

**CAUSES OF DISPUTES AND RESOLUTION SYSTEMS IN GOVERNMENT
BUILDING MAINTENANCE PROJECTS IN SAUDI ARABIA**

BY

MOUATH MASAUD ALGHAMDI

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DEANSHIP OF GRADUATE STUDIES

This thesis, written by **Mouath Masaud Alghamdi** under the direction of his thesis advisor and approved by his thesis committee, has been presented and accepted by the Dean of Graduate Studies, in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE IN CONSTRUCTION ENGINEERING AND MANAGEMENT**.



Dr. Laith Hadidi
Department Chairman



Dr. Suliman Al-Homidan
Dean of Graduate Studies

Date _____



Dr. Ali Shash
(Advisor)



Dr. Adel Alshibani
(Member)



Dr. Khwaja Mazher
(Member)



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2023

Dedication

To

*My beloved wife and family. For they have provided support, affection, and inspiration,
and without them, none of my success would be possible.*

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In the name of Allah, Most Gracious, Most Merciful

First and foremost, I would like to praise Allah, the Almighty, for the blessings given to me during my education and in completing my thesis.

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LIST OF ABBREVIATIONS

ADR	Alternative Dispute Resolution
RII	Relative Importance Index
IMPT	Importance Index
NAVFAC	Naval Facilities Engineering Command
SCCA	Saudi Centre for Commercial Arbitration
BOG	The Board of Grievances
FAII	Frequency Adjusted Importance Index

ABSTRACT

Full Name : [Mouath Masaud Alghamdi]

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Humans' comfort and economic stability are directly tied to the conditions of their houses, workplaces, hospitals, etc. which are attained through maintenance. Government building owners' satisfaction with building maintenance services is a worldwide concern. Saudi Arabian government facilities continue relying exclusively on private contractors for maintenance, which increases the probability of dispute occurrences. Most disputes that arise during government maintenance projects end up negatively impacting everyone involved.

The study's objectives are to pinpoint the leading causes of disputes, determine the dispute resolution cost, duration, methods employed in the sector, and assess the effects of such disputes on the contractors and maintenance projects. These objectives were achieved by a variety of analysis techniques of information obtained from a designed questionnaire survey and a case study approach in government building maintenance projects. The leading disputes causes and high risks on cost, time and/or quality in government building maintenance projects are the lack of original as-built drawings for government buildings, poorly defined scope of work, owner's constant interferences in contract execution, owner's delay in response/decision making, owner's delay in payment, unskilled contract's manpower, contractor's mistakes in devolving the bidding/estimation, contractor's unawareness of government rules and regulations, inaccurate BOQ in the lump-sum contract and fluctuation of materials costs during project execution. The cost of mediation for resolving disputes is less than SR100,000, the cost of litigation or court system ranges from SR100,000 up to SR300,000 and the cost of arbitration falls within SR300,000 to less than SR400,000. The most probable duration of mediation process for dispute resolution is less than 2 months, the probable duration of arbitration method is 2 to less than 6 months and probable duration of litigation takes anywhere from 12 to less than 18 months.

Furthermore, mediation resolution method is used anywhere from 76%-100%, court system is used anywhere from 50% - 75%, and arbitration method is used to settle anywhere from 1% -25% for dispute resolution in government building maintenance projects. The increment in project cost, reduction in productivity, loss of business viability, tension and dampness of team spirit, and profitability loss are the leading consequences of government building maintenance project disputes.

In conclusion, the majority of disputes are caused by owners, project documents, and contractors respectively. However, communication is the first step towards the resolution of any dispute. Therefore, establishing a well communication strategy is critical in minimizing disputes occurrences in maintenance projects. Each party has a responsibility, and only with their cooperation and commitment, a project may succeed.

ملخص الرسالة

الاسم الكامل: معاذ مسعود الغامدي

عنوان الرسالة: أسباب النزاعات وأنظمة التسوية في مشاريع صيانة المباني الحكومية في المملكة العربية السعودية

التخصص: هندسة وإدارة التشييد

تاريخ الدرجة العلمية: مايو 2023

ترتبط راحة البشر واستقرارهم الاقتصادي ارتباطاً مباشراً بظروف منازلهم وأماكن عملهم ومستشفياتهم وما إلى ذلك والتي يتم تحقيقها من خلال الصيانة. رضا ملاك المباني الحكومية عن خدمات صيانة المباني هو مصدر قلق عالمي. تستمر مرافق الحكومة السعودية في الاعتماد حصرياً على مقاولين من القطاع الخاص للصيانة، مما يزيد من احتمالية حدوث النزاع. تنتهي معظم النزاعات التي تنشأ أثناء مشاريع الصيانة الحكومية بالتأثير سلباً على جميع المعنيين. تتمثل أهداف الدراسة في تحديد الأسباب الرئيسية للنزاعات، وتحديد تكلفة تسوية المنازعات، والمدة، والأساليب المستخدمة في هذا القطاع، وتقييم آثار هذه النزاعات على المقاولين ومشاريع الصيانة. تم تحقيق هذه الأهداف من خلال مجموعة متنوعة من تقنيات تحليل المعلومات التي تم الحصول عليها من الاستبيان المصمم ودراسة الحالة في مشاريع صيانة المباني الحكومية. أسباب النزاعات الرئيسية والمخاطر العالية على التكلفة والوقت والجودة في مشاريع صيانة المباني الحكومية هي عدم وجود رسومات أصلية للمباني الحكومية، ونطاق عمل غير واضح بشكل جيد، وتدخل المالك المستمر في تنفيذ العقد، وتأخر المالك في الاستجابة أو اتخاذ القرار، تأخر المالك في السداد، القوى العاملة للمقاول الغير ماهرة، أخطاء المقاول في تقديم العطاء، عدم وعي المقاول بالقواعد واللوائح الحكومية، جداول الكميات غير الدقيقة في عقد المبلغ الإجمالي وتقلب تكاليف المواد أثناء تنفيذ المشروع. تكلفة الوساطة لحل النزاعات أقل من 100.000 ريال سعودي، وتتراوح تكلفة التقاضي أو نظام المحاكم من 100.000 إلى 300.000 ريال سعودي وتكلفة التحكيم في حدود 300.000 ريال إلى أقل من 400.000 ريال سعودي. المدة الأكثر احتمالاً لعملية الوساطة لتسوية المنازعات هي أقل من شهرين، والمدة المحتملة لطريقة التحكيم من 2 إلى أقل من 6 أشهر والمدة المحتملة للتقاضي تستغرق ما بين 12 إلى أقل من 18 شهراً. علاوة على ذلك، يتم استخدام طريقة حل الوساطة من 76 % إلى 100 %، ويستخدم نظام المحاكم من 50 % إلى 75 %، ويتم استخدام طريقة التحكيم من 1 % إلى 25 % لتسوية المنازعات في مشاريع صيانة المباني الحكومية. الزيادة في تكلفة المشروع، وانخفاض الإنتاجية، وفقدان جدوى الأعمال، وتوتر روح الفريق، وخسارة الربحية هي النتائج الرئيسية لنزاعات مشاريع صيانة المباني الحكومية. في الختام، فإن غالبية النزاعات ناتجة من المالكين ووثائق المشروع والمقاولين على التوالي. ومع ذلك، فإن التواصل المستمر هو الخطوة الأولى نحو حل أي نزاع. لذلك، يعد إنشاء استراتيجية اتصال جيدة أمراً بالغ الأهمية في تقليل حدوث النزاعات في مشاريع الصيانة. كل طرف لديه مسؤولية، وفقط من خلال تعاون الاطراف والتزامهم، يتم نجاح المشروع.

CHAPTER 1

INTRODUCTION

1.1 General Overview

Humans' comfort and economic stability are directly tied to the conditions of their houses, workplaces, hospitals, etc. which are attained through maintenance. Building maintenance is a combination of technical and administrative procedures, including supervisory actions, conducted to keep or restore a building or other facility to a condition in which it continues to serve its intended purpose and retain its economic worth (Allen, 1993).

Improper building maintenance is a universal problem that affects the long-term performance of a building; it is currently acknowledged as an issue that is important to consider (Arditi & Nawakorawit, 1999).

1.2 Problem Statement

The government building maintenance industry in Saudi Arabia has experienced a growth rate increase by 17% from 2008 to 2014. Moreover, this growth is expected to rise from 75 billion riyals in 2014 to 370 billion riyals by 2030 (Alshehri, 2017).

The Saudi government depends heavily on contractors to maintain its various and sizable buildings all over the kingdom. Saudi Arabian government facilities continue relying exclusively on private contractors for maintenance, which increases the probability of dispute occurrences.

Contacts are prone to conflict and disputes especially those which extend over long service time due to uncertainty. This type of relationship has not been explored previously. The

literature is scarce in subjects related to the type of relationship between the different parties to maintenance contractors. The literature is almost null of research on disputes in maintenance projects. The maintenance industry is being neglected since practically all the attention of researchers is being directed toward other industries (Al-Hammad et al., 1996). At first glance it was believed that the maintenance industry is free of significant problems. However, visiting the Scientific Judicial Portal revealed sizable disputes in government building maintenance projects.

Disputes arise during government building maintenance projects have a detrimental impact on the project cost, duration and the interests of both owners and the contractors. Disputes are inevitable; however, they can be avoided/reduced by investigating and studying their root causes. The current situation raises the following questions:

- What are the leading causes of disputes in government building maintenance projects?
- What is the cost of resolving a dispute in a government maintenance project?
- How long does it take to resolve a dispute in a government maintenance project resolution cost?
- What are the methods that are used to resolve a dispute in a government maintenance project?
- What are the consequences of disputes on owners, contractors and building maintenance projects?

This study, to the best knowledge of the author, is the first to study the dispute causes in government building maintenance projects. The dispute causes of government building maintenance projects have not been given sufficient attention which promoted this research study.

1.3 Research Objective

This study aims to investigate disputes in government building maintenance projects in Saudi Arabia. The specific goals of the study are:

- Identify the causes of disputes in government building maintenance projects.
- Determine the cost, duration, and methods of solving disputes in the government building maintenance projects.
- Define the effects of disputes on owners, contractors, and projects.
- Compare the results of three case studies from the Saudi Judicial Court system with the collected data.

1.4 Significance of the Study

This study focuses on dispute causes of government building maintenance projects locally where most of them are being undertaken by the private sector. This study to the best knowledge of the author, is first of its kind. Therefore, this study provides the leading disputes causes, their consequences and the common resolution methods used during a dispute occurrence in maintenance projects. Moreover, this research would be a significant attempt toward avoiding/reducing occurrences of disputes between contractors and owners and improving the early decision-making process in choice of resolution systems of the government building maintenance contracts. This study will also close a gap in the book of knowledge.

1.5 Scope and Limitation of the Research

This scope of this study is limited to the findings of government building maintenance projects in Saudi Arabia as well as ccontractors' perceptions. Contractors with first, second, and third-degree classifications in building maintenance services and government

buildings from the Ministry of Municipality and Rural Affairs and housing (MOMRA) are only considered in this study. This study is also limited to contractors located in Eastern Province due to cost and time constraints.

CHAPTER 2

LITERATURE REVIEW

2.1 Background & definitions

Chartered Institute of Building, (CIOB) (1990) defined maintenance as work carried out to preserve, restore, or enhance a building (Yasin et al., 2019). Similarly, the British Standard Institute BS 3811, (1984) states that maintenance refers to the technical and administrative activities that are carried out to maintain a facility operating effectively. Additionally, maintenance is described as the work that includes maintaining or repairing a facility or any other work that is performed to keep it operating at its optimal condition or to an acceptable quality (Seeley, 1987). Even though these maintenance definitions have their own unique twists, they are all essentially referring to the same overarching idea.

2.2 Building Maintenance

It is imperative that maintenance be performed as soon as the construction phase of a building is finished since this step contributes significantly to extension of its useful life and retain the building's economic worth (Gajzler, 2013). The appropriate maintenance of a building is highly essential since it keeps the facility in top shape and ensures that the users of the property receive the best possible service. It also has the potential to affect the building's functionality and safety. (Yasin et al., 2019). Furthermore, it is difficult to replace or rebuild every building in an area. Hence, maintenance is very important to ensure that the assets are maintained for their intended use (Kim Wing et al., 2016). It is possible to reduce the amount of work necessary to maintain a building by taking advantage of a

variety of elements, including the consideration of maintenance procedures during design and construction of a building (Seeley, 1987).

2.2.1 Types of Maintenance

Although it is desirable to construct buildings that are maintenance-free, that is impossible. Most of the materials that are utilized in the construction of buildings will, over time, get damaged as a result of various circumstances and external factors. However, if these considerations are considered at the design phase, subsequent maintenance work can be cut down significantly. (Seeley, 1987). Maintenance usually is divided into two categories, planned and unplanned maintenance (Figure 1). Within an organization, the practice of proactively arranging and exercising control over the activities that are connected to a particular equipment is referred to as planned maintenance. On the other hand, unplanned maintenance refers to the action of performing maintenance without first devising a plan.

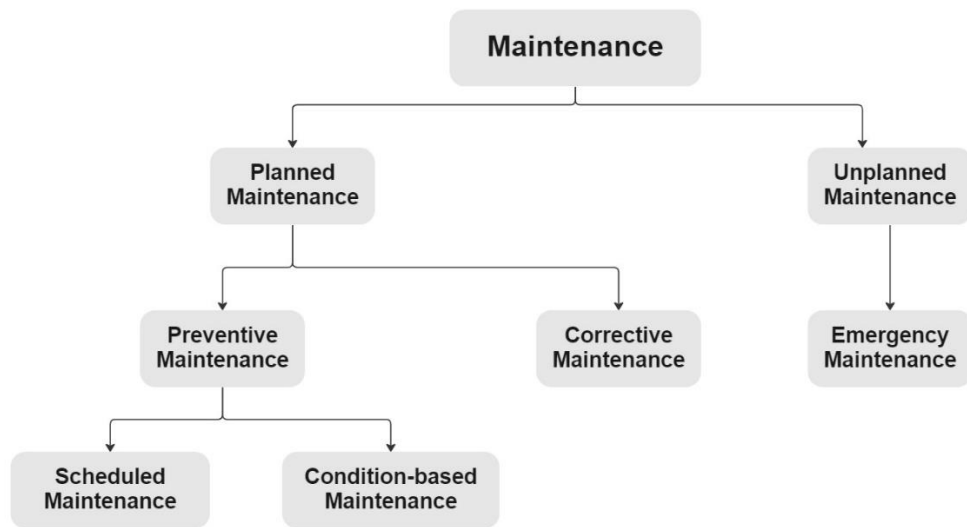


Figure 1: Types of Maintenance

Source: (British Standard Institute - BS 3811, 1984; Seeley, 1987)

Additionally, emergency maintenance is performed as a result of an unexpected failure and is utilized to return the asset to its initial state of functionality. This type of maintenance

falls under the umbrella of unplanned maintenance. Planned maintenance may be broken down into two subcategories: corrective maintenance, which is similar to emergency maintenance, that is carried out on the asset in order to restore it to the condition of functionality. Preventive maintenance on the other hand entails carrying out routine maintenance to keep an asset or item in its original state (Seeley, 1987).

Another terminology that is commonly used in the maintenance industry is deferred maintenance. This type of maintenance is the consequence of maintenance that was either not completed correctly or postponed to a later date. Deferred maintenance may be brought on by several circumstances, including a deficiency in financial, or a failure to recognize and address the problems, or both of these things (Yasin et al., 2019).

This type of maintenance has received more attention because of the significance and influence it has on buildings. Unfortunately, deferred maintenance happens wherever there is a lack of efficient methods for managing building maintenance. It is not uncommon for owners and contractors to get in disputes due to deferred maintenance. Both parties contribute to the postponement of maintenance such as the delay of payment by owners or the failure of contractor to recognize the issue that need maintenance. Therefore, Inadequate management can have a negative influence on the long-term condition and worth of the facility. (Nah et al., 2015). The majority of the causes of deferred maintenance may be summed up as follows: a lack of coordination between operational and strategic planning, a lack of resources, poor financial planning, and improperly applied techniques of assessing needs. (Kaiser, 2004; Yasin et al., 2019).

2.2.2 Maintenance Contracts

Contracting out is a topic that is regularly brought up in conversations between legal and accounting professionals because of the large range of applications that might benefit from it and the diverse range of legal and financial considerations that are involved. Martin (1997) describes the various kinds of maintenance contracts as falling into one of three categories. First, the work package contract is the most fundamental kind of contract. This kind of contract is often carried out by both the client and the contractor. This contract details the schedule of the maintenance activities as well as the appropriate times for those activities to be carried out. In contracts of this kind, the payment for the contractor's services is often determined by either a per-unit fee or a flat price. The client may be required to postpone the activities of the scheduled maintenance plan in the event that the contractor does not have adequate availability. In this scenario, the client has the financial flexibility to search for the most cost-effective contractors without needing to maintain a close working connection with the contractor. Because of the nature of this sort of contract, it is necessary for the maintenance activities to be clearly spelled down and comprehended. The client has full discretion over all aspects of the maintenance procedure.

Second, in contrast to a conventional contract, a performance contract assures the availability of a certain set of services to the parties involved. Both the owner and the contractor have distinct obligations regarding the maintenance and operation of the technical system in this type of contract. It is common practice for a contractor's budget to be regularly reviewed to reduce the likelihood of unanticipated situations leading to a rise in expenses. In most cases, this step requires a meeting to take place between the owner and the contractor. A contractor is required to demonstrate that he can fulfill the terms of

the contract in addition to maintaining the performance standards that were previously agreed upon. The contractor must often set up a variety of measurement equipment to get an accurate picture of the system's availability. Usually, costs are higher in the performance contract, which are often associated with the maintenance of the system, as well as the contractor's duty for the formulation and implementation of the maintenance plans and procedures. The client and the contractor usually discuss the goals and performance statements of the system they're working on. Usually, the client approves the maintenance concept suggested by the contractor. However, establishing this type of contract usually takes a long time due to the level of effort involved.

The last type of contract is called a facilitator contract, and in this kind of arrangement, the client is primarily the end user. The contractor is accountable for the asset's maintenance and management. The numerous managerial logics that are normally handled by the contractor are largely responsible for the reduction in complexity brought on by this contract. In most cases, getting the owner's permission to utilize the operating instructions that the contractor provides is necessary before proceeding. Because of this, the client is no longer liable for the way the system is used. The term lease contract is often used interchangeably with facilitator contract. Because it eliminates the requirement of developing a long-term working relationship, this kind of contract is advantageous for the owner as well as the contractor. In contrast to standard contracts, more risk is assumed by the contractor in exchange for the opportunity to collaborate with the client. This guarantees that both parties can trust one another and work together to make strategic decisions on the business. Because of its adaptability, the facilitator contract has the potential to be appealing to both parties.

2.2.3 Maintenance Strategies

A maintenance program is a strategy that is used to maintain the functionality and appearance of buildings as well as meet the needs of the users and the challenges of the organization. As the buildings and infrastructures age, regular maintenance or repairs are required (Kim Wing et al., 2016). The maintenance strategy should align with the organization's objectives and ensure that the resources are being used effectively. In addition to this, it needs to achieve the service objectives as its primary priority. (Velmurugan & Dhingra, 2015). Some of applicable maintenance strategies used in the maintenance industry are risk, procurement, financial management and technical strategies. The risk management strategy is a step that an organization can take to identify the various risks associated with its assets. It will then assist them in developing a prioritized maintenance program. The financial management strategy is a step that can be taken to determine the appropriate funding arrangement for the various maintenance activities. This strategy should also inform clients of the decisions regarding the use of external contractors and in-house staff members. It should also reflect the government's policies regarding the procurement procedures. The management strategy for maintenance will help determine the various management arrangements for the various maintenance activities carried out within an organization. Finally, the technical strategy for maintenance will help determine the scope and schedule of the various maintenance activities that would be carried out on the organization's assets. It will also help identify the appropriate strategies to be utilized (Emovon et al., 2016).

2.3 Conflict, Claim & Dispute Relationship

The maintenance industry regularly faces various problems. Although most of these problems are manageable, disputes conversely are different due to their complexity and the various legal implications involved. Conflicts and disputes are used interchangeably in the maintenance industry. Many professionals confuse the two terms when it comes to working in the maintenance industry (Acharya et al., 2006). There are some authors who do not differentiate between the two terms to the point where they managed to combine both under one category (Fenn et al., 1997). On the other hand, Jaffar et al., (2011) defines a conflict as an interaction between two parties that is characterized by doubt or disagreement regarding an idea or action. Wilmot & Hocker, (1998) considers conflicts as the struggle between two parties that are committed to achieving incompatible goals. A conflict is typically an argument about a project operation. It can be triggered by a disagreement between two or more parties over their understanding of the situation (Vorster, 1993). All those definitions are falling under the same argument category which can be triggered by a disagreement between one or more parties in a maintenance project. However, Wani, (2011) went beyond in defining conflict, which can refer to in various contexts, such as fight, argue, combat, and war. These terms are equally evocated and can be used to describe the term conflict. Understanding the various terms that are used to describe conflict requires knowing which of them fits under the title of. Moreover, actions and arguments that are both presented to a controversy are more likely to lead to a conflict. Despite the possibility of preventing disputes from forming, the process of the resolution usually involves the use of third parties (Equbal et al., 2017). Diekmann & Girard, (1995) supports this by stating that a dispute is any contractual issue that must be resolved beyond the

capability of the project management at site. Madhumitha et al., (2020) also has an alike definition of dispute which is a situation where two parties disagree on the terms of a contractual right. The causes of the disagreement are usually the actions of the parties at the site.

On the other hand, a claim is a document that asserts a right to a certain type of remedy or property. (Semple et al., 1994). Maintenance claims can be made in various projects for extra money or time. Also, they can be based on various contractual terms and procedures such as a breach of contract. Claims on contracts are inevitable but oftentimes required in order to resolve unforeseen changes that have occurred in the project. Despite the fact that these claims can be resolved peacefully, it is nevertheless possible that it will lead to an excessive accumulation of conflicts and disputes (Kumaraswamy, 1997). Figure 1 illustrates how disputes arise in the construction industry; dispute can be the result of a conflict, claim or other sources (e.g., force majeure, Covid-19).

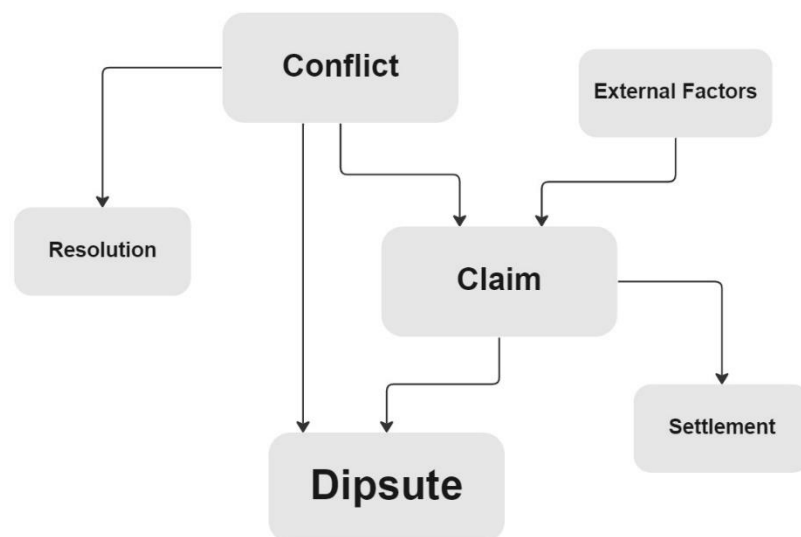


Figure 2. Conflict, Claim & Dispute Relationship

Source: (Adopted and modified from Dangrochiya et al., 2021; Kumaraswamy, 1997)

A conflict can be resolved internally within the project team, or it can be claimed for. Similarly, a claim can either be settled within or leads to the formation of a dispute. Maintenance contracts can be challenging due to their complexity and often lengthy duration. As a result, they can generate significant disagreements and financial disputes during execution (Dangrochiya et al., 2021). The relationship is not simple when the objective of the owner is to keep the project within its financial constraints while the maintenance contractors are focused on executing the project with least possible costs in order to make the most amount of the profit. On the other hand, each of the involved parties are susceptible to unanticipated events, which may have an impact on the planning stages of the project. This could lead to disputes and disagreements that would affect the project's financial viability (Dangrochiya et al., 2021). Finally, Cheung and Yiu (2006, pp.5) elucidates the relationship between conflict and dispute in a way that is both straightforward and profound, “conflict is in fact an underlying cause of dispute. In other words, dispute is the manifestation of the underlying conflict.”.

2.4 Disputes in Building Maintenance Industry

Government entities and companies in Saudi Arabia are heavily dependent on maintenance contractors to operate and maintain facilities in all different aspects. The government building maintenance industry in Saudi Arabia has been growing rapidly which experienced an increase of 17% from 2008 to 2014. This growth is expected to rise in cost from 75 billion riyals in 2014 to 370 billion riyals by 2030 (Alshehri, 2017). The earliest study found in the literature review concerns the interface difficulties between owners and maintenance contractors in Saudi Arabia by Al-Hammad, (1995) of thirty issues were found facing the maintenance industry through a questionnaire survey. These issues were

sorted into four primary categories, which were as follows: lack of competent supervision, poor contract and specifications, financial difficulties, and laborers' difficulties. The main issues that the owner and maintenance contractors faced were lack of direct contractor oversight, inaccurate specifications and standards, and owners' meager maintenance budgets.

Later on, a more comprehensive study was conducted by (Al-Hammad et al., 1996) that involved interviewing authorities in charge of maintenance in both the public and private sectors which identified twenty-four issues facing the building maintenance industry in Saudi Arabia. The lack of unskilled laborers in the building maintenance industry in Saudi Arabia is one of the primary factors that could have a negative impact on the life cycle of the building, and it is considered economically inefficient by owners. This is one of the main points that could have a negative impact on the lifespan of the building. The majority of Saudi Arabia's workforce is comprised of workers from other nations. Selection of the wrong personnel will have a detrimental effect on both productivity and the quality of the maintenance job.

