing the sample size enhances the statistical power, hence improving the ability to identify and analyze trends and correlations. Furthermore, it diminishes the influence of sampling biases and enhances the scope of findings.

Last but not least, there is a pressing need for more research on construction disputes in the Malaysian construction industry. One significant action would be undertaking a subsequent investigation to assess the frequency and severity of the seven underlying principal factors found by factor analysis. This approach would yield crucial insights by attributing importance scores to these elements. This subsequent investigation enables the stakeholders to allocate resources and direct efforts toward resolving the most crucial factors that significantly influence the outcome or performance of the construction projects. Understanding construction dispute dynamics in Malaysia through research is essential for developing practical solutions to reduce disputes and promote long-term development in the Malaysian construction industry.

5.6 Summary

Overall, this chapter offers a thorough integration of the research process, encompassing the findings, implications, limitations and recommendations. It highlights the importance of the research for the construction industry and provides suggestions for future research efforts. The chapter functions as a connection between the research process and its possible influence on industry practices and other research.

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APPENDICES

Appendix A: Questionnaire

EVALUATING THE CAUSES AND EFFECTS OF CONSTRUCTION DISPUTES IN PRIVATE SECTOR PROJECTS

Dear Sir/Madam

My name is Kelly Lim Kah Yee, currently I am a final year undergraduate student from Universiti Tunku Abdul Rahman (UTAR), pursuing Bachelor of Science (Honours) Quantity Surveying. I am conducting a research for my Final Year Project, which is titled "Evaluating the Causes and Effects of Construction Disputes in Private Sector Projects". This research aims to appraise the effects of construction disputes and the contributing factors to discover the underlying dimensions of disputes in the context of private sector projects.

The questionnaire consists of 4 sections which may take approximately 10 - 15 minutes to complete. I would greatly appreciate it if you could take a moment to complete this survey, as it provides vital information that is relevant to the research. All information gathered from this survey will be carefully kept confidential and used only for academic purposes.

If you have any queries regarding the research questions, please do not hesitate to contact me via email (kelly0236@utar.my) or phone (016-2541535).

Thank you for your valuable time and effort in participating in this survey. Your contribution is greatly appreciated.

Yours faithfully,
Kelly Lim Kah Yee

** Indicates required question*

Section A: Background Information

1. 1. The nature of your current organisation in the construction industry. *

Mark only one oval.

- A. Client
- B. Consultant
- C. Contractor
- Other: _____

2. 2. Highest education level *

Mark only one oval.

- A. High School
- B. Diploma
- C. Degree
- D. Postgraduate Degree (PhD, Master)

3. 3. Years of working experience in the construction industry *

Mark only one oval.

- A. Less than 5 years
- B. 5 to 10 years
- C. 11 to 20 years
- D. More than 20 years

4. 4. Type of construction projects involved that have construction disputes (You may select more than 1 option) *

Tick all that apply.

- A. Residential project
- B. Commercial project
- C. Industrial project
- Other: _____

Section B: Effects of Construction Disputes in Private Sector Projects

From the following selection, please indicate your level of agreement on the effects of construction disputes in private sector projects.

5. *Mark only one oval per row ***Mark only one oval per row.*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Cost overruns	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Delay in the progress of work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tension in communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Break down in cooperation between parties	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Erosion of profit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Loss of professional reputation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wastage and under-utilization of man-power and resources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor work quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Challenges associated with insurance coverage procedure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Section C: Frequency of Causes of Construction Disputes in Private Sector Projects

From the following selection, please rate how frequent are these causes of construction disputes in private sector projects.

6. *Mark only one oval per row ***Mark only one oval per row.*

	Never Happened	Rarely	Sometime	Often	Always
Lack of communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Payment delays	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Financial failure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adversarial culture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Behavioral adaptations of individuals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Change of scope	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Design errors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nonavailability of information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unrealistic expectations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The owner's arbitrary changes in the design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Delays and extension of time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technical inadequacies of the contractor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor quality of work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contractor's noncompliance with the design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unsuitable leadership style of project manager	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ambiguous contract drafting, terms and provisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Different interpretations of the contract provisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unfair Risk Allocation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate and incomplete contract documentation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Breaches of Contracts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inconsideration of environmental issues and site conditions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate administration and management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changes in legal and economic factors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shortage in supply (Materials and Labour)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Poor site safety conditions

Section D: Severity of Causes of Construction Disputes in Private Sector Projects

From the following selection, please rate how severe are these causes of construction disputes in private sector projects.

7. Mark only one oval per row *

Mark only one oval per row.

	Not Severe	Little	Moderate	Very	Extremely
Lack of communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Payment delays	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Financial failure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adversarial culture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Behavioral adaptations of individuals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Change of scope	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Design errors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nonavailability of information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unrealistic expectations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The owner's arbitrary changes in the design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Delays and extension of time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technical inadequacies of the contractor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor quality of work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contractor's noncompliance with the design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unsuitable leadership style of project manager	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Ambiguous contract drafting, terms and provisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Different interpretations of the contract provisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unfair Risk Allocation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate and incomplete contract documentation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Breaches of Contracts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inconsideration of environmental issues and site conditions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate administration and management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changes in legal and economic factors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shortage in supply (Materials and Labour)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor site safety conditions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Questionnaire Survey.

Thank you very much for participating in this survey.

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