Furthermore, vaguely defined scope of work or maintenance contracts can also result in dispute occurrences during contract execution as mentioned by (Lai et al., 2004). The terms “Fair Wear and Tear” and Vandalism” found in building maintenance contracts can be interpreted differently by the owners and contractors which usually leads to conflicts and disputes. According to (Ogunmakinde et al., 2013) the use of foreign building materials, lack of maintenance culture discipline, and knowledge, bad economy, corruption all contributed to poor maintenance work that resulted in disputes.

Table 1: Dispute Causes of Maintenance Industry

Reference	Conflict & Dispute Sources	
(Al-Hammad, 1995)	1. Lack of direct supervision by contractor 2. Lack of accuracy in specification and standards. 3. Owners' low budget for building maintenance. 4. Contractors' unawareness of owner complaints about his laborers' abilities. 5. Unspecified labor skills in contract. 6. Lack of training program for maintenance team. 7. Inaccurate estimation of maintenance costs by contractors. 8. Lack of cost indexes used by owners for cost estimation. 9. Inappropriate selection of laborers by contractors (cheap, unskilled). 10. Insufficient communication between contractors and supervisors due to poor report-writing skills. 11. Lack of proper information between the owner's maintenance department and financial department. 12. Lack of direct supervision by owner. 13. Slowness of contractor's performance and owner approval on work. 14. Familiarity of maintenance team with modern technology. 15. Lack of communication between contractor/owner and maintenance laborers (language barrier). 16. Underestimation of leadership and supervision skills. 17. Lack of labor incentives. 18. Inappropriate schedule of payments. 19. Loading unnecessary costs on contractor. 20. Insufficient laborer loyalty. 21. Performance of external work by laborers to increase their income. 22. Insufficient laborer food support by contractor. 23. Contractor's overestimate laborers' capabilities. 24. Lack of penalty clause in contract. 25. Long distance from worksite to laborers' accommodation. 26. Sudden decision by laborers to leave or strike. 27. Contractors' lack of knowledge of local climatic and environmental factors. 28. Inflexibility of Contractors/Owners in arranging labor assignment from one site to another. 29. Adaptation of old technology and systems by old personnel. 30. Laborers' illiteracy.	
(Al-Hammad et al., 1996)	1. Budget and financial problems. 2. Not counting for maintenance during design 3. Unavailability of spare parts. 4. Unavailability of local manpower. 5. Lack of proper tools. 6. Shortage of contract period. 7. Poor management. 8. Lack of O and M manuals. 9. Poor quality control. 10. Usage of sub-standard materials. 11. Lack of feedback data. 12. Lack of institutions and training facilities. 13. As-built documents. 14. Lack of specialized contractors. 15. Lack of uniform specifications. 16. Misuse of facilities. 17. Method of classification. 18. Spare parts become obsolete. 19. Lack of co-ordination 20. Not using LCC method 21. Un-use facilities 22. Usage of new materials 23. Lack of uniform contracts 24. Maintenance not understood by public.	
(Lai et al., 2004)	Vague contract terms: "Fair Wear and Tear" and "Vandalism"	
(Ogunmakinde et al., 2013)	1. Lack of funds. 2. Lack of maintenance culture. 3. Indiscipline/Ignorance. 4. Bad Economy. 5. Death of owner of building. 6. Quality of building materials. 7. Lack of skilled maintenance. 8. Personnel. 9. Remoteness of the building.	

These papers concern mainly the problems facing the building maintenance industry itself, overlooking parties involved and the root causes behind them, and the effects on owners and contractors. Those points can also be taken into account when considering different causes of disputes regarding government building maintenance projects. However, due to the noticed shortage on research and publications that focus on the dispute causes in building maintenance, the studies from the next closest industry, which is construction, will be also reviewed in order to put together a full picture of the dispute causes.

2.5 Disputes in Construction Industry

Construction is the industry that is most closely related to maintenance, and it is possible to look into the construction sector for further dispute causes in order to develop a complete knowledge of this subject. Waldrom (2006) conducted a study that revealed only fifty-six percent of projects are completed on time, and over forty-four percent of them run late due to a conflict/dispute among other factors. The increasing diversity of participants in the construction industry has raised the number of conflicts and disputes (Kumaraswamy & Yogeswaran, 1998). Harmon (2003) also supports the idea that complexity and diversity of the construction industry can create various types of conflicts. One of these is the destructive conflict, which usually stems from the limited resources available to complete a project. Human interactions during the design, planning, and construction phases often lead to conflicts. Nagamani et al. (2021) suggests that these conflicts arise due to the multi-disciplinary nature of the projects and the varying interests of the participants. Despite the existence of clever contract drafting, it is still not possible to completely eradicate disputes (Chern, 2020). As demonstrated in the below section, it is useful to start by categorizing the causes of the dispute initially into different groups from the literature review in order

to completely analyze each dispute cause that is related with its group and also compare the results and influences of the groups later on.

2.5.1 Dispute Categories

Because the parties involved often have quite different points of view, the building industry and maintenance projects are typically bound to be fraught with arguments and disagreements. Every side approach challenges and potential answers from a somewhat different perspective. Disputes can arise when owners and contractors have differing perspectives, which can sometimes lead to confrontation between the two parties. In most cases, the connection that exists between a client and a contractor in the context of a project is intricate and interwoven. Furthermore, it is important to categorize the causes of the disputes, as this demonstrates what the causes of the disputes are related to, as well as the influence that each group has in comparison to the others (Table 2).

Table 2. Category Types of Dispute Causes

No.	Reference	Types of Conflict & Dispute Causes	
1	(Tanriverdi et al., 2021)	1. Process. 2. Project.	3. People
2	(Madhumitha et al., 2020)	1. Owner related. 2. Contract related. 3. Design related. 4. Contractor related.	5. Human behavior related. 6. Financial / economical related. 7. External factors. 8. Material, labor and equipment related.
3	(El-Sayegh et al., 2020)	1. Owner related. 2. Designer related. 3. Contractor related.	4. Contractual. 5. Other
4	(Alsuliman, 2019)	1. factors before the award of tenders. 2. factors during the award of tenders.	3. factors after the award of tenders. 4. general factors.
5	(Trangkanont, 2018)	1. Project owners' withholding payment and defective construction documents. 2. Contractors' inadequate and incompetent project staff and workers.	3. Contractors' inefficient project management

No.	Reference	Types of Conflict & Dispute Causes	
6	(Cakmak & Cakmak, 2014)	1. Owner related. 2. Contract related. 3. Design related. 4. Contractor related.	5. Human behavior related. 6. Project related. 7. External factors.
7	(Jelodar et al., 2012)	1. Project and Uncertainties. 2. Contract and Processes	3. People and Behavior issues.
8	(Cheng et al., 2009)	1. Caused by owner. 2. Caused by general contractors.	3. Caused by both parties. 4. Caused by acts of God.
9	(Acharya et al., 2006)	1. Owner evoked conflicts. 2. Consultant evoked conflicts. 3. Contractor evoked conflicts.	4. Third Party evoked conflicts. 5. Other project specific matter evoked conflict.
10	(Cheung & Yiu, 2006)	1. Non-performance. 2. Payment.	3. Time
11	(Sykes, 1996)	1. Construction contracts.	2. Unpredictable events
12	(J. E. Diekmann et al., 1994)	1. People. 2. Process.	3. Product.
13	(Totterdill, 1991)	1. Technical related 2. Legal related	3. Managerial related

2.5.2 Disputes in International Construction Industry

A dispute is usually not uncommon between two or more parties in either maintenance or construction projects. Conflicts are inevitable in any project due to the varying perceptions of various parties and if not handled the proper way, they escalate to disputes (Cakmak & Cakmak, 2014). A study made by Semple et al. (1994) on causes of delays, cost overruns, and claims on 20 various projects in Western Canada indicated that the cost of these projects will be absorbed by one or more of the parties involved. The study also investigates the contractual clauses and procedures related to these issues. This studies also indicates that many of the critical elements of a construction contract are related to disputes, delays, changes, and site condition (Semple et al., 1994). On a bigger scale, a study by Kumaraswamy, (1997) was done on sixty-one projects sites and the data was collected from 46 responses based in Hong Kong to investigate the various needs related to construction claims and to identify the root causes of these significant claims. The claims

are analyzed through a classification system and an estimate of their relative significance. The top three root causes in this study were variation orders, late site possession and work disruption by employer/Engineer. Those same root causes later analyzed and used by Yates (1998) to form a perspective of the increasing number of conflicts and disputes in the procurement of new building projects and how they become a major concern for the construction industries in various countries.

Mitropoulos & Howell, (2001) analyzed twenty-four construction disputes that contribute to the development of process model to explain how disputes are formed. The study indicates some factors that will assist in the reduction of dispute numbers as well as minimize the severity of claims in construction sites. Those factors are problems related to contract, uncertainty, human behavior, and dispute resolution methods. Similarly, a survey by Brooker (2002) was made of construction lawyers revealed that they experienced varying levels of success and failure when they tried to resolve disputes through Alternative Disputes Resolution (ADR). The study concluded with four factors that had the highest involvement of the failure or rejection of the mediation: payment, delay, defect/quality, professional negligence.

A six hundred and sixty-six cases of construction lawsuits involving the U.S. Naval Facilities Engineering Command (NAVFAC) over a period of twenty-one years were identified by (Kilian, 2003). Thirty different cases were randomly selected and analyzed to identify various primary causes of the disputes. The study found twenty-six percent of litigation causes is interpretation of contracts, delays about twelve percent, and eleven percent are caused by disputes. On the other side of the world, a questionnaire survey was conducted by Acharya et al., (2006) based in South Korea to provide a list of conflicting

factors to prevent future projects from facing unfavorable effects. One twenty-four responses were received from professional practitioners in the construction industry. Based on importance weighting, twenty four percent is related to site condition issues, twenty tow percent is related to interruption, and twenty-one percent is related to change order. Shockingly, the study also revealed that the owner and consultant are prime parties for conflicts in the construction site. The higher percentage of conflict and disputes causes goes for contract interpretation, which also can be supported a study in Australia by Waldrom (2006) report that revealed variations, and interpretation of the scope of works are the main issues that affect overall life cycle the project.

Yiu & Cheung (2007) used a catastrophe-theory-based system to study how the behaviour change among level of construction conflict, amount of behavioural flexibility, and the level of tension. Those perimeters are implemented from an older study they did in 2006. They examined the moderated multiple regression on the system. The results of the study revealed that there is a radical correlation between the amount of behavioural flexibility and the level of tension. As a result, even with a limited set of options, a person may find it hard to overcome certain conflicts. Another technique was developed by Cheng et al. (2009) using a fuzzy-set theory framework in combination with the case-based reasoning model to make a tool that can help people with construction disputes. This technique allows users to mine past cases and analyze them efficiently and improve their skills when dealing with construction disputes. Thirty-nine causes of disputes were acquired from literature (see table 3) grouped under four categories: caused by owner, caused by general contractor, related to both parties and act of God.

Having the proper management techniques in place can help prevent conflicts from turning into disputes. A study was made by Elmabrok et al. (2016) to Identify the most likely causes of conflicts during a project. This paper presents an analysis of the factors that led to conflicts during the construction of projects in Serbia and Libya. The data was obtained from a survey of two hundred and eighteen and interviews of forty-two participants. The top three ranked areas of conflict were payment delay, variation orders, and evaluation differences in respectively. An Important study two year later by Trangkanont (2018) to identify causes behind construction disputes that affected project costs. It was carried out using qualitative and quantitative methods. The three most critical factors that affected the project's success. These factors were identified as: inadequate project staff and workers, payment delay by owner and insufficient documents, and inefficient project management. The issue of payment delay by owner and insufficient documents was identified as the most critical factor that affected the project's cost which supports the finding of the pervious study made by Elmabrok et al, (2016) that payment delay by owners ranked the top cause in three different countries (Libya, Serbia, Thailand).

Due to the varying capabilities and expertise of various individuals involved in a project, conflicts and disputes are bound to happen. Doing so can help prevent them from becoming a major factor that could delay the project's completion. Madhumitha et al. (2020) identified thirty-eight causes of conflict and disputes under eight categories (Table 2, Table 3). The analysis shows the top three factors in causes of disputes were work progress delay caused by contractor, accidents related disputes, and mismanagement of funds by contractor respectively. The most recent study was conducted using SPSS software (Nagamani et al., 2021). There were four stages in this study, data collection from

respondents, data analysis (mean & relative importance index), partial correlation analysis, further analysis (linear regression) respectively. The top three critical factors that could cause disputes identified in the study were poor labor management, failure of client to respond to issues in time, and poor planning.

Different authors had identified the source of disputes and used different analysis techniques to determine the most important factors that would lead to disputes. Those factors have been summarized and organized in Table 3. Historical preference has been taken into consideration in the design of the table.

The takeaway from this is that there are many factors that can lead to disputes, and it is noticeable that the number of factors is growing as the literature review move to more recent studies; this could be due to the fact that more studies have been focusing on the issue recently, the fact that projects are getting more complex, or a combination of both of these factors.

Table 3. Dispute Causes of Construction Industry in Other Countries

Source: (Cheung & Yiu, 2006; Mitkus & Mitkus, 2014)

Reference	Conflict & Dispute Sources	
(Nagamani et al., 2021)	1. Poor planning prior to work being contracted for execution. 2. Lack of regulatory clearances. 3. Inadequate specifications in contracts. 4. Inadequacy of design as obtained from consultant. 5. Improper contract formulation by the client. 6. Delayed procurement of materials. 7. Improper sequencing of work during master scheduling. 8. Resource planning been done as per work schedule projected. 9. non-availability of qualified and experienced engineers. 10. Poor quality checks in various stages of the project by the contractor and client. 11. Poor quality of raw materials.	12. There is any changes in working drawings during execution. 13. Ineffective site supervision by contractor. 14. Increase of material prices caused disputes between contractor and client. 15. Poor cash flow affects work leading to disputes between client and contractor. 16. Review whether poor application of health, safety factors by contractor. 17. Poor labor management and poor labor quality led to delays or affected work progress. 18. Late completion of work has been a contributory factor. 19. Failure of client to respond to issues in time.

Reference	Conflict & Dispute Sources	
		20. Lack in formal communication between client and contractors causing poor record keeping.
(Madhumitha et al., 2020)	1. Variations initiated by the owner. 2. Accelerating the work for quick completion. 3. Delay in payment for cumulative works. 4. Scope change made by the owner 5. Late giving of possession 6. Ambiguities in contract documents. 7. Improper risk allocation in contract. 8. Delay in approval of the contract. 9. Mistakes in contract document 10. Disputes caused due to design errors 11. Incomplete specifications in design. 12. Poor quality of design. 13. Technical inadequacy of the contractor. 14. Failure to plan and execute the change of work. 15. Delay in work progress by the contractor 16. Poor site management 17. Mistakes during construction stage 18. Lack of understanding and agreement in contract document. 19. Misunderstanding between the parties 20. Lack of team spirit.	21. Lack of communication among team members. 22. Failure to respond on time 23. Slow decision making 24. Changes to payment date. 25. Under estimation of the project. 26. Mismanagement of funds by contractor. 27. Additional costs incurred because of rapidly increased prices. 28. Disputes due to uncertain accidents. 29. Delay due to rework. 30. Unforeseen ground condition of the project. 31. Poor record maintenance. 32. Unrealistic expectation by the contractor. 33. Extended work weeks. 34. Poor quality of materials. 35. Shortage of materials in market. 36. Shortage of labor supply 37. Equipment unavailability and failure 38. Price fluctuation of construction material.
(Trangkanont, 2018)	1. Owners' payment delay. 2. Owners' change order with no compensation. 3. Owners' default on payment. 4. Project time delay and cost overrun due to defective drawing. 5. Inappropriate construction methods affecting nearby buildings. 6. Contractors' lack of project staff and workers. 7. Time extension due to weather. 8. Disparity of quality acceptance. 9. Ineffective communication resulting in misunderstanding.	10. Contractors' lack of quality supervision. 11. Construction materials against specification. 12. Project time delay due to delay in work progress. 13. Disparity of contractual interpretation. 14. Substandard quality performance resulting in reworking. 15. Delay in construction materials and equipment delivery. 16. Contractors' lack of progress report. 17. Project time delay due to MEP works.
(Elmabrok et al., 2016)	1. Design errors. 2. Unclear specifications. 3. Delays in payments. 4. Lack of communication. 5. Excessive contract variations.	6. Differences in evaluation. 7. Differing site conditions. 8. Project documentation. 9. Cultural differences.
(Cheng et al., 2009)	1. Unclear tender documentation 2. Unclear blueprints 3. Tender qualification 4. Tender decision process	21. Unclear contract content 22. Unsuitable illustration 23. Down tick tender 24. Collusive tender

Reference	Conflict & Dispute Sources	
	5. Land not available on schedule 6. Inspection delayed 7. Co-operation delayed 8. Pipeline re-located 9. Contract terminated unilaterally 10. Site ambit changed 11. Content changed 12. Advance use 13. Payment disputes 14. Payment delayed 15. Doubts about related laws 16. Contract time disputes 17. Construction acceleration 18. Quality identification 19. Inspection disputes 20. Unreasonable limitations	25. Delayed contract time 26. Tender decision process 27. Related laws 28. Default on contract 28. Payment disputes 29. Contract time delayed 30. Compensation responsibility 31. Unclear tender documentation 32. Tender decision process 33. Quality identification 34. Related laws 35. Severe weather 36. Unanticipated site condition 37. Unanticipated human factors 38. Rising cost index 39. Policy changed
(Yiu & Cheung, 2007)	1. Adversarial attitudes. 2. Mistrust level. 3. Inconsistent demands	4. Degree of uncertainty. 5. Work Overloads
(Cheung & Yiu, 2006)	1. Task interdependency. 2. Differentiations. 3. Communication obstacles.	4. Tensions 5. Personality traits.
(Waldrom, 2006)	1. Availability of subcontractors, labor, or materials. 2. Poor management and inefficiency by constructors and principals.	3. Unexpected risks materialized. 4. Variations to, and interpretation of, the scope of works.
(Acharya et al., 2006)	1. Confusing requirements of owner. 2. Excessive change orders. 3. Supremacy of owner/consultant. 4. Project scope definition not clear. 5. Site access delays. 6. Lack of space in construction site. 7. Financial failure of owner. 8. Unbalanced risks. 9. Owner furnished material. 10. Delay in decision by owner. 11. Late handover of construction site. 12. Owner-furnished equipment. 13. Delay in running bill payment. 14. Defective design. 15. Errors and omissions in design. 16. Excessive extra work. 17. Differing site condition. 18. Excessive quantity variations. 19. Specification related. 20. Financial failure of contractor. 21. Slow work of contractor. 22. Incompetent contractor. 23. Major defects in maintenance. 24. Local people interruptions/protests. 25. Subcontractor inefficiency 26. Non-payment to subcontractor. 27. Mentality of contractor. 28. Defective construction (quality).	30. Labor disputes/union strikes. 31. Adverse weather/acts of God. 32. Market Inflation. 33. Public disorder. 34. Third party delays. 35. Change order negotiation. 36. Issue of security of construction site. 37. Lack of communication. 38. Accident/safety. 39. Labor, equipment, material shortage. 40. Interpretation of escalation/de-escalation. 41. Necessity of environmental improvement. 42. Negligence or negative attitudes of project participants. 43. Environmental hazards. 44. Excessive correspondence. 45. Inadequate administration of project participants. 45. Material testing technique. 46. Difference in construction technique. 47. Acceleration or suspension of work.

Reference	Conflict & Dispute Sources	
	29. Change in government codes.	
(Sheridan, 2003)	1. Valuation of variations. 2. Valuation of final account.	3. Failure to comply with payment provision.
(Kilian, 2003)	1. Defective specifications. 2. Communication (post award). 3. Communication (pre-award). 4. Project scheduling. 5. Pre-award design review. 6. Unforeseen site conditions. 7. Quality assurance. 8. Change order issuance. 9. Pre-award bid review. 10. Communication (internally). 11. Faulty negotiation procedure. 12. Pre-construction conference procedures. 13. Project management procedures. 14. Progress monitoring. 15. Knowledge of local statutes. 16. Submittal response period.	17. Familiarity with contract documents. 18. Bid development error. 19. Scheduling. 20. quality control. 21. Non-compliance with contract. 22. Knowledge of NAVFAC contracting. 23. Financial practices. 24. Submittal preparation. 25. Davis-bacon wages. 26. Faulty negotiation procedures. 27. Knowledge of environmental regulations. 28. Record keeping. 29. Negotiation procedures. 30. Project management procedures.
(Brooker, 2002)	1. payment. 2. Delay.	3. Defect/Quality. 4. Professional negligence.
(Mitropoulos & Howell, 2001)	1. Project uncertainty. 2. Contractual problems. 3. Opportunistic behavior.	4. Contractor Financial Position. 5. Cost of conflict
(Yates, 1998)	1. Variations. 2. Ambiguities in contract document. 3. Inclement Weather. 4. Late issue of design information/ drawings.	5. Delay possession of site. 6. Delay by other contractors employed by the client. 7. Postponement of part of the project.
(Kumaraswamy, 1997)	1. Inaccurate design information. 2. Inadequate design information. 3. Inadequate site investigations. 4. Slow client response (decisions). 5. Poor communications.	6. Unrealistic time targets. 7. Inadequate contract administration. 8. Uncontrollable external events. 9. Incomplete tender information. 10. Unclear risk allocation.
(Colin et al., 1996)	1. Payment. 2. Performance. 3. Delay	4. Negligence. 5. Quality and administration as headings of construction dispute.
(Bristow & Vasilopoulos, 1995)	1. Unrealistic expectations 2. Contract documents 3. Communications	4. Lack of team spirit 5. Changes
(Semple et al., 1994)	1. Acceleration. 2. Restricted access.	3. Whether/cold. 4. Increase in scope.
(Heath et al., 1994)	1. Contract terms. 2. Payments. 3. Variations. 4. Extension of time.	5. Nomination. 6. Re-nomination. 7. Availability of information.
(Watts & Scrivener, 1993)	1. Determination of the agreement. 2. Payment related. 3. The site and execution of work.	4. Time related. 5. Negligence and nuisance 6. Final certificate/payment.
(Spittler & Jentzen, 1992)	1. Ambiguities contract document. 2. Competitive/adversarial attitude.	3. Dissimilar perceptions of fairness by the participants.
(Hewitt, 1991)	1. Change of scope	4. Delay

Reference	Conflict & Dispute Sources	
	2. Change of condition 3. Acceleration	5. Disruption 6. Termination

2.5.3 Disputes in Middle Eastern Construction Industry

The complexity of the construction industry and the varying capabilities of the various participants can create conflicts. Each participant has their own goals and expectations when it comes to resolving disputes (Cakmak & Cakmak, 2014). A recent study made by Tanriverdi et al. (2021) in Turkey, which uses a causal map analysis method to determine the fundamental causes of disagreements. It accomplishes this by investigating the patterns of emergence of disputes in practice. The map is then validated using the FIDIC Yellow Book in an expert workshop led by a project consultant. The findings of the study reveal that various factors, such as contractual terms and pre-construction studies, can contribute to the emergence of disputes. This finding reinforced the idea that disputes are caused and affected by so many factors, rather than being limited to one cause. Two year earlier, a study was carried out on Kuwait international airport project for conflict management (Alazemi & Mohiuddin, 2019). A total of one hundred and eighty-eight questionnaire surveys were distributed to participants. The study revealed that the most common cause of disputes was inadequate communication and contradicting instructions. Among other factors that contributed to the development of conflicts, the main effects were poor construction efficiency, reduced productivity, and delays.

In Iraq, a study made on various factors that affect the construction industry's disputes and claims. The study mentions two main types of claims in the construction industry: during execution phase and after project completion. The main causes of disputes are the contract documents and the contractor's lack of effective contract management (Al-Zwainy et al.,

2018). To reinforce the finding of the pervious study, Elziny et al. (2016) provided a comprehensive analysis of the various issues that arise in the construction industry in Egypt. It also reviewed the various dispute settlement procedures that are utilized by the companies involved in the projects. The study was able to identify the most prevalent sources of disagreements in the construction sector through a survey. Similarly, it found that the main issue was contract management, followed by scope of work and contract issues, financial and project related issues respectively. The full review on causes of disputes in middle east region is summarized in 4 table.

Table 4. Dispute Causes of Construction Industry in Middle East

Reference	Country	Conflict & Dispute Sources	
(El-Sayegh et al., 2020)	United Arab Emirates	1. Variations initiated by the owner (additive/deductive). 2. Obtaining permit/approval from the municipality/different government authority. 3. Material change and approval during the construction phase. 4. Slowness of the owner's decision-making process. 5. Time limitation in the design phase. 6. Lack of communication and coordination between parties during construction. 7. Poor financing by the owner. 8. Inadequate early planning of the project. 9. Poor preparation and approval of drawings. 10. Underestimation and incompetence of contractors. 11. Low financing by the contractor during construction. 12. Unsuitable leadership style of construction/project manager. 13. Failure to make interim awards on extensions of time and compensating by the owner.	14. Shortage and unproductive manpower. 15. Modifying legislation and regulations. 16. Poor supervision and site management. 17. Inadequate or incomplete technical plans/specification. 18. Poorly written contracts. 19. Contradictory and inaccurate information in the contract documents. 20. Poor design. 21. Contract amendments. 22. Differing site conditions. 23. Inadequate site investigation. 24. Poorly defined scope of work. 25. Inappropriate weather conditions 26. Impact on locality in terms of noise, traffic, and pollution/contamination. 27. Impact of local cultures and social values in the settlement of conflicts.
(Elhag et al., 2020)	United Arab Emirates	1. Variations because of client initiated changes during construction stages.	6. Poor performance from the contractor.

Reference	Country	Conflict & Dispute Sources	
		2. Selection of contractors by low bid procurement rather than quality and value-based procurement. 3. Unfair risk allocation where the majority risk is transferred to the contractor. 4. Fast track nature of the projects with unrealistic project planning and project timeframe. 5. Poor co-operation and communication between the parties because of the fragmentation of construction process.	7. Constructability issues due to separate design and construction phases. 8. Lack of mutual trust and openness between the parties. 9. Authority rules and regulations. 10. Shortage in availability of manpower. 11. Shortage in availability of material. 12. Force majeure events. 13. Nonflexible attitude and disagreement over scope variations.
(Alazemi & Mohiuddin, 2019)	Kuwait	1. Delays in time for project completion. 2. Type of procurement method adopted. 3. Conflicting commitment of project managers. 4. Absence of qualified personnel in key positions. 5. Differences in views among stakeholders.	6. Deficiencies in design. 7. Unrealistic expectations from clients. 8. Dissatisfaction of work progress of main contractor by Architect/Engineer. 9. Limited Resources. 10. Lack of team spirit among project team members.
(Cakmak & Cakmak, 2014)	Turkey	1. Variations initiated by the owner. 2. Change of scope. 3. Late giving of possession. 4. Acceleration. 5. Unrealistic expectations. 6. Payment delays. 7. Delays in work progress. 8. Time extensions. 9. Financial failure of the contractor. 10. Technical inadequacy of the contractor. 11. Tendering. 12. Quality of work. 13. Design errors. 14. Inadequate / incomplete specifications. 15. Quality of design.	16. Availability of information. 17. Ambiguities in contract documents. 18. Different interpretations of the contract provisions. 19. Risk allocation. 20. Other contractual problems. 21. Adversarial / controversial culture. 22. Lack of communication. 23. Lack of team spirit. 24. Site conditions. 25. Unforeseen changes. 26. Weather. 27. Legal and economic factors. 28. Fragmented structure of the sector.
(Mohamed et al., 2014)	Egypt	1. Cooperation and communication nature among project team. 2. Conflicting goals & objectives of project parties. 3. No trust between the parties. 4. Qualification of teamwork. 5. Negotiations lacked experience. 6. Lack of teamwork spirit. 7. No trust in the mediator.	19. Change Orders. 20. Inappropriate contractor selection. 21. Inadequate risk identification/allocation. 22. Site limitation, considering storage, access. Etc. 23. Problems with authorities or neighbors affecting progress.

Reference	Country	Conflict & Dispute Sources	
		8. Other issues in human behavior. 9. Delay interim payment from client. 10. Extension of time. 11. Inadequate scope definition. 12. Incomplete drawings and specification. 13. Poorly written contracts clauses. 14. Inaccurate estimating. 15. Error of pricing or costing. 16. Quality of technical specifications. 17. Planning errors accelerations. 18. Contradictory and erroneous information in the mass of documents.	24. Changes in environmental regulations. 25. Force majeure. 26. Consultant's quality control procedures. 27. Late supply of equipment and materials. 28. Poor labor productivity. 29. Variation in quantities. 30. Bad quality of contractor's works. 31. Inadequate site or soil investigation report.
(Enshassi et al., 2012)	Palestine	1. Delay in releasing payments to the main contractor. 2. Awarding the tender to the contractor with the lowest price. 3. Giving instructions to the subcontractor directly without consulting the main contractor. 4. Using several variation orders. 5. Objection of the owner on the implementation. 6. method used by the subcontractor. 7. Delay in providing the information such as additional drawings, benchmarks, setbacks, etc. 8. Short period allowed for implementing the project. 9. Assigning part of the works to new subcontractor, without informing the original subcontractor. 10. Main contractor's financial problems. 11. Delay in contract progress payments. 12. Delay by the main contractor in providing the necessary materials to the subcontractor. 13. Low experience and low capability of the main contractor. 14. Failure of the main contractor to use the insurance in case of injury of subcontractor's labor. 15. Failure to provide necessary clarifications of the drawings to the subcontractor.	17. Delay in shop drawings and sample material approval. 18. Delay of the main contractor in submitting the formal documents to the supervision staff. 19. non-adherence to the conditions of the contract. 20. Delay of the works behind the time schedule. 21. non-adherence of the subcontractor to the time schedule. 22. Lack of construction quality work. 23. Neglecting the instructions of the main contractor. 24. Shortage of skilled labor with the subcontractor. 25. Failure to preserve and take care of the materials. 26. Exhausting the plant and resources of the main contractor. 27. Absence of the subcontractor from the site. 28. Partnering the works to another subcontractor 29. without getting the approval of the main contractor. 30. Shortage of equipment or machinery at the subcontractor. 31. Changes in material and labor costs.

Reference	Country	Conflict & Dispute Sources	
		16. Interaction of the work of subcontractors, which lead to delay of the work.	32. Involvement of the subcontractor in several projects.

2.5.4 Disputes in Saudi Arabian Construction Industry

Many construction projects in Saudi Arabia encounter lengthy and frequent delays due to the complexity of the projects and the time required to finish them. The most recent study was made by (Shash & Habash, 2021) to discover the factors that contribute to the frequency of disputes in Saudi Arabia's Central Province. According to the findings of the study, the province's construction industry is rife with disputes. The main sources of these disputes were both the contractors and the owners of the industry. Poor quality of the project documents was a major cause identified by the study. Excessive variation orders submitted by the owners, interference during construction, and response delay to information requests were sources of disputes from the owner's side. Furthermore, Alsuliman (2019) identified fifty causes of delays in public construction projects in Saudi Arabia. The factors that contributed to these delays were categorized into four phases: before, during and after the award of tenders, and general. A study conducted on over two hundred construction industry participants revealed that various factors contribute to the delay of projects. The top factors are focused on the selection of the lowest bidder and on awarding projects that are beyond the financial capabilities of the contractors. All those factors will result in conflicts, disputes, and litigations due to failure in completing projects either within time or budget.

Another major factor that would result in conflicts and disputes in construction industry is inconsistencies during design or construction. Arain et al. highlighted the origins of the

numerous challenges that generate disparities in the design and construction phases of significant projects in Saudi Arabia. It was conducted by surveying twenty-seven contractors. The findings of this study revealed that the communication gaps between the parties involved, and the lack of working drawings are some of the most critical factors that affect the design and construction interface. Other factors such as the weather conditions, the number of participants, and contractor involvement during the design phase were considered the least significant causes of conflict between project professionals. However, Assaf & Al-Hejji (2005) conducted a survey and included the perspective of owner, consultant, and contractor to assess delay related factors in Saudi Arabian projects. Seventy-three factors were identified through the literature and the survey was conducted from fifty-seven project participants ranging from owners, contractors, and consultants. Results found seventy percent of projects in Saudi Arabia experienced time overrun and most cause of delay that owners, consultants, and contractors agreed on is change orders. However, each party involved had a different first ranked cause of delay from each party's preceptive, owners: shortage of labours; contractors: payment delay by owner; consultants: bidding and award methods. Which clearly indicates that each party has a different perspective of cause of project overrun.

Human interactions and interfaces between parties during the various stages of a building project can result in disagreements and disputes. One of oldest study in this field, a survey conducted in Saudi Arabia by A. Al-Hammad & Assaf (1992) to measure the level of importance of various factors that affect the design and construction interface. The top three ranked factors that affect design-construction interface are work drawings details, unfamiliarity with local condition and buildability. As seen through the literature, the

references on dispute causes are new in Saudi Arabia. The below table summarizes the causes of disputes in the study that had been done in Saudi Arabia.

Table 5. Dispute Causes of Construction Industry in Saudi Arabia

Source: (Almutairi et al., 2015)

Reference	Conflict & Dispute Sources	
(Shash & Habash, 2021)	1. Weakness in contract language and instruments. 2. Inaccurate specification of items. 3. Contradictions between the project documents 4. Lack of setting a reference for the disputes between the owner and the contractor. 5. Un-realistic schedule of the project. 6. Inaccurate BOQ in Unit-Price contracts. 7. Low quality in administration processes. 8. Change in the item description and quantities in the BOQ by owner.	9. Changing the project specifications after materials approval by owner. 10. Sizable variation orders that exceed the maximum allowed percentage in the standard contract 11. Delays in handing over the project site. 12. Owner Interference in the contract execution. 13. Delay of response to the requested decisions by the owner. 14. The long period of project hold.
(Mahamid, 2014)	1. Delay in progress payment by owner. 2. Unrealistic contract duration. 3. Change orders. 4. Poor quality of completed works. 5. Labor inefficiencies. 6. Unforeseen problems. 7. Main contractor financial problems. 8. Inflation. 9. Inaccurate bill of quantities. 10. Fluctuation in material cost and labor during construction. 11. Difference in the interpretation of plans and specifications. 12. Poor site management by contractor. 13. Differing site conditions. 14. Slow in making decision from owner. 15. Evaluation of the quality and quantity of completed works.	16. Approval delay by owner/consultant. 17. Inability of main contractor to sublet the contract during bidding. 18. Accuracy of project cost estimate. 19. Insufficient specifications of materials. 20. Violating condition of the contract. 21. Exchange rate. 22. Mistakes in design. 23. Poorly written contract. 24. Insufficient working drawing details. 25. Qualifications of subcontractors. 26. Shop drawing approval. 27. Adverse weather conditions. 28. Lack of skill labor. 29. Inspection delay by consultant.
(Alghamdi, 2008)	1. Change orders. 2. The owner apply penalty on contractor without conducting investigation of the delay reason.	3. Lack of clarity in the contract's conditions. 4. Site conditions.
(Abbas, 2005)	1. Lack of clarity in the drafting of contracts. 2. Changing key people responsibility.	3. Increase the number of vendors.

2.5.5 Dispute Cause Frequency Comparison

Table 6 summarizes dispute causes collected from different sources in literature review based the geographical reign. The frequency of dispute caused through this comparison technique will be utilized to run the pilot study in this paper. This technique is used as the base approach to collect different dispute causes discussed in multiple studies and later will be short listed and modified to best fit the targeted industry. Adjustments will be made later on by experts in the maintenance industry to the following dispute causes during a pilot study process. The table indicates that the highest frequency of dispute cause is variation order, inadequate/incomplete technical plans/specification, and shortage of skilled manpower/labor respectively. Those causes will be further evaluated along with the other causes later in the study.

Table 6: Dispute Causes Frequency Comparison

Dispute Category & Dispute Cause \ Source			(Shash & Habash, 2021)	(Mahamid, 2014)	(Alghamdi, 2008)	(Abbas, 2005)	(El-Sayegh et al., 2020)	(Elhag et al., 2020)	(Alazemi & Mohiuddin, 2019)	(Cakmak & Cakmak, 2014)	(Mohamed et al., 2014)	(Enshassi et al., 2012)	(Nagamani et al., 2021)	(Madhumitha et al., 2020)	(Trangkanont, 2018)	(Cheng et al., 2009)	(Acharya et al., 2006)	(Kilian, 2003)	(Yates, 1998)	(Kumaraswamy, 1997)	(Heath et al., 1994)	(Hewitt, 1991)
Region			Saudi Arabia				Middle Eastern						International									
A. Owner Related	A1	Variation Orders	•	•	•		•	•		•	•	•		•	•	•	•	•	•		•	
	A2	Selection of contractor based on low bid rather than qualification						•	•		•	•				•		•				
	A3	Delay in material/drawing approval					•					•		•								
	A4	Delay in payments		•							•	•		•	•		•				•	•
	A5	Delay in response/decision making	•	•			•					•	•	•		•	•			•		
	A6	Owner interference in the execution										•										
	A7	Poor planning prior to work being contracted					•	•					•			•			•			
	A8	Work accelerated for quick completion								•				•		•	•					•
	A9	Late site handover	•							•				•					•			
	A9	Apply penalty without conducting proper investigation			•																	
	A10	Change of key personal responsibility				•										•	•					
B. Contractor Related	B1	Lack of site supervision							•			•	•		•			•				
	B2	Poor financial management		•			•			•		•	•	•			•	•				
	B3	shortage of skilled manpower/labour		•			•	•	•		•	•	•	•	•	•	•					

Dispute Category & Dispute Cause \ Source			(Shash & Habash, 2021)	(Mahamid, 2014)	(Alghamdi, 2008)	(Abbas, 2005)	(El-Sayegh et al., 2020)	(Elhag et al., 2020)	(Alazemi & Mohiuddin, 2019)	(Cakmak & Cakmak, 2014)	(Mohamed et al., 2014)	(Enshassi et al., 2012)	(Nagamani et al., 2021)	(Madhumitha et al., 2020)	(Trangkanont, 2018)	(Cheng et al., 2009)	(Acharya et al., 2006)	(Kilian, 2003)	(Yates, 1998)	(Kumaraswamy, 1997)	(Heath et al., 1994)	(Hewitt, 1991)
Region			Saudi Arabia				Middle Eastern					International										
	B4	Poor quality of completed work		•				•	•	•	•	•			•	•	•					
	B5	Poor site management		•			•	•				•				•	•	•				
	B6	Delay of material procurement									•	•	•									
	B7	Improper sequencing of work						•					•				•					
	B8	Mistakes during Construction stage					•						•									
	B9	Poor quality of material											•	•								
	B10	Unsuitable project leadership					•		•						•							
	B11	Incompetent contractor		•			•							•	•	•	•					
C. Contract/Documents Related	C1	Inadequate/incomplete technical plans/specification	•	•			•			•	•		•	•	•	•	•	•	•			
	C2	Poorly written contracts	•	•			•				•			•		•	•				•	
	C3	Contradiction between project documents	•								•											
	C4	Unrealistic project schedule		•					•	•						•		•		•		
	C5	Inaccurate BOQ	•	•							•											
	C6	Poorly defined scope of work								•	•					•	•	•				•
	C7	Ambiguities in contract document			•	•	•			•				•				•	•			
D. Human	D1	Lack of communication and coordination						•		•	•	•	•		•		•	•		•		

Dispute Category & Dispute Cause \ Source			(Shash & Habash, 2021)	(Mahamid, 2014)	(Alghamdi, 2008)	(Abbas, 2005)	(El-Sayegh et al., 2020)	(Elhag et al., 2020)	(Alazemi & Mohiuddin, 2019)	(Cakmak & Cakmak, 2014)	(Mohamed et al., 2014)	(Enshassi et al., 2012)	(Nagamani et al., 2021)	(Madhumitha et al., 2020)	(Trangkanont, 2018)	(Cheng et al., 2009)	(Acharya et al., 2006)	(Kilian, 2003)	(Yates, 1998)	(Kumaraswamy, 1997)	(Heath et al., 1994)	(Hewitt, 1991)
			Region				Saudi Arabia				Middle Eastern				International							
	D2	Misunderstanding between owner and contractor									•				•							
	D3	Lack of team spirit						•	•	•	•			•								
E. Project Related	E1	Delay of permit/approval from other government authority					•						•				•					
	E2	Differing site conditions			•		•			•	•					•	•					•
	E3	Shortage of materials in market						•				•		•			•					
	E4	Materials delay due to custom clearance									•		•		•							
	E5	Fluctuation of materials cost during project execution		•								•	•	•		•						
F. External Factors	F1	Weather conditions								•					•	•	•		•			
	F2	Inflation		•			•										•					
	F3	Unforeseen problems		•						•				•						•		
	F4	Force majeure		•				•									•					

2.6 Conflict, Claim and Dispute Management

The increasing number of disputes nowadays in projects has prompted many companies to implement a proper dispute management process (Nagamani et al., 2021). A contractual dispute resolution mechanism should be in place before, during, or shortly after a contract is entered into. This ensures that there is a proper framework for addressing any issues that can be expected during a project. The mechanism should be easily established (Figure 3) shows the pathway of dispute resolution) and allow the parties to continue performing their duties without any delay (Astor & Chinkin, 1992; Fenn et al., 1998).

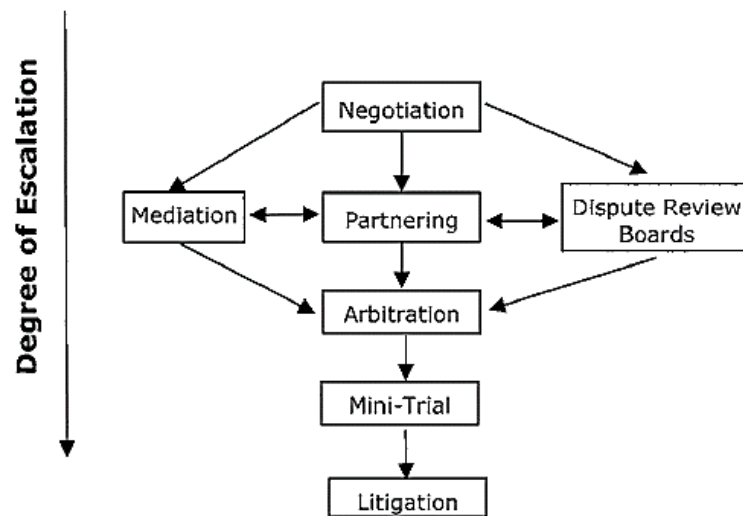


Figure 3. Dispute Resolution Pathway in Construction

Source: (Kassab et al., 2006).

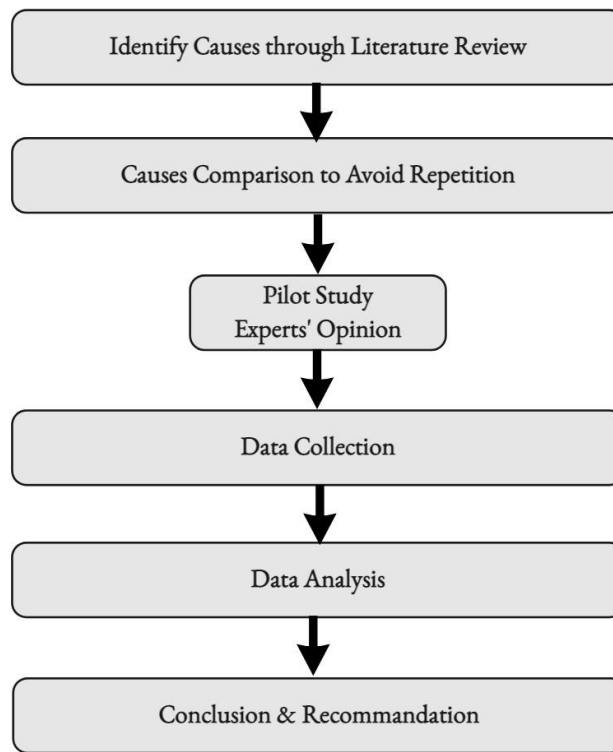
A dispute review system that is fair and unbiased is what parties want. This type of review system was first introduced in the US in the 1960s. These systems are referred to as dispute adjudication boards. The World Bank and other international organizations also have their own sample forms (Chern, 2020). There are two types of dispute boards: the dispute resolution board and the dispute adjudication board. Although there are many ways to

implement dispute boards, courts typically lack the proper expertise to handle them (Klee, 2015). According to some statistical data, if a dispute board is operational on a project, it will be able to successfully resolve ninety nine percent of disputes within ninety days (Chern, 2020).

CHAPTER 3

RESEARCH METHODOLOGY

This chapter presents the various steps that were taken to achieve and accomplish the study's objectives. The required data, data collection and data analysis are described in the following sections. The below flow chart represents the steps that were taken to achieve the study's objective.



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Figure 4: Methodology Flow Chart

3.1 Required Data

The data required to achieve the objectives of this study are related to the causes of disputes in government maintenance projects, the dispute resolution methods, the cost and duration of dispute resolution, and the impact of disputes on owners, contractors, and the projects.

3.1.1 Causes of disputes: a dispute is any contractual issue that must be resolved beyond the capability of the project management at site (J. Diekmann & Girard, 1995). Subsequently, dispute cause is the underlying reason of the dispute which if eliminated, it would prevent the reoccurrence of that dispute. Furthermore, dispute causes are identified through a comprehensive literature review based on geographical regions (International, Middle Eastern, Saudi Arabian). The various causes of disputes are then shortlisted to most frequent causes by a cause comparison approach (table 6). The causes of disputes are grouped into six categories which are used to determine each dispute cause related category. The following table contains the causes that are derived from the literature and are used to conduct this study.

A. Owner related: this category includes potential causes that an owner may commit during the execution of the maintenance contract, i.e., scope changes, payment delays, interference in contractor's work, etc.

B. Contractor related: this category includes potential causes that a contractor may commit during the execution of the maintenance contract, i.e., site supervision, delay in material procurement, etc.

C. Project document: this category includes potential causes that a contractor may commit during the execution of the maintenance contract, i.e., clarity of the contract language, availability of as-built drawings, etc.

D. Owner and Contractor: this category includes potential causes that an owner and a contractor may commit during the execution of the maintenance contract, i.e., communication, business relationship, etc.

E. External factors: this category includes potential causes that occur during the execution of the maintenance contract beyond the control of the owner and the contractor, i.e., shortage of skilled labor, inflation, etc.

Table 7 presents the potential disputes causes in building maintenance contracts.

Table 7: Summarized causes of disputes

No.	Category	Dispute Cause
1	Owner Related	Excessive variation orders
2		Delay in material/drawing approval
3		Delay in payments
4		Delay in response/decision making
5		Constant interferences in contract execution
6		Late site handover to the contractor
7		Apply penalty without conducting a proper investigation
8		Contradiction directions enforced on the contractor by different personnel from the owner side
9	Contractor Related	Lack of site supervision
10		Subcontracting/outsourcing all project activities
11		unskilled contractor's manpower/labor
12		Poor quality of completed work
13		Poor site management
14		Delay of material procurement
15		Improper sequencing of work
16		Mistakes in devolving the bidding/estimation
17		Unawareness of government rules and regulations
18		Poor quality of material
19		Unsuitable project leadership
20		incompetent subcontractors
21	Project Document Related	Inadequate/incomplete technical plans/specification
22		Lack of original as-built drawings for government buildings
23		Weakness in contract language
24		A contradiction between project documents
25		Unrealistic project schedule
26		Inaccurate BOQ in the lump-sum contract
27		Ambiguity in project boundaries and responsibility
28		Poorly defined scope of work
29		Lack of setting a dispute resolution reference between contract parties
30		Mixing lump-sum and unit-price impractically in the same contract
31		Ambiguity in the contract document

No.	Category	Dispute Cause
32	Owner & Contractor Related	Lack of communication and coordination
33		Misunderstanding between owner and contractor
34		Lack of team spirit
35	External Factor	Delay of permit/approval from other government authority
36		Differing site conditions
37		Shortage of skilled workers for maintenance services
38		Unavailability of required spare parts
39		Materials delay due to customs clearance
40		Fluctuation of materials costs during project execution
41		Weather conditions
42		Inflation
43		Unforeseen problems
44		Force majeure

3.1.2 Dispute resolution methods: The different types of methods that are used to resolve disputes between an owner and a maintenance contractor.

3.1.3 Dispute resolution cost: The monetary, in Saudi Riyals, that an owner expends from the time of filling the complaint until the issuance of the dispute verdict.

3.1.4 Dispute resolution duration: The duration, in Calendar Months, between the time of filing of a complaint and the time of issuance of the dispute verdict.

3.1.5 Effect of disputes on contracting parties: the consequences of dispute occurrences which impact the contracting parties in building maintenance projects are identified through a comprehensive literature and then shortlisted to the most frequent dispute consequences. Table 8 contains the dispute consequences that are derived from the literature.

Table 8: Summarized Dispute Consequences

Source: (Adopted from Mashwama et al., 2019; Mbatha, 2021)

No	Dispute Consequences
1	Increment in project cost
2	Reduction in productivity
3	Loss of business viability
4	Tension and dampness of team spirit

No	Dispute Consequences
5	Profitability loss
6	Breakdown in communication and professional relationship
7	Diminution of respect between parties
8	Damages to business relationships
9	Delay in the progress of work
10	Loss of company reputation
11	Delay in project delivery date
12	Abandonment of the project
13	Underutilization of resources

3.2 Data Collection

The necessary data was collected from the top management of building maintenance contractors through a developed structured questionnaire. The questionnaire consisted of three parts. The first part consists of questions seeking information related to the respondent i.e.,

- Employee position/job title.
- Years of experience.
- Highest degree level of education.
- Company size/grade.
- Company experience in building maintenance.
- Project size and type.

The second part consists of questions seeking information related to the maintenance contractor i.e.,

- Location of the company.
- Number of years the company has been in business.
- Number of maintenance projects executed annually.

- Company classification based on the Ministry of Municipal and Rural Affairs and housings.

The third part consists of questions seeking information related to causes of disputes, resolution methods, resolution costs and duration, and disputes consequences on stakeholders.

The causes of disputes are presented with a 5-point Likert Scale with 1 representing rarely/little and 5 representing always/immense (Rajgor et al., 2016; Susmitha et al., 2018) to measure frequency and severity. Table 8 presents the 5-point rating scale system that was used to measure the frequency and the severity of the dispute causes is as follows:

Table 9: Frequency & Severity Indices Table Form

Index type \ Frequency (n)	(a=1)	(a=2)	(a=3)	(a=4)	(a=5)
Frequency Index (FI)	Never	Rarely	Sometimes	Often	Always
Severity Index (SI)	No effect	Little	Moderate	Significant	Immense

The third part of the questionnaire also includes an evaluation of the dispute consequences as well as direct questions related to resolution time and cost. Lastly, participants are asked, based on their experience to list three applicable methods used to avoid/reduce dispute occurrences in the building maintenance industry.

The pilot study is an important step in the research process for determining the viability of a larger investigation. (Connelly, 2008). It also enables professionals to assess the validity and efficacy of the collected causes (Abo-Abdo, 2015). The questionnaire survey was handed to three different professional project managers/engineers with ten plus years of experience in government building maintenance projects. The following comments were pointed:

- Give a simple explanation of the terminology arbitration and mediation in the questionnaire survey.
- It was recommended to include the following dispute causes to the list: contradiction directions enforced on the contractor by different personnel from the owner side, subcontracting/outsourcing all project activities by the prime contractor, lack of setting a dispute resolution reference between contract parties and mixing lump-sum and unit-price impractically in the same contract.
- For the resolution methods in part 3: instead of making a choice of the exact percentage of the resolution methods used, it can be a range which would make it easier for the participants to decide.
- A recommendation is made to give the participants the choice of taking the survey either in a PDF form or a link to an electronic version.
- I was also directed to the Saudi Center for Commercial Arbitration, Implementing Regulations of the Law of Arbitration and Scientific Judicial Portal which are useful recourses in either obtaining some case study to be included in my thesis or have a sense of ongoing disputes, their causes and methods used for resolutions.

Besides, the data for three case studies on disputes on government building maintenance contracts were collected from the Scientific Judicial Portal. Case studies are frequently conducted to produce a thorough grasp of a complicated problem. They are commonly used in various academic and scientific fields. Causes of disputes, resolution systems, duration, effects on project and contractor are complex and related to one another. Case studies are in-depth analyses of modern phenomena in their actual environments (Yin, 2009). Case studies provide the actual data that can be reviewed and investigated. A comparison of the

conceptual data from the first part will be made with the actual data at the end of the study.

The selection choice of the case studies will account for each of the following resolution systems to cover different aspects of the causes, effects, resolution system, etc.

- Mediation: third party involvement to propose an acceptable agreement, but do not have the authority to impose it.

- Arbitration: third party involvement to decide after hearing proofs and reviewing documents presented by the parties. Although the agreement to arbitrate is voluntary, the final decision is binding as courts enforce it.

- Court: government entity which has the authority to adjudicate disputes between parties regarding commercial lawsuits.

Case studies gain deeper insight into the disputes causes, practicable resolution systems, and the cost and time of a dispute resolution. The selection of the case studies was considered carefully to ensure feasibility to carry out a formal investigation that involves the effects on both individuals and projects.

3.3 Population & Sample Size Determination

The population consists of contractors that are classified by Ministry of Municipality and Rural Affairs and Housing (MOMRA) as 1, 2 or 3 in the building maintenance industry and specialized particularity in building maintenance services and construction activities for government buildings. According to (MOMRA 2022), the total number of contractors that are specialized in building maintenance services and construction activities for government buildings in Eastern Province is fifty-three (53) contractors. Because the population size is small, invitation letters were sent to all fifty-three contractors to participate in the study with the hope that the responses will exceed the calculated

minimum sample size. The Kish approach is used to determine the yield representative sample for proportions, and final estimated sample size:

$$n_0 = \frac{pq}{e^2} \quad \text{Equation (1)}$$

$$n = \frac{n_0}{1 + \left(\frac{n_0}{N}\right)} \quad \text{Equation (2)}$$

n_0 = estimated sample size

n = sample size.

N = targeted population size

p = estimated proportion; assumes = 0.5 (maximum variability).

$q = (1 - p)$ = maximum percentage of standard error allowed.

$e = \pm 10\%$ (desired precision level)

For both p and q , a value of 0.5 will be used in order to get the largest sample size possible.

Also, the 10% maximum standard error will be used for this study. Equation 1 & equation

2 are then used to determine the final sample size as follows (Israel, 2009):

$$n_0 = \frac{(0.5 \times 0.5)}{0.1^2} = 25$$

$$n = \frac{25}{1 + \frac{(25-1)}{53}} = 17.2 \approx 18 \text{ responses}$$

Min. response rate = $(18/53) \times 100 = 33.96 \%$

3.4 Data Analysis

The study targeted top management key personnel of maintenance contractors with adequate experience in building maintenance of government facilities. Using statistical analysis techniques to obtain the most accurate and meaningful results from the survey.

Those techniques were utilized to evaluate the causes of disputes in building maintenance that are collected through the submitted surveys as well as effects of disputes on both

contractors and maintenance projects. The data collected during the surveys are linked to a 5-point scale system, therefore it is important that the collected data is properly evaluated in correspondence to the scale system used. The following analysis techniques are utilized to achieve the aim of the study:

A. Severity Index (SI%): Rank of dispute causes based on their impact (Rajgor et al., 2016; Susmitha et al., 2018).

$$\mathbf{SI\%} = \frac{\Sigma W}{A \times N} \times 100 \quad \text{Equation (3)}$$

W = weight giving to each factor by participants.

A = the highest weight

N = total number of participants.

B. Frequency Index (FI%): Rank of dispute causes based on their frequency.

$$\mathbf{FI\%} = \frac{\Sigma W}{A \times N} \times 100 \quad \text{Equation (4)}$$

W = weight giving to each factor by participants.

A = the highest weight

N = total number of participants.

C. Frequency Adjusted Importance Index (FAII): Rank of dispute causes based on their severity and frequency (Gunduz & Ahsan, 2018).

$$\mathbf{FAII} = \mathbf{SI\%} \times \mathbf{FI\%} \quad \text{Equation (5)}$$

D. Coefficient of Variation (CV): is a statistical measure of the variability of a set of numbers in a population which explains the level of agreement between participants.

$$\mathbf{C_v} = \frac{\sigma}{\mu} \quad \text{Equation (6)}$$

σ = Standard deviation

μ = mean

E. Cronbach's alpha (α): is used to calculate reliability, is to draw conclusions about the value of each item based on the total score (Fachrurrazi et al., 2018).

$$\alpha = \frac{k}{(k-1)} \left[1 - \frac{\sum_{i=1}^k \sigma^2_{yi}}{\sigma^2_x} \right] \quad \text{Equation (7)}$$

k = number of items within the scale,

σ^2_{yi} = Variance associated with item i .

σ^2_x = Variance associated with total scores.

F. Risk Matrix Analysis: is used to identify and mitigate potential risks. This approach raises the probability that the project will be finished successfully while lessening the impact of any potential problems. The risk assessment matrix provides a tabular illustration of the risk analysis by classifying them according to their frequency and degree of severity.

CHAPTER 4

RESULTS AND DISSCUSSION

This chapter presents analysis and discussion on the collected data. This chapter presents the characteristics of the participants, the causes of disputes in government building maintenance contracts, disputes resolutions methods, disputes resolution cost and duration, and disputes consequences on stakeholders.

4.1 General Information

The researcher sent the developed questionnaire through email in the first week of October 2022 to the whole population of Grades 1, 2, and 3 maintenance contractors in the Eastern Province of Saudi Arabia. The researcher immediately contacted the contractors over the phone to ascertain that they had received the questionnaires and to encourage them to participate in the study. Unfortunately, few contractors completed and returned the questionnaire within the suggested timeline. The researcher followed up with the remaining contractors by email, WhatsApp, and telephone calls, but the response rate continued to be low. The researcher then, decided to go in person to those contractors and collect the required data directly through interview. This strategy resulted in increasing the number of participants to 38 out of the 53 contractors. Only completed questionnaires were included in the analysis to ensure high data reliability. Thirty-eight responses received, but only thirty-six were considered which puts this survey in the acceptance range of minimum

$$\text{response rate: Response rate} = \frac{36}{53} \times 100 = 67.9\% \quad \text{Equation (8)}$$

For email surveys, Saunders et al., (1997) recommended that response rate should be calculated as follows: total number of responses / (sample size - ineligible - unreachable)

>30%. The response rate for this survey was $36 / (53 - 0) = 67.9\%$, which is higher than the calculated minimum and exceeding the recommended 30% boundary. Table 10 presents the sent, received, and valid questionnaires.

Table 10: questionnaire survey sent, received, and valid.

Item	Responses
Minimum required responses	18
Total sent questionnaires	53
Total received responses	38
Total valid responses	36
Percentage of valid responses	94.70%

4.1.1 Characteristics of Participants

The main characteristics of participants who are the sources of the information for the study are presented in this section in the form of tables and graphs. These include participant current occupation, experience, nationality, and types of projects participated in, education level, and degree discipline.

• Participants' job titles

The positions of participants vary from project managers, construction managers, senior project engineers, maintenance supervisor, site civil engineer, project engineer, and quality engineer. Figure 5 shows the distribution of the participant's current job title.

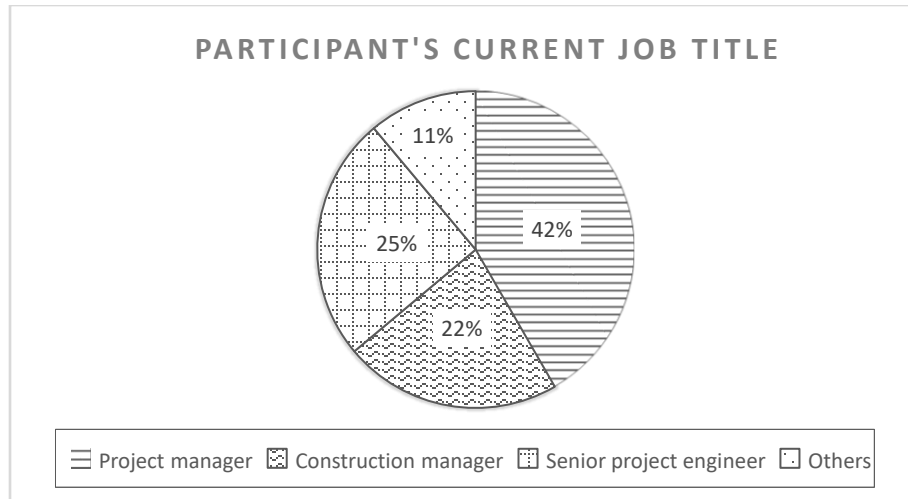


Figure 5: Current job title

- **Experience of participants in the building maintenance field**

The experience is measured by the number of years in the government building maintenance field. The results indicate that the majority (86%) of the participants' experience in the government building maintenance field is more than five years. Figure 6 presents the distribution of the participants' experiences.

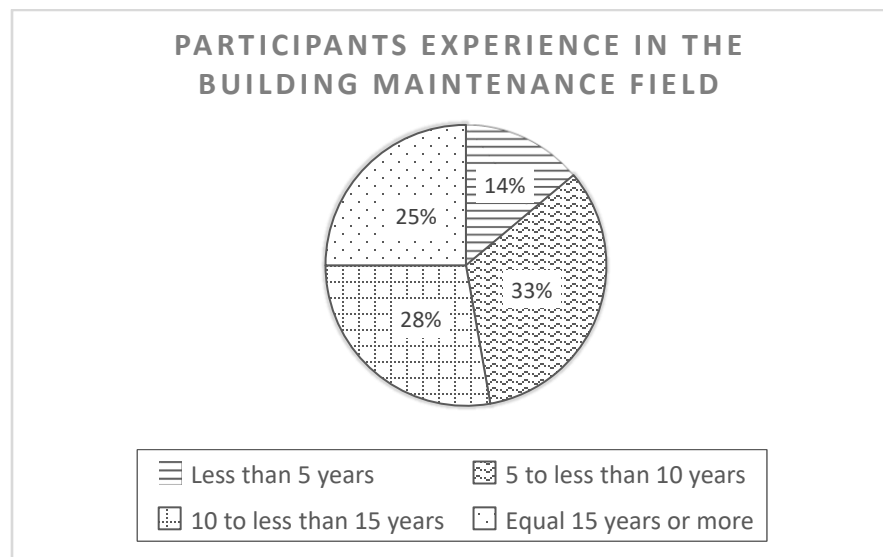


Figure 6: Experience of participants in the building maintenance field

- **Respondents' participation in government building maintenance project**

Figure 7 indicates that more than 90% of participants have participated in government building maintenance projects which is an expected result since the survey was sent to a targeted population specialized in this field.

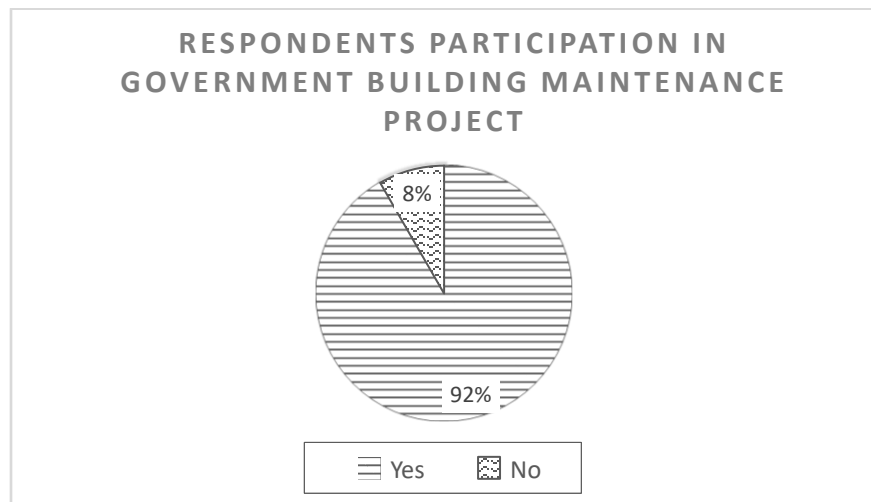


Figure 7: Respondents participation in government building maintenance project

- **Number of government building maintenance projects participated in**

The number of projects the respondents participated in vary; however, the below figure 8 indicates that more than fifty percent of respondents have participated in six or more government building maintenance projects.

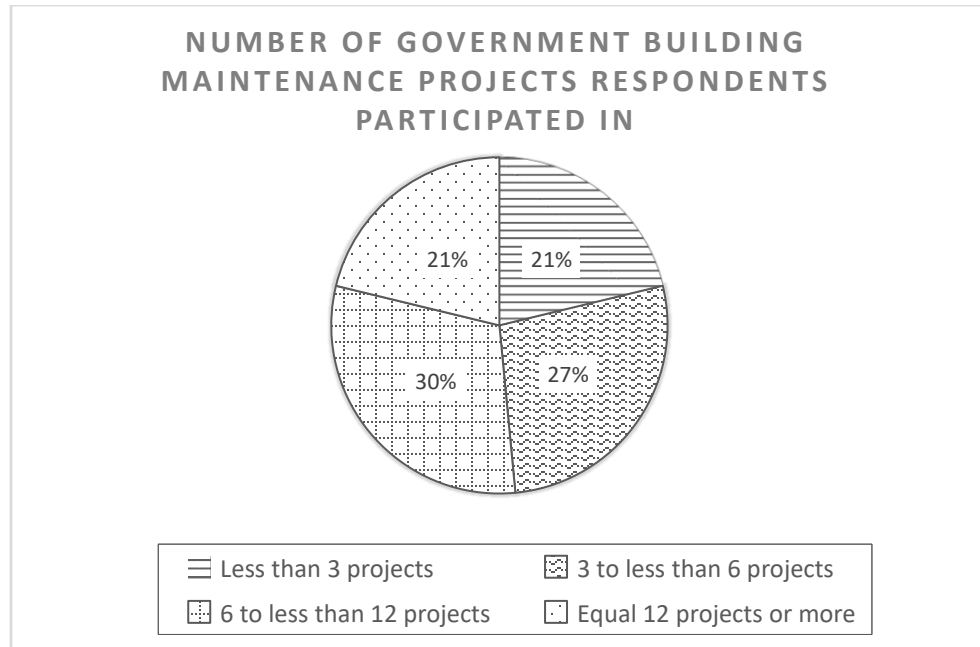


Figure 8: Number of building maintenance projects respondents participated in

• **Participants roles during the execution of government building maintenance projects:**

It is very common for participants' responsibilities and roles to change from their regular ones throughout the course of a maintenance project's execution, whether that's because of the need to make use of their specific skills and knowledge, or because they've been promoted to a new position; and that explains why there are two different questions for occupations, which one involves current position while the other one is during the maintenance project's execution. The below figure illustrates the participants' roles during the execution of building maintenance projects.

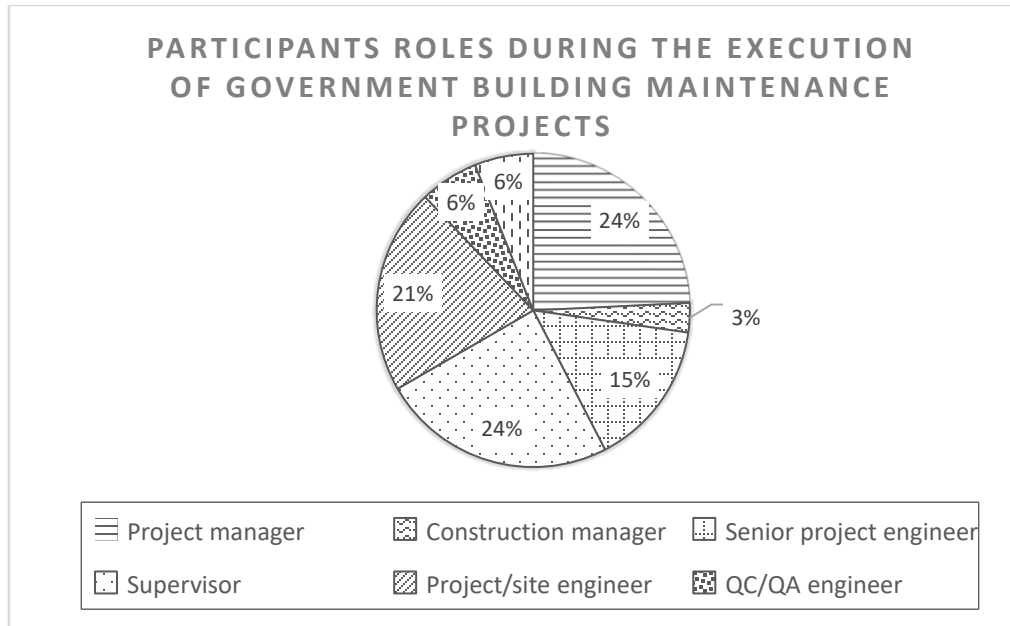


Figure 9: Participants roles during the execution of building maintenance projects

• **Number of years of participants with current employer:**

The results indicate that more than sixty percent of participants have been with their current employer for five years or more. This observation illustrates the in-depth knowledge on the employer's business and in maintenance projects.

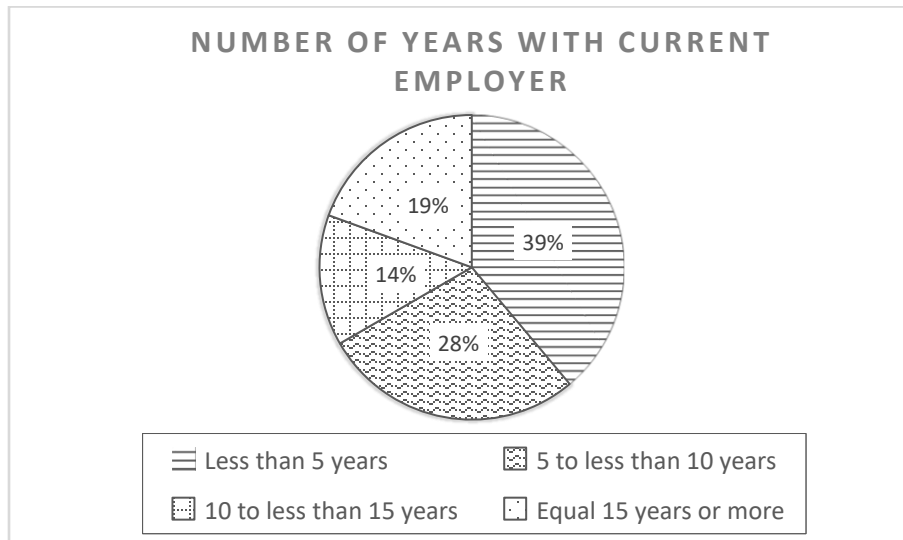


Figure 10: Number of years of participants with current employer

- **Educational level of participants:**

Participants include 2 PhD degree holders, twelve master's degree holders, twenty bachelor's degree holders, and 2 diploma degree holders.

Table 11: Educational level of participants

Educational level	Number of Participants	Percent (%)
Diploma	2	6%
Bachelor's degree	20	56%
Master's degree	12	33%
PhD	2	6%
Total	36	100.0%

- **Degree disciplines of Participants:**

The field of Civil Engineering is the most common among the participants, followed by Mechanical, Electrical and Industrial Engineering respectively. Two of the participants represent distinct fields: building engineering and business administration.

Table 12: Degree disciplines of Participants

Participant's degree discipline	Number of Participants	Percent (%)
Civil Engineering	12	33%
Mechanical Engineering	9	25%
Electrical Engineering	9	25%
Industrial Engineering	4	11%
Others	2	6%
Total	36	100.0%

- **Nationality of Participants:**

There is a total of 36 participants involved in this research; 18 are Saudi and another 18 are from other countries.

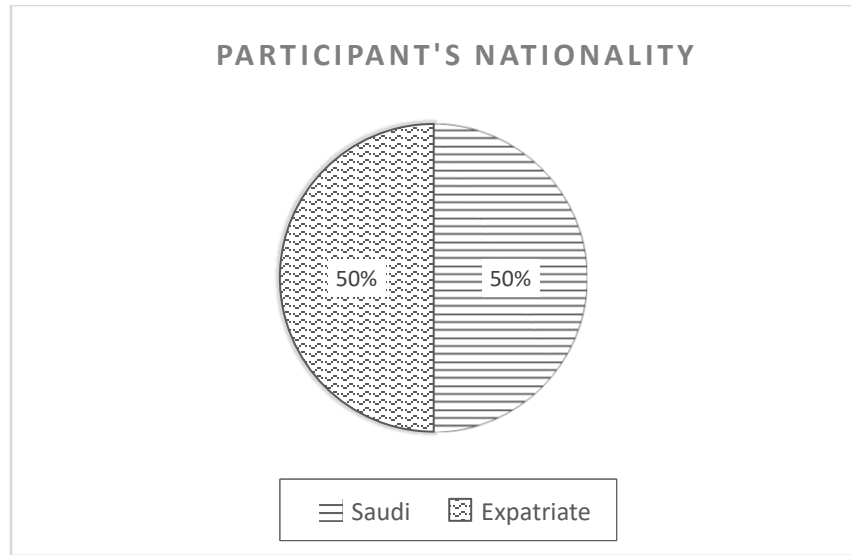


Figure 11: Nationality of Participants

4.1.2 Characteristics of the Maintenance Contractors

The maintenance contractor is described based on company location, employee counts, company grade, number of projects executed annually, company experience in maintenance industry, and annual revenues. All participants work for a MOMRAH classification grade one, two or three contractors who are specialized in building maintenance services and construction activities for government buildings.

- **Main Office Locations:**

The result indicates that the main office participating maintenance contractors are in the major cities in the Eastern Province. Figure 12 presents the maintenance contractor's main office distribution. The majority of maintenance contractors are located in the Dammam - Khobar - Dhahran region, the capital of the Eastern Province.

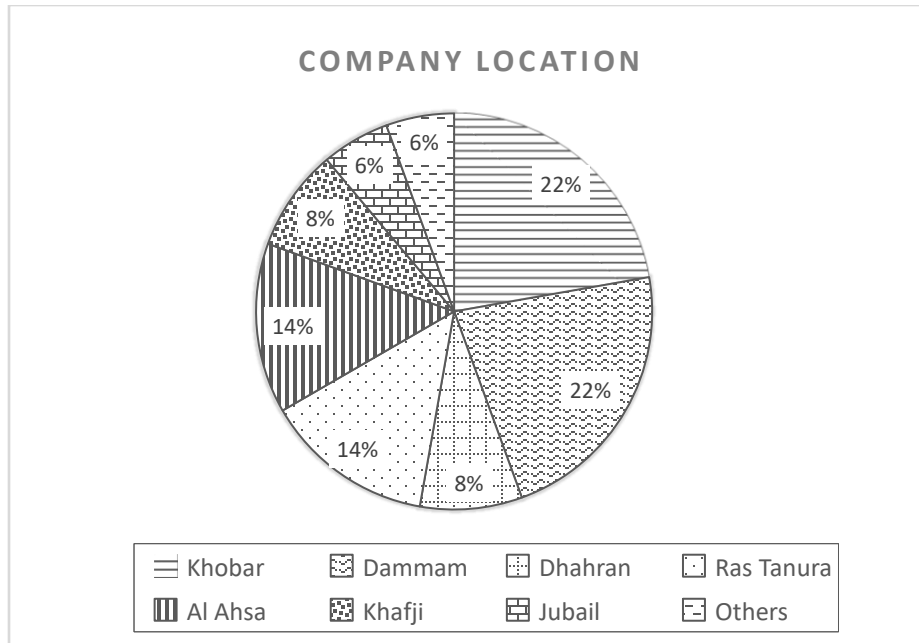


Figure 12: Company Locations of Participants

• **Organization experience in the building maintenance:**

The below figure shows that 31% of organization experience is less than ten years in building maintenance business, while the majority of 69% lies between ten or more years of experience in building maintenance business.

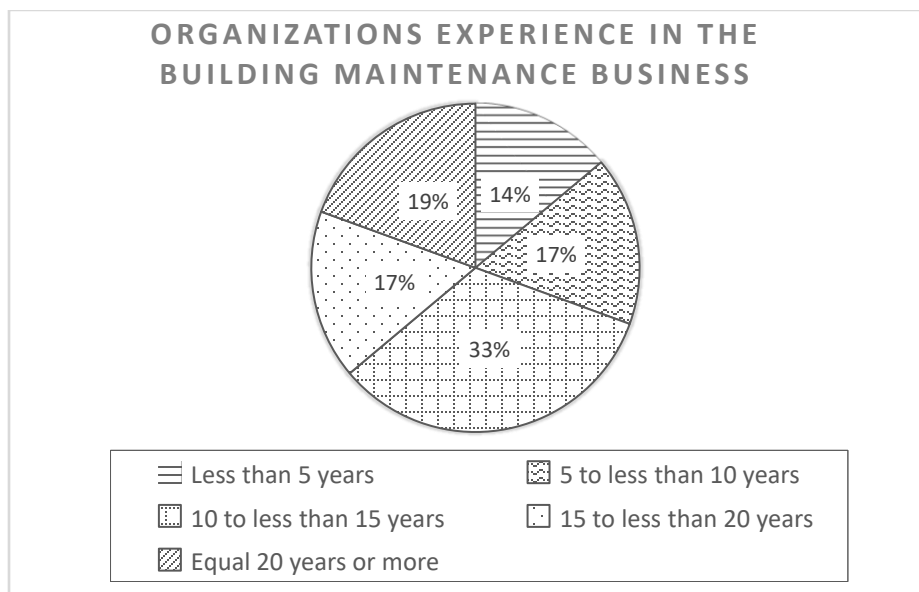


Figure 13: Organization experience in the building maintenance business

- **Number of employees in the participant's organization:**

The results indicate that 22% of organizations have less than 500 employees; 58% of the organizations have 500 to less than 2000 employees and the remaining 19% have 2000 or more employees.

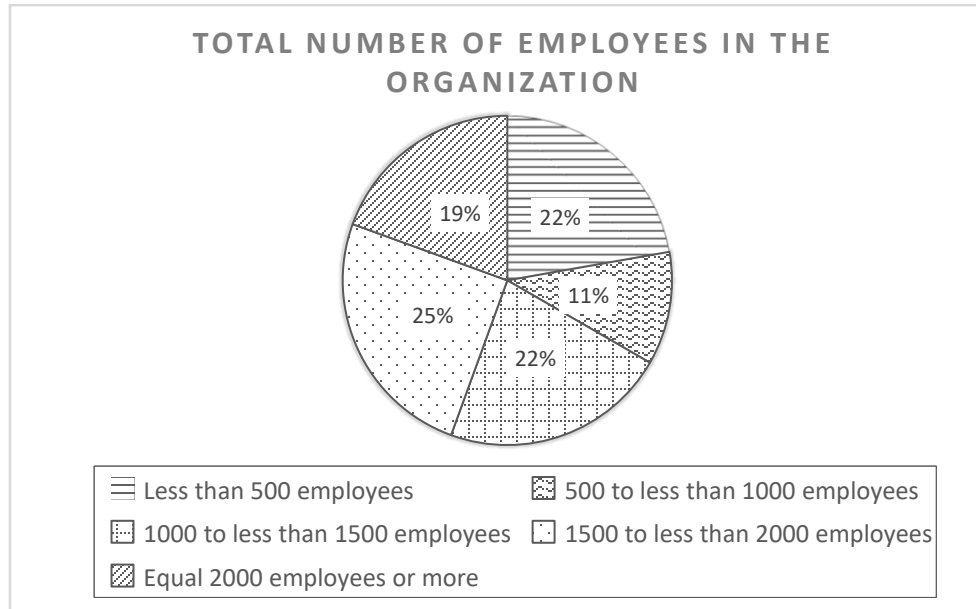


Figure 14: Number of employees in the organization

- **Company classification in building maintenance (Ministry of Municipal and Rural Affairs and Housings classification):**

Table 13: Number of Companies in each MOMRAH grade

Company Grades (MOMRAH)	Contractors
Grade one	17
Grade two	11
Grade three	8
Total	36

Seventeen participants as shown in the above table work in a grade one company which accounts for 47% of participants, eleven in a grade two company and eight in a grade three company according to the classification of MOMRAH.

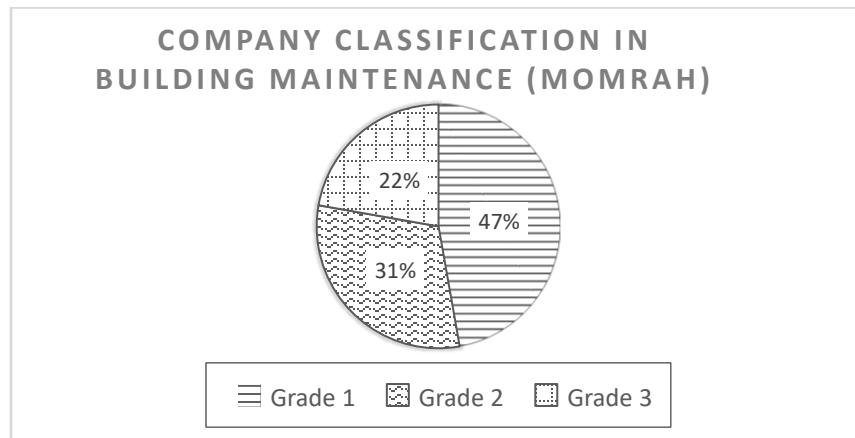


Figure 15: Company classification in building maintenance

- **Number of maintenance projects for government buildings executed annually:**

Sixty percent of the companies undertake more than ten building maintenance projects annually while the remaining 36% only execute nine or less projects annually. The below figure illustrates the percentages in detail.

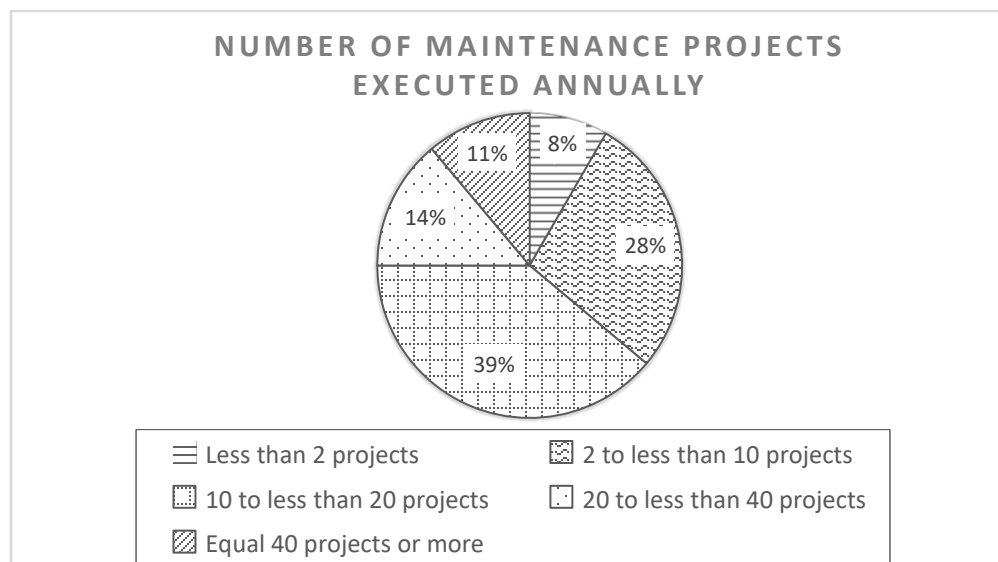


Figure 16: Number of maintenance projects executed annually.

• **Company’s annual government building maintenance volume in millions of Saudi Riyals:**

The below figure is a representation of the company’s annual government building maintenance volume in millions of Saudi Riyals.

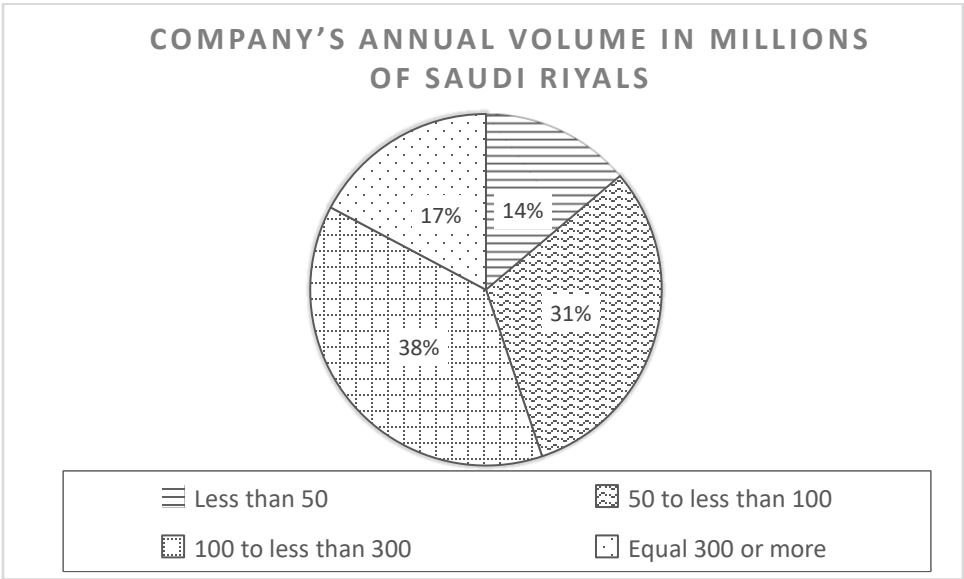


Figure 17: Company’s Annual Volume

It is evident that the data were collected from knowledgeable sources who are working for well-established maintenance contractors. This conclusion asserts that the collected data is reliable and valid.

4.2 Statistical Analysis of Collected Data

Reliability tests are used to evaluate the effectiveness of research. Examining and reporting of the statistical analysis instruments contributes to the study's credibility, which in turn contributes to the credibility of the conclusions of the study. Therefore, before discussing the dispute causes frequency and severity, it is mandatory to measure the validity and reliability of collected data.

4.2.1 Reliability Test

The purpose of Cronbach's alpha analysis, which is used to calculate reliability, is to draw conclusions about the value of each item based on the total score (C-Alpha). It is recommended that C-Alpha, a coefficient measuring dependability, be greater than 0.8 (Which is a value to the appropriateness of the questionnaires) (Fachrurrazi et al., 2018). The internal consistency of a collection of items may be evaluated using Cronbach's alpha. It's a way to evaluate how trustworthy a scale is. The format for Cronbach's alpha is presented in Equation (6).

The Cronbach-Alpha coefficient was calculated for each set of data separately in the below tables using SPSS (Statistical Package for Social Sciences). Moreover, additional analysis into each item is carried out to identify each item's impact when combined with the other items as well as the repercussions of its removal.

Reliability Test of Dispute Cause Frequency:

The calculated Cronbach's Alpha for the Frequency of Dispute Causes is 0.893, which is greater than 0.8 meaning the response values for each participant are consistent throughout the questionnaire items and considered a reliable measurement of collected data.

Table 14: Cronbach's Alpha for Dispute Cause Frequency

Data Type	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Frequency of Dispute Causes	0.900	0.893	44

Moreover, an additional analysis into each dispute cause Cronbach's Alpha value (Table 14) indicates that when differing site conditions, fluctuation of materials costs during project execution, weather conditions, inflation, unforeseen problems, and force majeure are deleted from this data set, the Cronbach's Alpha's value would be higher than (0.9). This means that the internal consistency of those dispute causes is not as consistent as the rest of the items. However, any value of 0.8 and above is considered within the acceptable range. This table is a useful tool whenever Cronbach's Alpha value is less than 0.8 and we are trying to investigate the items that are not as consistent as the rest and can be deleted in order to achieve a higher value of Cronbach's Alpha.

Table 15: Cronbach's Alpha of Frequency Result if an Item Deleted

Frequency of Dispute Causes	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Cronbach's Alpha if Item Deleted
Excessive variation orders	138.5278	373.171	0.894
Delay in material/drawing approval	138.2500	403.907	0.899
Delay in payments	138.1389	387.380	0.895
Delay in response/decision making	138.0278	391.056	0.896
Constant interferences in contract execution	137.8333	388.371	0.896
Late site handover to the contractor	138.7500	401.336	0.899
Apply penalty without conducting a proper investigation	138.4722	386.599	0.896
Contradiction directions enforced on the contractor by different personnel from the owner side	138.3333	385.257	0.896
Lack of site supervision	138.9722	392.942	0.896
Subcontracting/outsourcing all project activities	138.4444	407.683	0.901
unskilled contractor's manpower/labor	138.4167	402.993	0.900
Poor quality of completed work	138.7222	398.606	0.898

Frequency of Dispute Causes	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Cronbach's Alpha if Item Deleted
Poor site management	138.6667	395.657	0.897
Delay of material procurement	138.3611	391.894	0.897
Improper sequencing of work	138.0833	381.450	0.894
Mistakes in devolving the bidding/estimation	138.2222	381.892	0.894
Unawareness of government rules and regulations	138.1111	388.502	0.896
Poor quality of material	138.7500	404.193	0.899
Unsuitable project leadership	138.6667	398.743	0.899
incompetent subcontractors	138.9167	394.936	0.898
Inadequate/incomplete technical plans/specification	138.7500	378.879	0.894
Lack of original as-built drawings for government buildings	137.6111	384.073	0.895
Weakness in contract language	138.4167	405.450	0.900
A contradiction between project documents	138.6667	385.829	0.895
Unrealistic project schedule	138.4444	401.797	0.899
Inaccurate BOQ in the lump-sum contract	138.3333	387.714	0.895
Ambiguity in project boundaries and responsibility	138.3056	388.961	0.896
Poorly defined scope of work	138.2222	405.378	0.900
Lack of setting a dispute resolution reference between contract parties	138.3889	379.159	0.895
Mixing lump-sum and unit-price impractically in the same contract	138.1389	376.637	0.894
Ambiguity in the contract document	138.6944	394.847	0.897
Lack of communication and coordination	139.2778	388.663	0.896
Misunderstanding between owner and contractor	138.1944	394.390	0.897
Lack of team spirit	138.9167	399.336	0.898
Delay of permit/approval from other government authority	138.3889	385.273	0.897
Differing site conditions	138.6944	408.618	0.901
Shortage of skilled workers for maintenance services	138.8056	389.761	0.896
Unavailability of required spare parts	138.9167	397.964	0.898
Materials delay due to customs clearance	138.4444	393.111	0.897
Fluctuation of materials costs project execution	138.2500	409.907	0.903
Weather conditions	139.1389	420.123	0.904
Inflation	139.0833	428.307	0.908
Unforeseen problems	139.1667	414.086	0.903
Force majeure	139.3333	413.429	0.902

Reliability Test of Dispute Cause Severity on Cost:

The result indicates that Cronbach's Alpha value for the dispute cause severity on cost is greater than 0.8 meaning that the responses for each participant are consistent throughout the questionnaire items and therefore considered reliable data.

Table 16: Cronbach's Alpha for Dispute Cause Severity – Cost

Data Type	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Severity of Dispute Causes - Cost	0.842	0.850	44

Similarly, Cronbach's Alpha value does not show a significant difference in result if an item deleted from the dispute causes meaning that the responses for each participant on each dispute cause is also consistent as well.

Table 17: Cronbach's Alpha of Severity - Cost Result if an Item Deleted

Severity of Dispute Causes - Cost	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Cronbach's Alpha if Item Deleted
Excessive variation orders	145.1389	233.952	0.844
Delay in material/drawing approval	145.0000	232.114	0.841
Delay in payments	144.5833	242.821	0.851
Delay in response/decision making	144.5556	229.740	0.838
Constant interferences in contract execution	144.6667	228.629	0.836
Late site handover to the contractor	145.1667	236.200	0.845
Apply penalty without conducting a proper investigation	144.7500	227.564	0.836
Contradiction directions enforced on the contractor by different personnel from the owner side	145.3333	226.800	0.834
Lack of site supervision	144.5278	229.571	0.837
Subcontracting/outsourcing all project activities	144.9167	239.793	0.846
unskilled contractor's manpower/labor	144.8889	234.444	0.843
Poor quality of completed work	144.3889	236.930	0.843
Poor site management	144.8056	233.190	0.841
Delay of material procurement	144.6111	229.102	0.837

Severity of Dispute Causes - Cost	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Cronbach's Alpha if Item Deleted
Improper sequencing of work	144.9167	230.707	0.838
Mistakes in devolving the bidding/estimation	144.4167	236.136	0.844
Unawareness of government rules and regulations	144.6667	233.943	0.840
Poor quality of material	144.4444	239.625	0.845
Unsuitable project leadership	144.6111	234.759	0.841
incompetent subcontractors	144.7778	234.521	0.840
Inadequate/incomplete technical plans/specification	144.6667	225.429	0.833
Lack of original as-built drawings for government buildings	144.7222	233.406	0.839
Weakness in contract language	144.6944	230.961	0.840
A contradiction between project documents	144.9444	231.197	0.838
Unrealistic project schedule	144.5556	222.254	0.833
Inaccurate BOQ in the lump-sum contract	144.6111	223.959	0.834
Ambiguity in project boundaries and responsibility	144.8056	225.704	0.835
Poorly defined scope of work	144.4167	231.221	0.838
Lack of setting a dispute resolution reference between contract parties	145.0000	222.686	0.834
Mixing lump-sum and unit-price impractically in the same contract	145.1111	221.073	0.833
Ambiguity in the contract document	144.7500	228.650	0.837
Lack of communication and coordination	144.9722	228.485	0.838
Misunderstanding between owner and contractor	145.0833	227.393	0.836
Lack of team spirit	145.1111	232.673	0.842
Delay of permit/approval from other government authority	145.2500	226.307	0.835
Differing site conditions	144.9722	222.485	0.832
Shortage of skilled workers for maintenance services	144.8611	234.123	0.842
Unavailability of required spare parts	144.9444	231.711	0.840
Materials delay due to customs clearance	145.0556	233.768	0.842
Fluctuation of materials costs project execution	144.6667	232.286	0.841
Weather conditions	144.8889	226.616	0.836
Inflation	144.6389	223.266	0.836
Unforeseen problems	144.6667	230.457	0.838
Force majeure	144.6111	228.759	0.837

Reliability Test of Dispute Cause Severity on Quality:

The result indicates that Cronbach's Alpha value for the dispute cause severity on quality is greater than 0.8 meaning that the responses for each participant are consistent throughout the questionnaire items and therefore considered reliable data.

Table 18: Cronbach's Alpha for Dispute Cause Severity – Quality

Data Type	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Severity of Dispute Causes - Quality	0.925	0.917	44

Moreover, the Cronbach's Alpha value for any item does not show a significant difference in result when deleted meaning that the responses for each participant on each dispute cause is considered consistent and no dispute cause effects the overall value of the Cronbach's Alpha.

Table 19: Cronbach's Alpha of Severity - Quality Result if an Item Deleted

Severity of Dispute Causes - Quality	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Cronbach's Alpha if Item Deleted
Excessive variation orders	123.1389	577.723	0.928
Delay in material/drawing approval	123.5000	568.086	0.927
Delay in payments	123.4444	555.397	0.926
Delay in response/decision making	123.2778	555.121	0.926
Constant interferences in contract execution	123.4722	548.942	0.924
Late site handover to the contractor	123.7500	564.307	0.927
Apply penalty without conducting a proper investigation	123.1667	559.114	0.926
Contradiction directions enforced on the contractor by different personnel from the owner side	123.0833	552.764	0.925
Lack of site supervision	122.8611	531.952	0.922
Subcontracting/outsourcing all project activities	123.0833	524.650	0.920
unskilled contractor's manpower/labor	122.9167	529.621	0.922
Poor quality of completed work	122.8889	527.244	0.921
Poor site management	123.1111	535.416	0.922

Severity of Dispute Causes - Quality	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Cronbach's Alpha if Item Deleted
Delay of material procurement	123.9722	560.542	0.926
Improper sequencing of work	123.4722	531.571	0.922
Mistakes in devolving the bidding/estimation	123.6667	540.857	0.923
Unawareness of government rules and regulations	123.7500	544.307	0.923
Poor quality of material	122.9722	520.942	0.920
Unsuitable project leadership	123.1111	522.844	0.920
incompetent subcontractors	123.2778	530.321	0.921
Inadequate/incomplete technical plans/specification	123.1111	523.302	0.921
Lack of original as-built drawings for government buildings	123.2778	522.835	0.920
Weakness in contract language	123.3611	536.409	0.922
A contradiction between project documents	123.4444	524.940	0.920
Unrealistic project schedule	123.3056	532.447	0.922
Inaccurate BOQ in the lump-sum contract	123.8611	561.837	0.925
Ambiguity in project boundaries and responsibility	123.3056	545.075	0.923
Poorly defined scope of work	123.0278	521.285	0.920
Lack of setting a dispute resolution reference between contract parties	123.4722	554.542	0.925
Mixing lump-sum and unit-price impractically in the same contract	123.6111	564.416	0.927
Ambiguity in the contract document	123.3056	539.190	0.923
Lack of communication and coordination	123.2500	527.564	0.920
Misunderstanding between owner and contractor	123.2222	533.378	0.921
Lack of team spirit	123.3611	552.009	0.924
Delay of permit/approval from other government authority	123.7778	565.778	0.926
Differing site conditions	123.6389	548.923	0.923
Shortage of skilled workers for maintenance services	123.1389	529.837	0.921
Unavailability of required spare parts	123.0833	558.650	0.926
Materials delay due to customs clearance	123.8611	567.552	0.927
Fluctuation of materials costs project execution	123.7222	549.978	0.924
Weather conditions	123.5833	558.993	0.926
Inflation	123.8333	556.829	0.926
Unforeseen problems	123.4722	550.542	0.924
Force majeure	123.8056	551.475	0.924

Reliability Test of Dispute Cause Severity on Time:

The result indicates that Cronbach's Alpha value for the dispute cause severity on time is also greater than 0.8 meaning that the responses for each participant are consistent throughout the questionnaire items and therefore considered reliable data.

Table 20: Cronbach's Alpha for Dispute Cause Severity – Time

Data Type	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Severity of Dispute Causes - Time	0.967	0.965	44

The Cronbach's Alpha value for any item does not show a significant difference in result when deleted meaning that the responses for each participant on each dispute cause is consistent and that is expected since the overall Cronbach's Alpha value for this data set is greater than 0.8.

Table 21: Cronbach's Alpha of Severity - Time Result if an Item Deleted

Severity of Dispute Causes - Time	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Cronbach's Alpha if Item Deleted
Excessive variation orders	134.7222	885.692	0.967
Delay in material/drawing approval	134.9167	853.279	0.965
Delay in payments	134.8333	889.343	0.967
Delay in response/decision making	134.8333	865.571	0.966
Constant interferences in contract execution	134.8611	858.752	0.966
Late site handover to the contractor	135.2778	859.578	0.966
Apply penalty without conducting a proper investigation	135.2222	880.578	0.966
Contradiction directions enforced on the contractor by different personnel from the owner side	135.1667	859.514	0.966
Lack of site supervision	135.3056	898.847	0.968
Subcontracting/outsourcing all project activities	135.4444	888.825	0.967
unskilled contractor's manpower/labor	135.0278	853.456	0.965
Poor quality of completed work	135.3056	876.390	0.967

Severity of Dispute Causes - Time	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Cronbach's Alpha if Item Deleted
Poor site management	135.0000	862.743	0.966
Delay of material procurement	134.9167	847.907	0.965
Improper sequencing of work	135.0000	851.200	0.965
Mistakes in devolving the bidding/estimation	135.4722	870.256	0.967
Unawareness of government rules and regulations	135.1111	860.159	0.966
Poor quality of material	135.3889	910.073	0.968
Unsuitable project leadership	134.8889	880.216	0.966
incompetent subcontractors	135.0556	875.140	0.966
Inadequate/incomplete technical plans/specification	135.3333	874.629	0.966
Lack of original as-built drawings for government buildings	135.1944	861.190	0.966
Weakness in contract language	135.0556	874.454	0.966
A contradiction between project documents	135.2778	862.835	0.966
Unrealistic project schedule	135.0833	861.850	0.966
Inaccurate BOQ in the lump-sum contract	135.3056	882.390	0.967
Ambiguity in project boundaries and responsibility	135.2222	855.378	0.966
Poorly defined scope of work	134.8333	863.571	0.966
Lack of setting a dispute resolution reference between contract parties	135.3333	836.114	0.965
Mixing lump-sum and unit-price impractically in the same contract	135.4722	861.056	0.966
Ambiguity in the contract document	135.1389	867.380	0.966
Lack of communication and coordination	134.9444	866.225	0.966
Misunderstanding between owner and contractor	135.0000	871.600	0.966
Lack of team spirit	135.1111	888.387	0.967
Delay of permit/approval from other government authority	135.1389	845.552	0.965
Differing site conditions	135.1667	866.771	0.966
Shortage of skilled workers for maintenance services	135.1667	858.029	0.966
Unavailability of required spare parts	135.1389	853.609	0.966
Materials delay due to customs clearance	135.0556	858.454	0.966
Fluctuation of materials costs during project execution	135.4722	894.885	0.968
Weather conditions	135.0833	877.164	0.967
Inflation	135.4444	899.054	0.968
Unforeseen problems	135.1944	865.304	0.966
Force majeure	135.0278	864.542	0.966

Reliability Test of Dispute Consequence Frequency:

The result indicates that Cronbach's Alpha value for dispute consequence frequency is also greater than 0.8 meaning that the collected data has a high internal consistency throughout the questionnaire items and therefore considered reliable data.

Table 22: Cronbach's Alpha for Dispute Consequence Frequency

Data Type	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Dispute Consequences	0.809	0.807	13

The Cronbach's Alpha values for delay in project delivery date, breakdown in communication and professional relationship, underutilization of resources, and delay in the progress of work show a slight increase in Cronbach's Alpha value when deleted meaning that the internal consistency of those dispute consequences is not as consistent as the rest of items. However, since the overall Cronbach's Alpha value is greater than 0.8, then this set is considered reliable.

Table 23: Cronbach's Alpha of Dispute Consequences Result if an Item Deleted

Dispute Consequences	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Cronbach's Alpha if Item Deleted
Abandonment of the project	38.6944	54.675	0.789
Increment in project cost	38.1389	57.552	0.797
Delay in project delivery date	38.5833	60.993	0.803
Profitability loss	38.4722	60.085	0.799
Loss of business viability	38.3333	57.657	0.797
Loss of company reputation	38.5833	54.421	0.781
Diminution of respect between parties	38.5000	56.257	0.794
Damages to business relationships	38.5278	58.199	0.791
Tension and dampness of team spirit	38.3889	56.073	0.790
Reduction in productivity	38.2778	58.778	0.793

Dispute Consequences	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Cronbach's Alpha if Item Deleted
Breakdown in communication and professional relationship	38.5000	61.914	0.809
Underutilization of resources	38.7778	61.149	0.808
Delay in the progress of work	38.5556	60.254	0.802

The results of this section indicate that Cronbach's Alpha values for all data sets are greater than 0.8 meaning that the responses for each participant are consistent throughout the questionnaire items in each data set. Therefore, this conclusion asserts the reliability of the collected data.

4.3 Severity of Dispute Causes on Cost, Time, and Quality of Maintenance Projects

Participants were asked to evaluate the severity of 44 predetermined dispute causes in terms of cost, quality, and time in government building maintenance projects in Saudi Arabia. This technique uses a 5-point Likert scale (1= No effect, 2= Very moderate, 3=Moderate, 4=Very severe, 5=Immense). The severity Index SI is used to express the impact of the dispute causes on government building maintenance projects in terms of cost, quality, and time separately. All projects are monitored and controlled through cost, time and quality; and maintenance projects are no different. Using the severity indices for cost, time and quality is useful in determining a prioritization mitigation strategy to reduce/avoid dispute occurrences.

It is important to find the most severe dispute causes in order to take the necessary precautions. There may be no need to take any action oftentimes, depending on the dispute cause severity. However, a drastic measure is required if a dispute cause severity is high.

Moreover, the coefficient of variation is calculated for each dispute cause on cost, time quality to measure level of agreement between participants. This type of statistical analysis provides an indication of the magnitude of a standard deviation in comparison to its mean. there is no one particular range that can be assigned to a coefficient of variation that is regarded as being within the range. However, lower values for the coefficient of variation are generally seen as being preferable in most disciplines. This is because lower values indicate that there is less fluctuation around the mean. Similarly, when the coefficient of variation is larger, the dispersion level around the mean tends to be higher as well. The

coefficients of variation for dispute cause severity on cost, time, and quality fall mostly within an acceptable range which is less than 30% meaning that level of agreement between participants is somewhat high across all three data sets with the exception of some CVs going above 30% (Brown, 1998; Ferreira et al., 2019).

However, the coefficients of variation for the three data sets indicate that there is less fluctuation around the means and the dispersion level around them is small meaning that the level of agreement between participants is medium to high. Therefore, this conclusion asserts the quality of the collected data.

Table 24: Impact of Dispute Causes on Cost, Time, and Quality Based on RII

No.	Category	Dispute Causes	Severity of Dispute Causes														
			Cost					Time					Quality				
			Mean	Std. Dev.	CV	SI	Rank	Mean	Std. Dev.	CV	SI	Rank	Mean	Std. Dev.	CV	SI	Rank
1	Owner Related	Excessive variation orders	3.03	1.23	0.41	0.61	41	3.56	0.73	0.21	0.71	1	3.11	0.75	0.24	0.62	12
2		Delay in material/drawing approval	3.17	1.03	0.32	0.63	35	3.36	1.2	0.36	0.67	7	2.75	0.91	0.33	0.55	31
3		Delay in payments	3.58	1.25	0.35	0.72	8	3.44	0.91	0.26	0.69	4	2.81	1.19	0.42	0.56	26
4		Delay in response/decision making	3.61	0.93	0.26	0.72	6	3.44	1.08	0.31	0.69	3	2.97	1.18	0.40	0.59	17
5		Constant interferences in contract execution	3.5	0.85	0.24	0.70	14	3.42	1.13	0.33	0.68	5	2.78	1.02	0.37	0.56	29
6		Late site handover to the contractor	3	1.17	0.39	0.60	42	3	1.24	0.41	0.60	32	2.5	1.06	0.42	0.50	38
7		Apply penalty without conducting a proper investigation	3.42	0.97	0.28	0.68	22	3.06	0.83	0.27	0.61	30	3.08	1.2	0.39	0.62	14
8		Contradiction directions enforced on the contractor by different personnel from the owner side	2.83	0.77	0.27	0.57	44	3.11	1.06	0.34	0.62	26	3.17	1.06	0.33	0.63	6
9	Contractor Related	Lack of site supervision	3.64	0.83	0.23	0.73	5	2.97	1.03	0.35	0.59	34	3.39	1.23	0.36	0.68	1
10		Subcontracting/outsourcing all project activities	3.25	0.94	0.29	0.65	29	2.83	0.77	0.27	0.57	40	3.17	1.25	0.40	0.63	7
11		unskilled contractor's manpower/labor	3.28	1.11	0.34	0.66	27	3.25	1.16	0.36	0.65	13	3.33	1.31	0.39	0.67	3
12		Poor quality of completed work	3.78	0.87	0.23	0.76	1	2.97	1.06	0.36	0.59	34	3.36	1.25	0.37	0.67	2
13		Poor site management	3.36	0.93	0.28	0.67	24	3.28	0.97	0.30	0.66	10	3.14	1.17	0.37	0.63	11
14		Delay of material procurement	3.56	0.91	0.26	0.71	9	3.36	1.27	0.38	0.67	7	2.28	0.97	0.43	0.46	44

No.	Category	Dispute Causes	Severity of Dispute Causes														
			Cost					Time					Quality				
			Mean	Std. Dev.	CV	SI	Rank	Mean	Std. Dev.	CV	SI	Rank	Mean	Std. Dev.	CV	SI	Rank
15		Improper sequencing of work	3.25	0.84	0.26	0.65	29	3.28	1.23	0.38	0.66	11	2.78	1.27	0.46	0.56	27
16		Mistakes in devolving the bidding/estimation	3.75	1.02	0.27	0.75	2	2.81	1.21	0.43	0.56	42	2.58	1.25	0.48	0.52	35
17		Unawareness of government rules and regulations	3.5	0.85	0.24	0.70	17	3.17	1.08	0.34	0.63	20	2.5	1.11	0.44	0.50	37
18		Poor quality of material	3.72	0.91	0.25	0.74	4	2.89	0.71	0.25	0.58	39	3.28	1.3	0.40	0.66	4
19		Unsuitable project leadership	3.56	0.81	0.23	0.71	11	3.39	0.8	0.24	0.68	6	3.14	1.33	0.43	0.63	9
20		incompetent subcontractors	3.39	0.64	0.19	0.68	23	3.22	0.93	0.29	0.64	15	2.97	1.23	0.41	0.59	17
21		Inadequate/incomplete technical plans/specification	3.5	0.77	0.22	0.70	14	2.94	1.01	0.34	0.59	37	3.14	1.4	0.45	0.63	10
22	Project Document Related	Lack of original as-built drawings for government buildings	3.44	0.69	0.20	0.69	20	3.08	1.16	0.37	0.62	29	2.97	1.32	0.44	0.59	17
23		Weakness in contract language	3.47	1.06	0.30	0.69	19	3.22	0.99	0.31	0.64	16	2.89	1.09	0.38	0.58	23
24		A contradiction between project documents	3.22	0.76	0.24	0.64	32	3	1.17	0.39	0.60	33	2.81	1.17	0.42	0.56	25
25		Unrealistic project schedule	3.61	1.05	0.29	0.72	7	3.19	1.21	0.38	0.64	18	2.94	1.19	0.41	0.59	20
26		Inaccurate BOQ in the lump-sum contract	3.56	1.08	0.30	0.71	9	2.97	0.91	0.31	0.59	34	2.39	0.8	0.34	0.48	42
27		Ambiguity in project boundaries and responsibility	3.36	1.02	0.30	0.67	25	3.06	1.19	0.39	0.61	31	2.94	1.07	0.36	0.59	20
28		Poorly defined scope of work	3.75	0.84	0.22	0.75	3	3.44	0.97	0.28	0.69	2	3.22	1.31	0.41	0.64	5
29		Lack of setting a dispute resolution reference between contract parties	3.17	1.18	0.37	0.63	35	2.94	1.43	0.49	0.59	38	2.78	0.96	0.35	0.56	29

No.	Category	Dispute Causes	Severity of Dispute Causes														
			Cost					Time					Quality				
			Mean	Std. Dev.	CV	SI	Rank	Mean	Std. Dev.	CV	SI	Rank	Mean	Std. Dev.	CV	SI	Rank
30		Mixing lump-sum and unit-price impractically in the same contract	3.06	1.19	0.39	0.61	39	2.81	1.21	0.43	0.56	44	2.64	0.99	0.38	0.53	33
31		Ambiguity in the contract document	3.42	0.94	0.27	0.68	21	3.14	0.96	0.31	0.63	22	2.94	1.15	0.39	0.59	20
32	Owner & Contractor Related	Lack of communication and coordination	3.19	1.12	0.35	0.64	33	3.33	0.96	0.29	0.67	9	3	1.12	0.37	0.60	16
33		Misunderstanding between owner and contractor	3.08	1	0.32	0.62	38	3.28	0.97	0.30	0.66	11	3.03	1.03	0.34	0.61	15
34		Lack of team spirit	3.06	1.15	0.37	0.61	39	3.17	0.94	0.30	0.63	20	2.89	0.92	0.32	0.58	23
35	External Factor Related	Delay of permit/approval from other government authority	2.92	0.97	0.33	0.58	43	3.14	1.36	0.43	0.63	23	2.47	0.77	0.31	0.49	39
36		Differing site conditions	3.19	1.01	0.32	0.64	33	3.11	1.04	0.33	0.62	25	2.61	0.8	0.31	0.52	34
37		Shortage of skilled workers for maintenance services	3.31	1.01	0.31	0.66	26	3.11	1.14	0.37	0.62	26	3.11	1.24	0.40	0.62	12
38		Unavailability of required spare parts	3.22	0.96	0.30	0.64	31	3.14	1.25	0.40	0.63	23	3.17	1	0.32	0.63	7
39		Materials delay due to customs clearance	3.11	1.09	0.35	0.62	37	3.22	1.1	0.34	0.64	17	2.39	1.02	0.43	0.48	42
40		Fluctuation of materials costs during project execution	3.5	1.03	0.29	0.70	16	2.81	1.01	0.36	0.56	42	2.53	1.03	0.41	0.51	36
41		Weather conditions	3.28	0.97	0.30	0.66	27	3.19	1.01	0.32	0.64	19	2.67	1.12	0.42	0.53	32
42		Inflation	3.53	1.28	0.36	0.71	13	2.83	0.91	0.32	0.57	40	2.42	1.08	0.45	0.48	41
43		Unforeseen problems	3.5	0.85	0.24	0.70	17	3.08	0.97	0.31	0.62	28	2.78	0.87	0.31	0.56	27
44		Force majeure	3.56	0.94	0.26	0.71	11	3.25	1.13	0.35	0.65	14	2.44	1.03	0.42	0.49	40

The results indicate that the most severe dispute causes in government building maintenance projects on cost, time and quality are either owner, contractor or project document related dispute causes. The owner related dispute causes in terms of time are excessive variation orders, delay in response/decision making, delay in payments, and constant interferences in contract execution. The contractor related dispute causes in terms of cost or quality are poor quality of completed work, mistakes in devolving the bidding/estimation, unskilled contractor's manpower/labor, poor quality of material and lack of site supervision. Lastly, the most severe project document related dispute cause is poorly defined scope of work. Table 25 summarizes the most severe dispute causes in owner, contractor and project document categories with a color-coding system to clearly present the similar dispute causes on cost, time and quality.

Table 25: Most Severe Dispute Causes on Cost, Time, and Quality

Severity						Rank
Category	Cost	Category	Time	Category	Quality	
Contractor	Poor quality of completed work	Owner	Excessive variation orders	Contractor	Lack of site supervision	1
Contractor	Mistakes in devolving the bidding/estimation	Project Document	Poorly defined scope of work	Contractor	Poor quality of completed work	2
Project Document	poorly defined scope of work	Owner	Delay in response/decision making	Contractor	unskilled contractor's manpower/labor	3
Contractor	Poor quality of material	Owner	Delay in payments	Contractor	Poor quality of material	4
Contractor	Lack of site supervision	Owner	Constant interferences in contract execution	Project. Document	Poorly defined scope of work	5

The most severe dispute causes are approached by each category and their effects on cost, time or quality are further discussed in the context of the text as follows:

4.3.1 Most Severe Owner Related Dispute Causes

The excessive variation order is the one of four owner related severe dispute causes on time in government building maintenance projects, but it has less of an impact on the cost and quality. Given the time and effort required to implement variation orders and the long procedures they usually take can justify its impact on time. The fact that constant adjustments have to be made for the project schedule due to the excessive variation orders in the midst of maintenance project just adds to the complexity, resulting oftentimes in time overrun, and dissatisfied maintenance contractors. Furthermore, at various stages of a maintenance project, decisions must be made by the owner and their approval is needed. As result, anytime there is a delay in response/decision making from owners, it has a major impact on the project's completion time and cost. However, the delay in response/decision making by owners does not seem to have an effect on the maintenance project quality. This is because most quality procedures are outlined in the contract document leaving the majority of the effect on the project time and cost. Another owner related severe dispute cause is delay in payments as it impacts the cost and time of government building maintenance projects which makes sense, given that contractors might pull out their recourses from the project and cease the work progress until they are paid, resulting in more inured expenses and delay in project time schedule. The constant involvement of the owner is vitally necessary in government building maintenance projects, although this involvement is frequently mistaken for interference with the contract execution. When owners approve the method of statement in executing a project, their intervention in the contract execution is less significant at this point, given that the project final handover must satisfy the contract criteria. In addition, the project's success is not served by pressuring

maintenance contracts to execute the project in a way they are not accustomed to, which explain the slight effect on cost, but more importantly its impact on time.

4.3.2 Most Severe Contractor Related Dispute Causes

The first most severe contractor related dispute cause is the poor quality of completed work on cost and quality of government building maintenance projects. This is due to the incurred costs of lacking to implement well-known quality standards and procedures in building maintenance projects. This dispute cause does not seem to have a direct effect on time, however, the impact on cost and quality would result in indirectly delays in project time schedule. The poor quality of completed work also requires oftentimes reworking jobs which costs owners and contractors a fortune. Therefore, maintaining a high standard of quality throughout every phase of a project saves time and money by preventing errors that would otherwise have to be fixed. Maintenance contractors also risk project termination and losing future clients as a result of the poor quality of the work performed. Therefore, in order to minimize the likelihood of poor quality of work in maintenance projects, it is imperative that maintenance contractors follow well known quality standards and procedures. The methods of ensuring the work quality are oftentimes specified in the contract document. These policies and regulations aid in the avoidance of poor quality of completed work which in return reduces/minimizes the dispute occurrence.

The mistakes in devolving the bidding/estimation is the second most contractor related severe dispute cause on cost in government building maintenance projects. There is no direct effect on time or quality and this is because usually developing the bids occurs before the project initial and execution phases. However, it is important to ensure accurate and fair estimation by contractors when bidding for maintenance projects as this may lead to

dispute occurrences or contract termination. An estimate may be impacted by a collection of minor errors. The estimator serves a dual purpose in this context, estimating and bidding. Attempts by estimators to perform both tasks at once always lead to errors. The estimator may start the bidding process only after being certain that the takeoff is completed, and the costs and manhours have been calculated appropriately. It is the contractor who is responsible for any mistakes made during the bidding process. A loss occurs in a project if its budget is lower than its actual expenditures.

Using poor quality material in maintenance projects is another severe contractor related dispute cause which definitely impacts both project cost and quality. Contractors might save money initially on low quality materials, but they will likely end up costing them more in the long term. Building materials are prone to a wide variety of degradation processes and oftentimes they might get defective before the project commission phase. Moreover, low quality materials might necessitate repairs during the warranty period, cutting into the contractors' profits. In the end, contractors will spend as much, if not more, on replacements and repairs as they have on high-quality materials from the start. Furthermore, utilizing low-quality materials in maintenance projects has an undeniable effect on the overall quality of the project. Therefore, it is essential that the used materials in government building maintenance projects are durable and reliable to endure for the duration of the warranty. The use of poor-quality material in maintenance projects does not seem to have a direct effect on time as much as on cost and quality. However, whenever an impact on cost or quality occurs in maintenance projects, a project time schedule delay would follow as a result in most cases.

The results also indicate that lack of site supervision is considered a severe contractor related dispute cause on the cost and quality of government building maintenance projects, but with no direct effect on time. One of the site supervisor's roles is to monitor the project work execution during the project lifespan. Moreover, site supervision in maintenance projects is crucial for carrying out the work in accordance with the contract requirements by following the quality and control procedures. The lack of site supervision oftentimes leads to defective completed work which results in a rework job that costs contractors double the initial planned budget. In addition, compliance with health and safety laws requires close monitoring and conducting regular checks of maintenance project sites. Therefore, the absence of site supervision in maintenance projects has a severe impact on cost and quality. Furthermore, having skilled labor in the maintenance field results in high productivity and accuracy in performing the work. On the contrary, hiring inexperienced workers almost always results in a rework job and owner dissatisfaction. Unskilled workers oftentimes lack the fundamental skills to perform the required maintenance work which increases the chances of performing poor quality of work that impacts the project time and quality. Therefore, the quality of work performed depends on the skills of workers.

4.3.3 Most Severe Project Document Related Dispute Causes

The poorly defined scope of work is the only most severe project document related dispute cause on cost, time, and quality in maintenance projects. Well definition of the project scope relies on a clear project objective and vision that owners must outline in advance in order to contribute to the success of the project. In the absence of a well-defined scope of work, success of maintenance projects is unlikely. Poor definition of project scope lacks the intended objectives, requirements and functionality of a project which results in taking

longer than planned, incurring more expenses to complete the project, and lacking the required quality of work which explains the importance of a well-defined scope of work in maintenance projects. The maintenance project's scope is a crucial contracting document that describes in detail what each party must accomplish. This essential document also describes in full everything that must be done, and how it will be done. Therefore, attention must be paid in preparing the project scope of work to avoid excessive variation orders. The constant changes in poorly defined project scopes during the execution phase have serious consequences on the project cost, time, and quality. Therefore, poorly defined scope of work is definitely a severe dispute cause and the best defense against these consequences is preparing a well-defined scope of work.

4.4 Frequency of Dispute Causes of Maintenance Projects

The participants were asked to evaluate the frequency of 44 predetermine causes of disputes of government building maintenance projects on a 5-point Likert scale (1= Never, 2=Rarely, 3=Sometimes, 4=Often, 5=Always). This section utilizes the frequency index find the most frequent dispute causes in government building maintenance projects in Saudi Arabia. The frequency index is determined for each dispute cause after calculating the mean, and standard deviation.

The coefficients of variation for dispute cause frequency fall mostly within an acceptable range which is less than 30% meaning that level of agreement between participants is somewhat high across all three data sets with the exception of some CVs going above 30%. However, those coefficients of variation indicate that there is less fluctuation around the means and the dispersion level around them is small meaning that the level of agreement between participants is medium to high (Brown, 1998; Ferreira et al., 2019).

The result indicates that the most frequent owner-related dispute causes are constant interferences in contract execution and delay in decision-making. In government building maintenance projects, the constant involvement of the owner is highly required but sometimes this involvement is misinterpreted as interference of the contract execution. Owner interference in the execution phase is indirectly associated with the lack of the as-built drawings as owners are unable to visualize the execution of the maintenance work; subsequently they feel the urgency for their constant intervention in the contract execution which explains the high frequency of this dispute cause. Furthermore, owners of maintenance projects are obligated to perform their roles perfectly to ensure smooth project execution. Responding to the contractor's requests to either acquire any necessary permits

and authorizations, or to provide clarification on any concerns regarding the project's scope is some of the main roles of owners. However, the delay in response or making the necessary decision by owners usually affects the time schedule of the project which contractors would be blamed for. The lack of establishing a project communication plan that specifies a defined duration for which each party is expected to respond in also contributes to the frequency of this dispute cause.

Table 26: Frequency of Dispute Causes

No.	Category	Dispute Cause	Mean	Std. Deviation	CV	FI	Rank
1	Owner Related	Excessive variation orders	3.22	1.51	0.47	0.64	25
2		Delay in material/drawing approval	3.50	0.81	0.23	0.70	12
3		Delay in payments	3.61	1.08	0.30	0.72	6
4		Delay in response/decision making	3.72	0.88	0.24	0.74	3
5		Constant interferences in contract execution	3.92	1.08	0.28	0.78	2
6		Late site handover to the contractor	3.00	1.01	0.34	0.60	32
7		Apply penalty without conducting a proper investigation	3.28	1.21	0.37	0.66	24
8		Contradiction directions enforced on the contractor by different personnel from the owner side	3.42	1.25	0.37	0.68	14
9	Contractor Related	Lack of site supervision	2.78	0.93	0.33	0.56	39
10		Subcontracting/outsourcing all project activities	3.31	0.89	0.27	0.66	21
11		unskilled contractor's manpower/labor	3.33	0.96	0.29	0.67	19
12		Poor quality of completed work	3.03	0.97	0.32	0.61	31
13		Poor site management	3.08	0.97	0.31	0.62	26
14		Delay of material procurement	3.39	1.08	0.32	0.68	16
15		Improper sequencing of work	3.67	1.20	0.33	0.73	4
16		Mistakes in devolving the bidding/estimation	3.53	1.11	0.31	0.71	10
17		Unawareness of government rules and regulations	3.64	1.13	0.31	0.73	5
18		Poor quality of material	3.00	0.79	0.26	0.60	32
19		Unsuitable project leadership	3.08	1.02	0.33	0.62	26
20		incompetent subcontractors	2.83	1.06	0.37	0.57	38
21	Project Document Related	Inadequate/incomplete technical plans/specification	3.00	1.26	0.42	0.60	34
22		Lack of original as-built drawings for government buildings	4.14	1.15	0.28	0.83	1
23		Weakness in contract language	3.33	0.79	0.24	0.67	20
24		A contradiction between project documents	3.08	1.13	0.37	0.62	26
25		Unrealistic project schedule	3.31	0.98	0.30	0.66	23
26		Inaccurate BOQ in the lump-sum contract	3.42	1.00	0.29	0.68	14
27		Ambiguity in project boundaries and responsibility	3.44	1.16	0.34	0.69	13

No.	Category	Dispute Cause	Mean	Std. Deviation	CV	FI	Rank
28		Poorly defined scope of work	3.53	0.91	0.26	0.71	9
29		Lack of setting a dispute resolution reference between contract parties	3.36	1.38	0.41	0.67	18
30		Mixing lump-sum and unit-price impractically in the same contract	3.61	1.36	0.38	0.72	7
31		Ambiguity in the contract document	3.06	0.83	0.27	0.61	29
32	Owner & Contractor Related	Lack of communication and coordination	2.47	1.06	0.43	0.49	43
33		Misunderstanding between owner and contractor	3.56	1.00	0.28	0.71	8
34		Lack of team spirit	2.83	0.91	0.32	0.57	36
35	External Factor Related	Delay of permit/approval from other government authority	3.36	1.48	0.44	0.67	17
36		Differing site conditions	3.06	0.86	0.28	0.61	30
37		Shortage of skilled workers for maintenance services	2.94	1.04	0.35	0.59	35
38		Unavailability of required spare parts	2.83	1.00	0.35	0.57	36
39		Materials delay due to customs clearance	3.31	1.01	0.31	0.66	21
40		Fluctuation of materials costs during project execution	3.50	1.21	0.34	0.70	11
41		Weather conditions	2.61	0.87	0.33	0.52	41
42		Inflation	2.67	1.10	0.41	0.53	40
43		Unforeseen problems	2.58	0.94	0.36	0.52	42
44		Force majeure	2.42	0.84	0.35	0.48	44

The results also indicate that the most frequent contractor-related dispute causes are improper sequencing of work and unawareness of government rules and regulations. The importance of work sequence is often emphasized in maintenance projects as they are considered time-sensitive projects which justifies the high frequency of this dispute cause. Improper work sequence affects the project's deadline and the quality of work performed. Usually, the role of setting the work sequence in maintenance projects is the responsibility of the contractor; and to ensure the project completion within the time and the required quality, contractors are imperative to set a proper work sequence in an early stage of the project unless instructed otherwise by the owner. Furthermore, the lack of awareness of the continuous updating Saudi rules and regulations expose maintenance contractors to penalties and delays in the project time schedule. Most of the maintenance work executed

to government buildings require some sort of procedure to be followed which can be sometimes work permits or approvals from other entities which are associated directly or indirectly in the executed maintenance project. It is the obligation of bidders (maintenance contractors) to be fully knowledgeable in the general rules and regulations of local content and government procurement authority before undertaking any government maintenance work, even if they are not explicitly outlined in the scope of work for the project. Therefore, it is crucial for contractors to be familiar with the Saudi rules and regulations pertaining to the executed work, in addition to the entity's own requirements.

Lastly, the most frequent project document related dispute cause in government building maintenance projects is the lack of original as-built drawings for government buildings. The lack of the as-built drawings is widespread in government buildings creating continuous difficulties for the maintenance team in carrying out their duties properly. This can be justified as proper maintenance is not performed until many years after government buildings start to decay. This is noticed across many cases worldwide as building maintenance is often seen or misunderstood as breakdowns or deficiencies in the building's structure or other problems in terms of meeting the building's intended purpose. Furthermore, older government buildings only relied on paper-based design drawings, which are vulnerable to the environment elements or are often lost. This issue causes a big concern to owners and contractors as the original as-built drawings must be accessible during the execution of corrective and preventative maintenance work in order to locate utility piping systems, electrical cables, and the structural components, etc.

4.5 Adjusted Frequency of Dispute Causes of Maintenance Projects

The frequency indices of dispute causes in government building maintenance projects are adjusted by considering the causes corresponding severity indices. FAII is calculated by multiplying the severity index by frequency index. All severity indices in terms of cost, time and quality are considered in calculation of FAII. The critical disputes causes are the ones with the highest FAII values (Gunduz & Ahsan, 2018). FAII produced improved ranking results by combining the severity and frequency in a single calculation. Therefore, FAII will be employed as the primary ranking technique in this paper due to its accuracy and precision.

Table 27: Adjusted Frequency of Dispute Causes on Cost, Time & Quality

No.	Category	Dispute Causes	Frequency Adjusted Importance Index (FAII)									
			FI	Cost			Time			Quality		
				SI	FAII	Rank	SI	FAII	Rank	SI	FAII	Rank
1	Owner Related	Excessive variation orders	0.64	0.61	0.39	33	0.71	0.46	10	0.62	0.40	14
2		Delay in material/drawing approval	0.70	0.63	0.44	18	0.67	0.47	7	0.55	0.39	20
3		Delay in payments	0.72	0.72	0.52	6	0.69	0.50	4	0.56	0.41	12
4		Delay in response/decision making	0.74	0.72	0.54	3	0.69	0.51	2	0.59	0.44	4
5		Constant interferences in contract execution	0.78	0.70	0.55	2	0.68	0.54	1	0.56	0.44	5
6		Late site handover to the contractor	0.60	0.60	0.36	40	0.60	0.36	33	0.50	0.30	39
7		Apply penalty without conducting a proper investigation	0.66	0.68	0.45	16	0.61	0.40	23	0.62	0.40	13
8		Contradiction directions enforced on the contractor by different personnel from the owner side	0.68	0.57	0.39	35	0.62	0.43	15	0.63	0.43	6
9	Contractor Related	Lack of site supervision	0.56	0.73	0.40	29	0.59	0.33	40	0.68	0.38	23
10		Subcontracting/outsourcing all project activities	0.66	0.65	0.43	23	0.57	0.37	29	0.63	0.42	8
11		unskilled contractor’s manpower/labor	0.67	0.66	0.44	22	0.65	0.43	12	0.67	0.44	3
12		Poor quality of completed work	0.61	0.76	0.46	15	0.59	0.36	34	0.67	0.41	10
13		Poor site management	0.62	0.67	0.41	27	0.66	0.40	22	0.63	0.39	18
14		Delay of material procurement	0.68	0.71	0.48	10	0.67	0.46	11	0.46	0.31	38
15		Improper sequencing of work	0.73	0.65	0.48	12	0.66	0.48	6	0.56	0.41	9
16		Mistakes in devolving the bidding/estimation	0.71	0.75	0.53	5	0.56	0.40	24	0.52	0.36	26
17		Unawareness of government rules and regulations	0.73	0.70	0.51	7	0.63	0.46	9	0.50	0.36	27
18		Poor quality of material	0.60	0.74	0.45	17	0.58	0.35	38	0.66	0.39	15
19		Unsuitable project leadership	0.62	0.71	0.44	20	0.68	0.42	19	0.63	0.39	17
20		incompetent subcontractors	0.57	0.68	0.38	36	0.64	0.37	32	0.59	0.34	32
21	Project Document Related	Inadequate/incomplete technical plans/specification	0.60	0.70	0.42	25	0.59	0.35	37	0.63	0.38	22
22		Lack of original as-built drawings for government buildings	0.83	0.69	0.57	1	0.62	0.51	3	0.59	0.49	1

No.	Category	Dispute Causes	Frequency Adjusted Importance Index (FAII)									
			FI	Cost			Time			Quality		
				SI	FAII	Rank	SI	FAII	Rank	SI	FAII	Rank
23		Weakness in contract language	0.67	0.69	0.46	14	0.64	0.43	13	0.58	0.39	19
24		A contradiction between project documents	0.62	0.64	0.40	30	0.60	0.37	30	0.56	0.35	31
25		Unrealistic project schedule	0.66	0.72	0.48	11	0.64	0.42	16	0.59	0.39	16
26		Inaccurate BOQ in the lump-sum contract	0.68	0.71	0.49	9	0.59	0.41	20	0.48	0.33	35
27		Ambiguity in project boundaries and responsibility	0.69	0.67	0.46	13	0.61	0.42	18	0.59	0.41	11
28		Poorly defined scope of work	0.71	0.75	0.53	4	0.69	0.49	5	0.64	0.45	2
29		Lack of setting a dispute resolution reference between contract parties	0.67	0.63	0.43	24	0.59	0.40	25	0.56	0.37	24
30		Mixing lump-sum and unit-price impractically in the same contract	0.72	0.61	0.44	19	0.56	0.41	21	0.53	0.38	21
31		Ambiguity in the contract document	0.61	0.68	0.42	26	0.63	0.38	27	0.59	0.36	28
32		Lack of communication and coordination	0.49	0.64	0.32	44	0.67	0.33	41	0.60	0.30	40
33	Owner & Contractor Related	Misunderstanding between owner and contractor	0.71	0.62	0.44	20	0.66	0.47	8	0.61	0.43	7
34		Lack of team spirit	0.57	0.61	0.35	41	0.63	0.36	35	0.58	0.33	34
35	External Factor Related	Delay of permit/approval from other government authority	0.67	0.58	0.39	31	0.63	0.42	17	0.49	0.33	33
36		Differing site conditions	0.61	0.64	0.39	32	0.62	0.38	28	0.52	0.32	36
37		Shortage of skilled workers for maintenance services	0.59	0.66	0.39	34	0.62	0.37	31	0.62	0.37	25
38		Unavailability of required spare parts	0.57	0.64	0.37	38	0.63	0.36	36	0.63	0.36	29
39		Materials delay due to customs clearance	0.66	0.62	0.41	28	0.64	0.43	14	0.48	0.32	37
40		Fluctuation of materials costs during project execution	0.70	0.70	0.49	8	0.56	0.39	26	0.51	0.35	30
41		Weather conditions	0.52	0.66	0.34	43	0.64	0.33	39	0.53	0.28	42
42		Inflation	0.53	0.71	0.38	37	0.57	0.30	44	0.48	0.26	43
43		Unforeseen problems	0.52	0.70	0.36	39	0.62	0.32	42	0.56	0.29	41
44		Force majeure	0.48	0.71	0.34	42	0.65	0.31	43	0.49	0.24	44

After adjusting the frequency of dispute causes in government building maintenance project by consider the severity on cost, time and quality, it is noticed that two owner related dispute causes appear in all categories which are constant interferences in contract execution and delay in response/decision making. Moreover, the two-project document related dispute causes that also effect cost, time and quality are lack of original as-built drawings for government buildings and poorly defined scope of work. Therefore, to better interpret and comprehend the results of the adjusted frequency of dispute causes in government building maintenance projects, table 28 uses a color-coding system to clearly present the similar dispute causes on cost, time and quality.

Table 28: Most Adjusted Frequent Dispute Causes in Maintenance Projects

Most Frequent Dispute Causes (FAIL)							Rank
Category	Cost		Category	Time		Category	
Project Document	Lack of original as-built drawings for government buildings		Owner	Constant interferences in contract execution		Project Document	1
Owner	Constant interferences in contract execution		Owner	Delay in response/decision making		Project Document	2
Owner	Delay in response/decision making		Project Document	Lack of original as-built drawings for government buildings		Contractor	3
Project Document	Poorly defined scope of work		Owner	Delay in payments		Owner	4
Contractor	Mistakes in devolving the bidding/estimation		Project Document	Poorly defined scope of work		Owner	5

The most frequent dispute causes are approached by each category and their effects on cost, time or quality are further discussed in the context of the text as follows:

4.5.1 Most Frequent Owner Related Dispute Causes

The results indicate the most frequent owner related dispute causes after considering the severity on cost, time and quality in government building maintenance projects are constant interferences in contract execution, delay in response/decision making, and delay in payments. The owner's continuous involvement is critical in government building maintenance projects; nevertheless, this involvement is sometimes misinterpreted as interference with contract execution. Therefore, owners must cooperate with maintenance contractors to ensure smooth project execution. The owners' major responsibilities include replying to the contractor's requests for permits and authorizations, as well as clarifying any concerns about the project's scope. As a result, delays in responding to or making critical decisions by owners typically impact the project cost, time, and quality. Furthermore, the delay in payments by owners in maintenance projects is a frequent dispute cause as contractors may withdraw their resources from the project and halt work progress until they are paid, impacting the project cost and time with less effect on quality.

4.5.2 Most Frequent Contractor Related Dispute Causes

The result indicate that the two most frequent contractor related dispute causes are mistakes in devolving the bidding/estimation and unskilled contractor's manpower/labor. Bidding on a maintenance project without first carefully reviewing the drawings and specifications would likely result in overestimated or underestimated bid. The mistakes in devolving the bidding/estimation by contractor mostly impact the project cost with less effect on time and quality. This is because typically developing the bids takes place before the project's planning and execution phases, therefore the impact on time or quality is minimal. The success of a bid relies on precise measurements and quantities of the project. Therefore,

failing to read the project documentation and lacking the proper experience of the in-house team definitely lead to incorrect project estimates. Sometimes, a site's specific circumstances require extra expenses (e.g., the project remoteness and lack of easy access to the site) which if not accounted for, contractors might end up skipping some quality measures to account for the cost loss caused by the underestimated project bid. Therefore, the mistakes in devolving the bidding/estimation impact mostly the project cost. Furthermore, high productivity and precision of performing maintenance projects only result from having skilled staff. Therefore, using unskilled personnel nearly invariably leads to rework and owner dissatisfaction. Unskilled personnel lack the essential skills to carry out the necessary maintenance work, which impacts the time and quality of the work. The level of competence a worker possesses determines the quality of the job produced; the greater the skill level, the better the quality of the work produced.

4.5.3 Most Frequent Project Document Related Dispute Causes

The results also indicate that most frequent project document related dispute cause in government building maintenance projects are the lack of original as-built drawings for government buildings and poorly defined scope of work. The lack of the as-built drawings is widespread in government buildings creating continuous difficulties for the maintenance team in carrying out their duties properly. This can be justified as proper maintenance is not performed until many years after government buildings start to deteriorate. This is noticed in many cases as building maintenance is often seen or misunderstood as breakdowns or deficiencies in the building's structure or other problems in terms of meeting the building's intended purpose. Moreover, according to the recent findings of (Chandra & Raj, 2020) that one of the most important aspects influencing building maintenance is the

available detailing of working drawings. This issue is a big concern to owners and contractors as the original as-built drawings must be accessible during the execution of corrective and preventative maintenance work in order to perform work as per allocated budget, planned schedule and required quality.

Furthermore, the scope of a maintenance project is a vital contracting document that specifies in detail what is expected of each party. Correctly identifying and drafting the project contract is the first step in establishing a project, perhaps the most crucial step. This critical document also spells out in detail everything that needs to be done, how to be done, and by when each milestone is expected to be completed. Moreover, the use of imprecise terminology and the lack of work instructions on how to deal with major project issues (e.g., variation orders) all contribute to the poor definition of project scope. Therefore, poor definition of scope of work impacts cost, time and quality of the project and is considered a frequent dispute cause in government building maintenance projects.

The discussed dispute causes are considered the most frequent dispute causes in government building maintenance projects and that is mainly due to the nature of maintenance projects as they follow a short time schedule and tight budget that rely on a dynamic work which is typically conducted on a periodic basis. Therefore, it is important to keep an eye for those dispute causes and have each party involved acknowledge their roles in the project to prevent them from arising during project execution.

4.6 Risk Mapping of Dispute Causes in Maintenance Projects

Identifying and mitigating potential risks is an essential part of any maintenance project management strategy. It raises the probability that the project will be finished successfully while lessening the impact of any potential problems. Risk assessment is a useful tool that is used during the planning phase of a project. It enumerates the possible threats to a project, records their frequency, and assesses the harm or delay that might result from those threats. The risk assessment provides a tabular illustration of the risk analysis by classifying them according to their frequency and degree of severity. The risk matrix relies on the conventional understanding of risk, which considers both the probability of an event and the severity of its potential outcomes. This indicates that a risk mapping matrix is constructed with two input variables. The severity and frequency are the sole factors that go into calculating the risk matrix (Ni et al., 2010). Causes of disputes are considered potential risks throughout the project lifecycle. Using a risk mapping matrix to visualize those risks is a great way to avoid them.

By providing a visual representation of each cause's average impact and frequency level in the data collected from the respondents, the risk mapping matrix, shown in Figure 18, is a tool that aids in expressing which risk zone each dispute cause fits into. The frequency mean values (1–5) are shown on the horizontal axis, while the impact mean values (1–5) are shown on the vertical axis. The matrix has been colored based on a set of thresholds. Different color codes and alphabetic letters signify various risk categories and suggest various actions. The risk categories are coded using the alphabetic letters A through E, as illustrated in table 29. Code A (blue color) implies a negligible risk, necessitating no further action on the part of the maintenance contractor. Code B (green color) signifies high impact

and moderate frequency which urges maintenance contractors to think about the viability of implementing measures to mitigate/reduce the risk. Code C (yellow) denotes high impact and moderate frequency. It requires contractors to assess further risk-reduction measures, execute those deemed practicable, and approve continuous operations. Furthermore, high frequency and high impact are indicated by the code D (orange color), and maintenance contractors are required to do an appropriate quantitative or qualitative risk analysis to confirm the risk level. It also requires maintenance contractors to implement adequate risk-reduction measures at this level. Finally, code E (red color) indicates very high impact and very high frequency and urges the use of opportunities found during risk analysis. (Gunduz & Abu-Hijleh, 2020; Shash & AbuAlnaja, 2023).

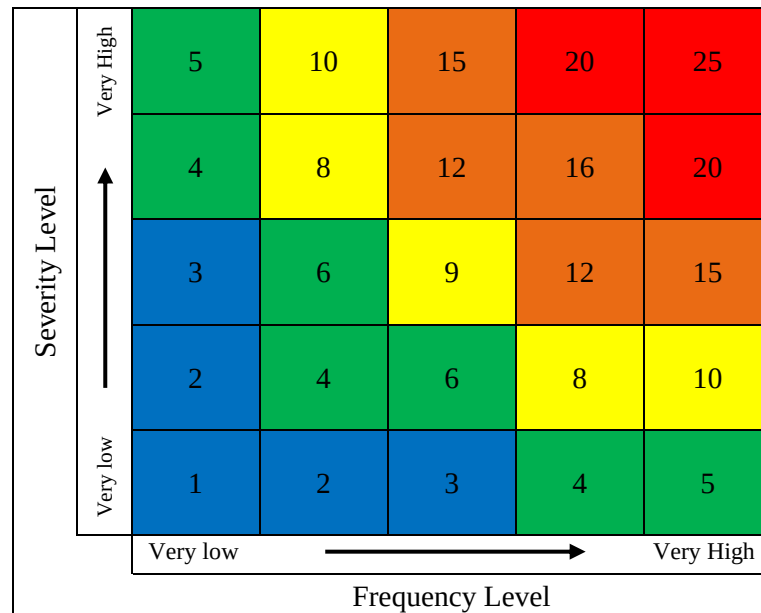


Figure 18: Risk Mapping Matrix

The author established the borders of each zone by studying other research that employed risk mapping in related domains and talking with academics and maintenance project experts on how they evaluate the likelihood and severity of risks associated with

maintaining government buildings. Table 34 indicates the risk class scale that corresponds with each color zone and code. The risk category is given for each potential risk as follows:

Table 29: Risk Matrix Class Scales

Impact × Frequency Mean Scale	Frequency/Importance Class	Zone	Color Grading
1.00 – 3.99	Very Low	A	Blue
4.00 – 7.99	Low	B	Green
8.00 – 11.99	Moderate	C	Yellow
12.00 – 19.99	High	D	Orange
20.00 – 25.99	Very High	E	Red

4.6.1 Risks Assessment of Dispute Causes on Cost, Time & Quality

Table 30 shows the average impact and frequency levels and risk zone for each of dispute cause on cost, time and quality. High risks are more critical to government building maintenance projects than moderate to low risks in most cases. The delay in payments, delay in response/decision making, constant interferences in contract execution, delay of material procurement, Improper sequencing of work, mistakes in devolving the bidding/estimation, unawareness of government rules and regulations, lack of original as-built drawings for government buildings, inaccurate BOQ in the lump-sum contract, poorly defined scope of work, and fluctuation of materials costs during project execution are all high risks in terms of cost, time and quality.

Table 30: Risks Assessment of Dispute Causes on Cost, Time & Quality

No.	Dispute Causes	Severity			Frequency Mean	Cost		Time		Quality	
		Cost Mean	Time Mean	Quality Mean		Frequency × Severity	Risk Zone/ Grading	Frequency × Severity	Risk Zone/ Grading	Frequency × Severity	Risk Zone/ Grading
Owner Related											
1	Excessive variation orders	3.03	3.56	3.11	3.22	9.76	C	11.46	C	10.02	C
2	Delay in material/drawing approval	3.17	3.36	2.75	3.50	11.08	C	11.76	C	9.63	C
3	Delay in payments	3.58	3.44	2.81	3.61	12.94	D	12.44	D	10.13	C
4	Delay in response/decision making	3.61	3.44	2.97	3.72	13.44	D	12.82	D	11.06	C
5	Constant interferences in contract execution	3.50	3.42	2.78	3.92	13.71	D	13.38	D	10.88	C
6	Late site handover to the contractor	3.00	3.00	2.50	3.00	9.00	C	9.00	C	7.50	B
7	Apply penalty without conducting a proper investigation	3.42	3.06	3.08	3.28	11.20	C	10.02	C	10.11	C
8	Contradiction directions enforced on the contractor by different personnel from the owner side	2.83	3.11	3.17	3.42	9.68	C	10.63	C	10.82	C
Contractor Related											
9	Lack of site supervision	3.64	2.97	3.39	2.78	10.11	C	8.26	C	9.41	C
10	Subcontracting/outsourcing all project activities	3.25	2.83	3.17	3.31	10.74	C	9.37	C	10.47	C
11	unskilled contractor's manpower/labor	3.28	3.25	3.33	3.33	10.93	C	10.83	C	11.11	C

No.	Dispute Causes	Severity			Frequency Mean	Cost		Time		Quality	
		Cost Mean	Time Mean	Quality Mean		Frequency × Severity	Risk Zone/ Grading	Frequency × Severity	Risk Zone/ Grading	Frequency × Severity	Risk Zone/ Grading
12	Poor quality of completed work	3.78	2.97	3.36	3.03	11.44	C	9.00	C	10.18	C
13	Poor site management	3.36	3.28	3.14	3.08	10.36	C	10.11	C	9.68	C
14	Delay of material procurement	3.56	3.36	2.28	3.39	12.05	D	11.39	C	7.72	B
15	Improper sequencing of work	3.25	3.28	2.78	3.67	11.92	C	12.02	D	10.19	C
16	Mistakes in devolving the bidding/estimation	3.75	2.81	2.58	3.53	13.23	D	9.90	C	9.11	C
17	Unawareness of government rules and regulations	3.50	3.17	2.50	3.64	12.74	D	11.52	C	9.10	C
18	Poor quality of material	3.72	2.89	3.28	3.00	11.17	C	8.67	C	9.83	C
19	Unsuitable project leadership	3.56	3.39	3.14	3.08	10.96	C	10.45	C	9.68	C
20	incompetent subcontractors	3.39	3.22	2.97	2.83	9.60	C	9.13	C	8.42	C
Project Document Related											
21	Inadequate/incomplete technical plans/specification	3.50	2.94	3.14	3.00	10.50	C	8.83	C	9.42	C
22	Lack of original as-built drawings for government buildings	3.44	3.08	2.97	4.14	14.26	D	12.76	D	12.30	D
23	Weakness in contract language	3.47	3.22	2.89	3.33	11.57	C	10.74	C	9.63	C
24	A contradiction between project documents	3.22	3.00	2.81	3.08	9.94	C	9.25	C	8.65	C
25	Unrealistic project schedule	3.61	3.19	2.94	3.31	11.94	C	10.56	C	9.73	C

No.	Dispute Causes	Severity			Frequency Mean	Cost		Time		Quality	
		Cost Mean	Time Mean	Quality Mean		Frequency × Severity	Risk Zone/ Grading	Frequency × Severity	Risk Zone/ Grading	Frequency × Severity	Risk Zone/ Grading
26	Inaccurate BOQ in the lump-sum contract	3.56	2.97	2.39	3.42	12.15	D	10.16	C	8.16	C
27	Ambiguity in project boundaries and responsibility	3.36	3.06	2.94	3.44	11.58	C	10.52	C	10.14	C
28	Poorly defined scope of work	3.75	3.44	3.22	3.53	13.23	D	12.15	D	11.37	C
29	Lack of setting a dispute resolution reference between contract parties	3.17	2.94	2.78	3.36	10.64	C	9.90	C	9.34	C
30	Mixing lump-sum and unit-price impractically in the same contract	3.06	2.81	2.64	3.61	11.03	C	10.13	C	9.53	C
31	Ambiguity in the contract document	3.42	3.14	2.94	3.06	10.44	C	9.59	C	9.00	C
Owner & Contractor Related											
32	Lack of communication and coordination	3.19	3.33	3.00	2.47	7.90	B	8.24	C	7.42	B
33	Misunderstanding between owner and contractor	3.08	3.28	3.03	3.56	10.96	C	11.65	C	10.77	C
34	Lack of team spirit	3.06	3.17	2.89	2.83	8.66	C	8.97	C	8.19	C
External Factor Related											
35	Delay of permit/approval from other government authority	2.92	3.14	2.47	3.36	9.80	C	10.55	C	8.31	C
36	Differing site conditions	3.19	3.11	2.61	3.06	9.76	C	9.51	C	7.98	B
37	Shortage of skilled workers for maintenance services	3.31	3.11	3.11	2.94	9.73	C	9.16	C	9.16	C

No.	Dispute Causes	Severity			Frequency Mean	Cost		Time		Quality	
		Cost Mean	Time Mean	Quality Mean		Frequency × Severity	Risk Zone/ Grading	Frequency × Severity	Risk Zone/ Grading	Frequency × Severity	Risk Zone/ Grading
38	Unavailability of required spare parts	3.22	3.14	3.17	2.83	9.13	C	8.89	C	8.97	C
39	Materials delay due to customs clearance	3.11	3.22	2.39	3.31	10.28	C	10.65	C	7.90	B
40	Fluctuation of materials costs during project execution	3.50	2.81	2.53	3.50	12.25	D	9.82	C	8.85	C
41	Weather conditions	3.28	3.19	2.67	2.61	8.56	C	8.34	C	6.96	B
42	Inflation	3.53	2.83	2.42	2.67	9.41	C	7.56	B	6.44	B
43	Unforeseen problems	3.50	3.08	2.78	2.58	9.04	C	7.97	B	7.18	B
44	Force majeure	3.56	3.25	2.44	2.42	8.59	C	7.85	B	5.91	B

The high risks that fall within the owner related category are delay in payment, constant interferences in contract execution and delay in response/decision making which effect the cost and time of the project directly. The continual involvement of the owner is vitally necessary in government building maintenance projects; however, this involvement is sometimes mistaken as interference with contract execution which poses a high risk in terms of the project cost, and time. Furthermore, owners in maintenance projects are required to work collaboratively with maintenance contractors in order to ensure a seamless project execution. Some of the key tasks of owners include responding to the contractor's requests for permits and authorizations, as well as providing clarification on any concerns about the project's scope. However, delays in responding or making crucial decisions by owners frequently impair the project's cost and time, for which mostly contractors are held accountable for. Lastly, delay in payments pose a high risk on contractors caused by owner in terms of cost and time which makes sense, given that contractors may withdraw their resources from the project and halt work progress until they are paid, resulting in additional delays and cost and time overruns.

The contractor related high risks in terms of cost or quality are delay of material procurement, mistakes in devolving the bidding/estimation, unawareness of government rules and regulations, and the improper sequence of the work. The importance of procuring materials on time is often emphasized in maintenance projects as they are considered cost and time sensitive projects. Therefore, delays in procurement are high risks and usually affects the project's cost. When bidding on maintenance projects, contractors must ensure accurate and fair estimation. Any faults made during the bidding process are the contractor's responsibility. When contractors submit a bid, they are taking a risk, perhaps

a big one. An accurate estimate is the first line of defence in lowering potential risks during the project execution. Furthermore, maintenance projects also face another high risk due to the contractor's lack of awareness of the constantly updated Saudi laws and regulations. Most maintenance work on government buildings requires some form of procedure to be followed, which may include work permits or permissions from other agencies that are directly or indirectly involved to project. Therefore, before doing any government maintenance work, contractors must be fully informed of the general laws and regulations of the local content and government procurement authority as well as the organization's own rules. Furthermore, the necessity of work sequence is frequently emphasized in maintenance projects since they are regarded as time-sensitive projects. An incorrect work sequence has an impact on the project's deadline. Typically, the role of setting the work sequence in maintenance projects is the responsibility of the contractor and to ensure the project completion is within time.

The high risks indicated in the results that are related to the project documents are the lack of original as-built drawings for government buildings, inaccurate BOQ in the lump-sum contract, and poorly defined scope of work. The lack of original as-built drawings for government buildings poses a threat on cost, time, and quality. The absence of as-built drawings is common in government buildings, posing high risks for the maintenance personnel in carrying out their duties appropriately. This is a high risk on terms of cost, time and quality of maintenance projects as maintenance is not conducted until many years after government facilities begin to deteriorate. This has been observed in many cases around the world, as regular building maintenance is frequently regarded or misunderstood as breakdowns or flaws in the structure of the building, or other problems in terms of

performing the facility's intended purpose. According to a recent study by Chandra & Raj, (2020), one of the most important factors impacting building maintenance is the availability of working drawings details. Unfortunately, older government buildings relied solely on paper-based architectural drawings, which were impaired by the elements or frequently lost. Therefore, this is a high risk for owners and contractors since the original as-built drawings must be available during the execution of corrective and preventative maintenance work to ensure the work is performed as per the allocated budget, planned schedule, and required quality. Another project document related high risk that impacts the project's cost and time is the project's scope of work. A well-defined project scope is dependent on a clear project aim and vision, which owners must articulate in advance in order to contribute to the project's success. Maintenance projects are unlikely to succeed in the absence of a well-defined scope of work due to the lack of the intended objectives, needs, and functionality of a project, resulting in the project lasting longer than planned, and incurring more expenses. Furthermore, inaccurate bill of quantities in a lump-sum contract also provides a high-cost risk because the nature of lump sum contracts which are considered fixed price contracts, and having incorrect bill of quantities leads to variation orders, which drive the project's cost higher than anticipated.

Lastly, the only external factor related to high risk in terms of cost is the fluctuation of materials costs during project execution, which is a big concern that needs to be addressed by the project owner and contractor to prevent project cost overrun. The risk of fluctuation of materials costs can also be managed through some provision of the contract which limits rate fluctuation to a set percentage otherwise, the owner has to incur some of the material rate change costs.

In conclusion, the discussed dispute causes are identified as high risks in government building maintenance projects though the risk mapping technique whereas the rest of dispute causes are moderate to low risks in terms of cost, time, and quality. Furthermore, the high risks identified through the risk mapping technique have many similarities to the most frequent dispute causes identified though FAII technique which assets that the most frequent dispute causes are oftentimes high risks in government building maintenance projects.

4.7 Consequences of Disputes

After determining the most frequent and severe dispute causes in government building maintenance projects, it is also essential to study the effects of the disputes on either owners, contractors, or projects. Most disputes that arise during government maintenance projects end up negatively impacting all parties involved. The participants were asked to indicate the dispute consequences. The participants provided numerical data on the consequences of disputes on business relationship between the stakeholders, the project progress, and on stakeholders' business reputation.

Table 31: Dispute Consequences Frequency

Dispute Consequences	Mean	Std. Deviation	Variance	FI	Rank
Increment in project cost	3.5556	1.22927	1.511	0.711	1
Reduction in productivity	3.4167	0.99642	0.993	0.683	2
Loss of business viability	3.3611	1.22247	1.494	0.672	3
Tension and dampness of team spirit	3.3056	1.26083	1.590	0.661	4
Profitability loss	3.2222	0.98883	0.978	0.644	5
Breakdown in communication and professional relationship	3.1944	1.00909	1.018	0.639	6
Diminution of respect between parties	3.1944	1.30536	1.704	0.639	7
Damages to business relationships	3.1667	1.02817	1.057	0.633	8
Delay in the progress of work	3.1389	1.04616	1.094	0.628	9
Loss of company reputation	3.1111	1.25988	1.587	0.622	10
Delay in project delivery date	3.1111	0.97915	0.959	0.622	11
Abandonment of the project	3.0000	1.37321	1.886	0.600	12
Underutilization of resources	2.9167	1.07902	1.164	0.583	13

The results indicate that an increment in project cost is the first and most frequent consequence of disputes, and this is an unavoidable result of any dispute. There are disputes which may be settled by negotiation and mediation and that is a healthy rapid resolution strategy which oftentimes would not affect the schedule or budget of the project. Other

dispute resolution methods, such as arbitration and litigation, might take anywhere from six months to three years depending on many factors. The owners and the contractors are losing a lot of money oftentimes because of the delay in resolving the disagreements. Delays in the execution of many maintenance projects can result in significant financial losses for the owners, especially in cases where the building is occupied before the project execution and the owner is required to temporarily relocate their employees and belongings to a rental building while the work is being undertaken. In addition, contractors may incur unanticipated costs for labor, materials and equipment needed to complete the work which get suspended until the disagreement is settled. In some cases, there are some costs that are associated with a judge or arbitrator that may be shared equally by the parties. Therefore, the final cost of the project would oftentimes be far higher than the initial estimates, which would have a major impact on both sides. The frequency results of dispute consequences are presented in a bar chart form in Figure 19.

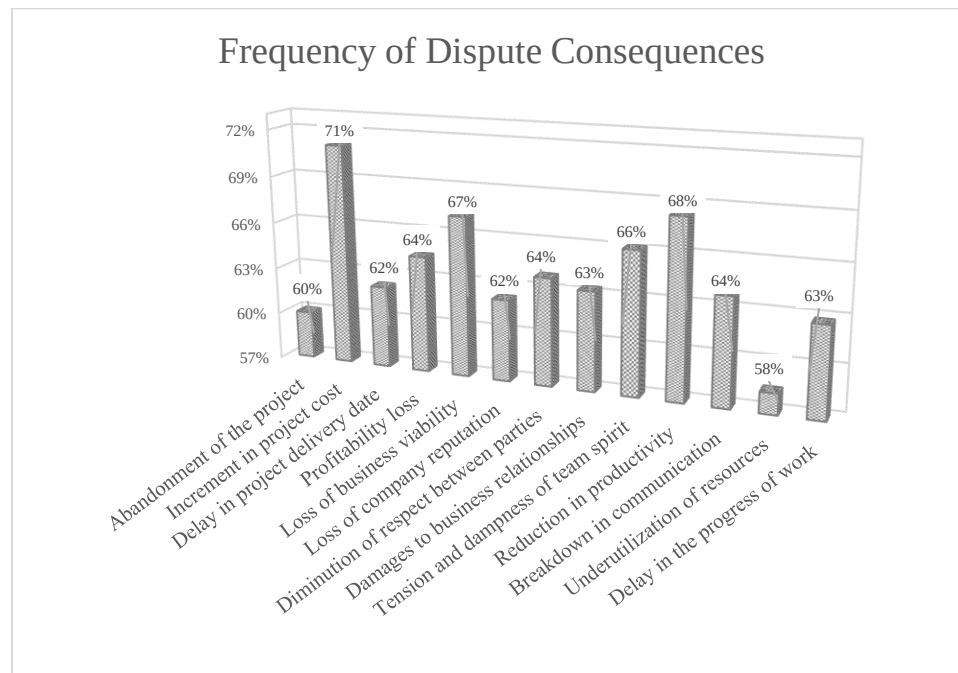


Figure 19: Dispute Consequences Based on Frequency

The results indicate that the second most frequent consequence of disputes in government building maintenance projects is reduction in productivity. Loss of productivity in maintenance projects often occurs when disputes prevent necessary tasks from being completed. Productivity drops may also be caused by not acquiring the necessary approval for completed activity before moving on to the next task due to ongoing disputes between parties. Therefore, oftentimes as long as the dispute remains unresolved, production will suffer. The owner's low productivity is likely also attributable to their focus on dispute settlement, which may prevent them from performing their essential responsibilities in the project. In addition, contractors occasionally pull out their workers from the site to other projects if the resolution process takes longer than intended, seeing as how this represents extra expenditures on the contractors' part and a feasible alternative is to deploy these resources elsewhere.

The results indicate that the loss of business viability is the third most frequent consequence of dispute in government building maintenance projects. A business may be considered viable if it has sustained profitability over time and can satisfy its financial and operational commitments. If a company is viable, it means it has a good chance of continuing to operate. This ability to endure depends on financial stability and productivity which oftentimes is affected by disputes in maintenance projects. A contractor's ability to maintain day-to-day operations and to weather inevitable disputes is essential in a maintenance project, otherwise, the contractor is unable to successfully complete the project. Disputes are always a possibility in maintenance projects, and they may diminish a company's viability if not resolved. Generally, contractors would feel the effects of business viability loss more than owners would.

The rest of the consequences of dispute are equally significant and may be broken down into two groups: (1) those that pertain to communication between the project parties, and (2) those that pertain to the project itself. Tension and dampness of team spirit, breakdown in communication and professional relationship, diminution of respect between parties, damage to business relationships, loss of company reputation would fall into the first group. Such sorts of disputes impact both owners and contractors, which would be avoided rather than reported in many cases due to their negative effect, which presents itself more overtly in individuals than the project itself. However, like any other kind of project, maintenance projects are managed by humans, and as the project progresses, the resulting effects of the lack of communication and interpersonal skills become more apparent. Most of the dispute consequences in the first group are intangible; therefore, they are not oftentimes immeasurable. However, there are various methods that may be used to manage and regulate those types of dispute consequences in maintenance projects until the disputes are resolved, such as the reimplementation of the code of conduct, the project communication strategy plan, and informal encounters outside of work.

The second group of dispute consequences are profitability loss, delay in the progress of work, delay in project delivery date, underutilization of resources, and abandonment of the project. These primarily affect the project directly which would result in a negative impact on contractors and owners. The second group of dispute consequences is more severe and requires immediate attention from the project team and owner to be resolved. Otherwise, unresolved disputes might lead to more detrimental outcomes for all parties involved and oftentimes lead to the abandonment of the project.

4.8 Dispute Resolution Systems

This chapter talks about the cost of dispute resolution, different methods used for resolution and the time each method requires a dispute to fully be resolved. This information is collected from experienced population in maintenance industry which is the primary objective of this study. The experienced participants indicated that the three most common dispute resolution methods in the maintenance industry are mediation, arbitration, and court. Hence, this chapter is broken down as follows: (1) Mediation cost, duration and disputes percentage solved through mediation, arbitration; (2) Arbitration cost, duration and disputes percentage solved through Arbitration; and (3) Court cost, duration and disputes percentage solved through court.

4.8.1 Mediation

A mediator is a third party who acts as an impartial facilitator in a dispute resolution process, with the goal of assisting the parties in reaching an agreement without further intervention from the mediator. Mediation has potential benefits since it encourages parties to work together to resolve their dispute, but it also has the risk of failure if the parties cannot reach an agreement. In mediation, both parties must agree to participate and find a settlement via discussion and compromise. The mediator will next speak with each party separately to highlight the benefits and drawbacks of each position, with the goal of reaching an agreement. The mediator's role is to assist the parties in reaching an amicable resolution by facilitating a discussion in which they come to terms with the fact that settling for less than ideal is the norm and reach an agreement. Instead of going through the lengthy process of arbitration and litigation, the mediator in session will work to find a mutually agreeable solution that will save both parties time and money.

The costs of mediators vary in cost from one another. Determining the exact cost for a mediation process is also difficult unless a fixed price has been agreed upon in advance. The mediator's compensation shall be based on the time the mediator actually spends on the case. It's possible for the mediator's compensation to be negotiated down from an hourly charge to a flat rate that everyone involved is comfortable with. And even with flat rates, mediators or mediation firms typically add extra hourly expenses if the parties are unable to reach a settlement within the specified time.

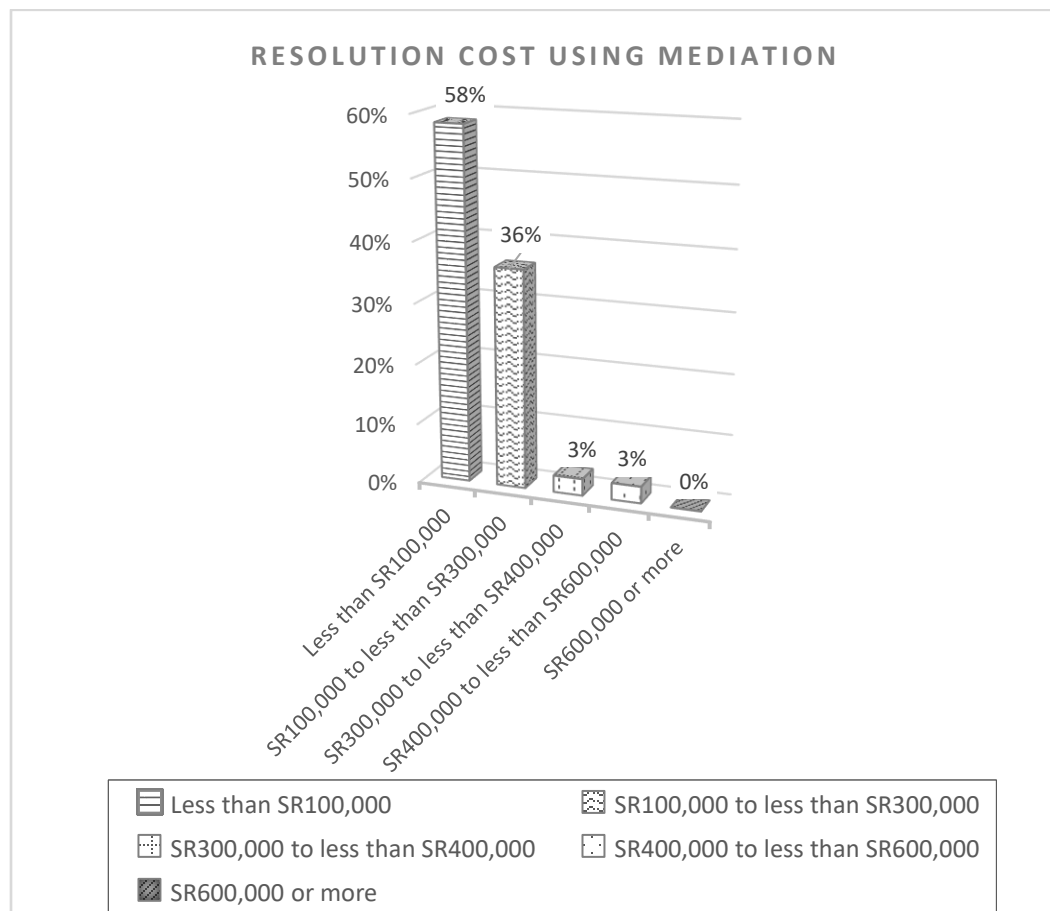


Figure 20: Resolution Cost using Mediation.

However, this research can help us get a sense of the range of costs associated with a mediation process for dispute resolution involving government building maintenance

projects. Participants are asked to select one of five possible cost ranges. It can be seen from the graph below that 36% of participants think that the cost of mediation is between SR100,000 and SR300,000. More than half of participants think the total cost would be less than SR100,000. The cost of mediation is based on what is decided upon by the sample majority, which is less than SR100,000.

Furthermore, the majority of participants' answers suggest that duration of mediation process is less than 2 months accounting for 53% of total answers.

Table 32: Resolution Duration using Mediation.

Resolution Duration using Mediation	Number of Participants	Percent (%)
Less than 2 months	19	53%
2 to less than 6 months	13	36%
6 to less than 12 months	3	8%
12 to less than 18 months	1	3%
Equal to 18 months or more	0	0%
Total	36	100%

This indicator is in conformance with the suggested duration of mediation resolution process from Saudi Center for Commercial Arbitration (SCCA). And that is one of the benefits of mediation resolution method as it helps keep costs down while still achieving the desired results in timely manner, two crucial characteristics for a success accomplishment of maintenance projects.

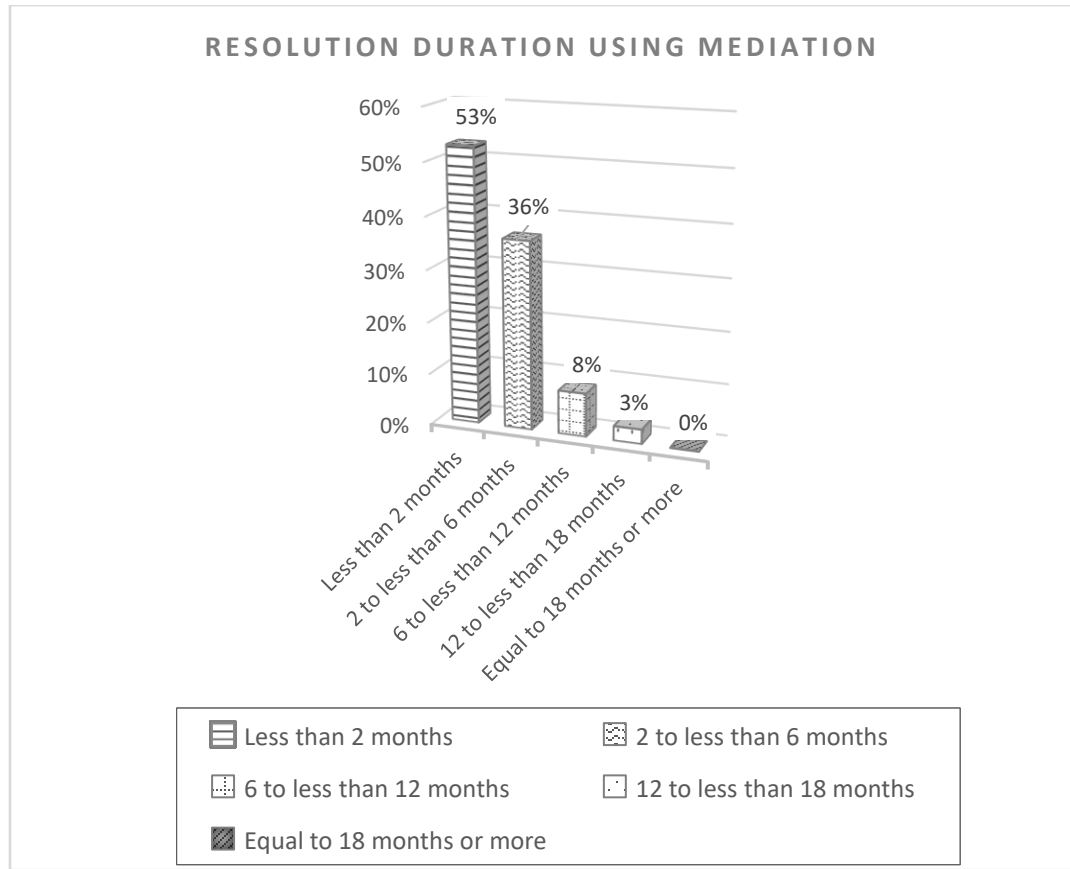


Figure 21: Resolution Duration using Mediation.

What sets mediation apart from arbitration is that, unlike in arbitration, the parties in mediation do not cede authority over the dispute to the mediator. It is commonly considered that mediation is a method based on interests, whereas arbitration is based on rights. In addition to considering previous behavior, parties who take commercial interests into consideration might make a decision based on how they want to continue working together in the future.

Furthermore, the study suggests that mediation is the most common method used to resolve government building maintenance project disputes. The majority of participants, who account for 64%, agree that mediation is used anywhere from 76%-100% to resolve disputes.

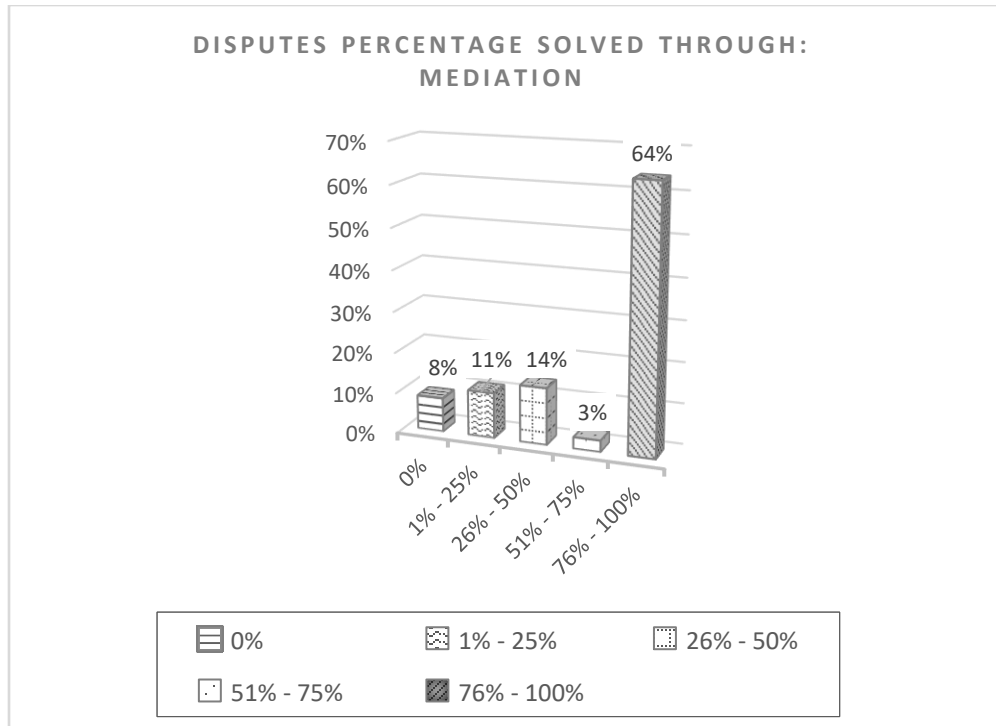


Figure 22: Disputes percentage solved through: Mediation.

There are many reasons why mediation is the preferred method of dispute resolution in Saudi maintenance industry, such as timesaving, court costs saving. Also, the parties are under no obligation to settle their dispute during mediation and are free to do so at any time. Nothing said during a mediation session can be used as evidence in a legal proceeding.

4.8.2 Arbitration

It is crucial to establish a resolution method in a government building maintenance contract to implement it in the event of a dispute occurrence during project execution. Many disagreements have varying causes and consequences and can be approached from several angles. Parties involved may also agree on the form of dispute resolution that is more convenient and expedited than what is specified in the contract.

Arbitration is a legally binding method of resolving disputes. The main distinction is that arbitrators generally have more freedom to reach a compromise between the disputing parties. In arbitration, a neutral third party is hired to act as a private judge. And if one party ultimately refuses to comply with the arbitrator's decision, the other might have it enforced in court. Arbitration may bring a disagreement to a final resolution, but the parties involved have little to no influence in the matter.

Arbitration is a method of dispute resolution that is used instead of going to court oftentimes. Due to the time and money required for litigation, many people prefer arbitration instead. As with any legal proceeding, the cost of arbitration also may range. The total price tag will increase or decrease depending on the size of the claim, the number of scheduled hearings, and the volume of discovery motions. However, the participants are asked to select the appropriate price of arbitration method based on a range of prices that would yield a comprehensible outcome and provide an indicator of the suitable range of the method's cost. A quicker approach, such as arbitration, is oftentimes more expensive than a slower procedure, such as litigation. One other thing that can't be ignored is the opportunity cost of a quick resolution.

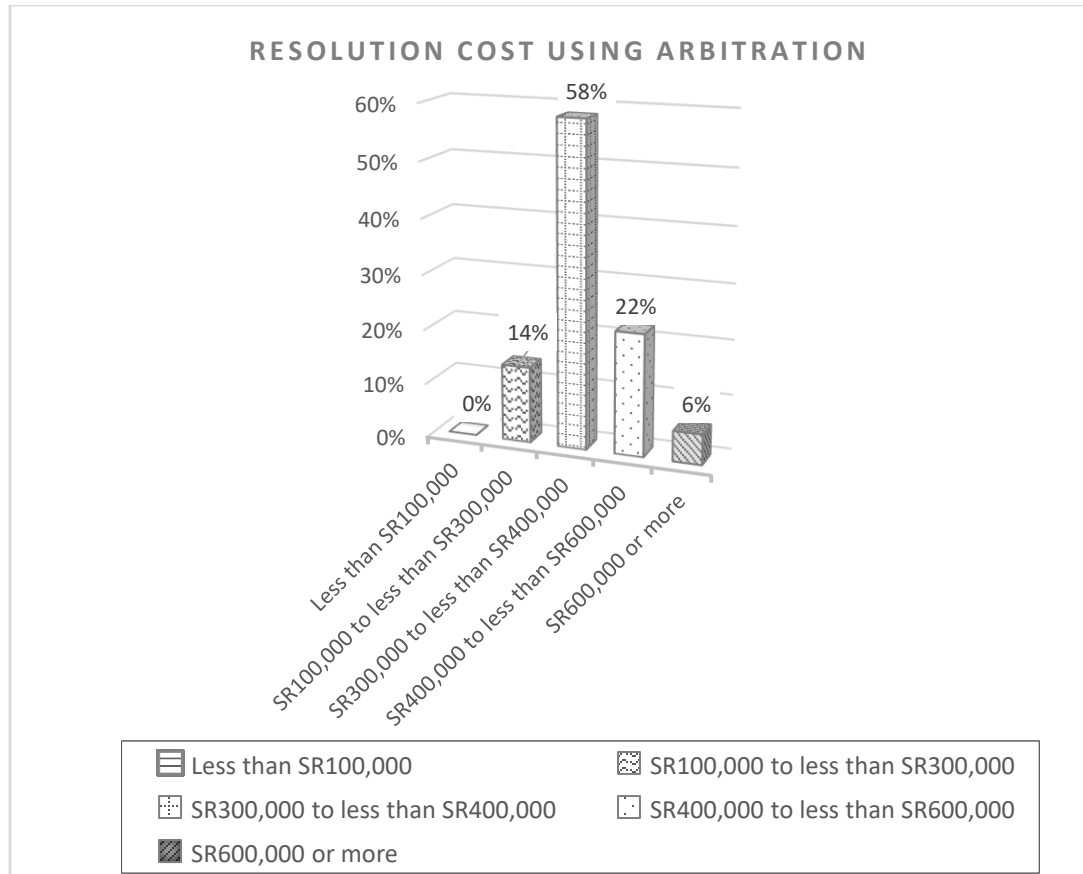


Figure 23: Resolution Cost using Arbitration.

The study findings suggest that the cost of arbitration in maintenance projects of government buildings falls within SR300,000 to less than SR400,000 per dispute resolution. The duration of the arbitration procedure, the number of arbitrators engaged, and even the style of hearing desired by the parties all contribute to the much greater cost of arbitration compared to the alternative dispute resolution approach of mediation.

Furthermore, contracts and rules governing the maintenance industry frequently utilize arbitration as the means of final dispute resolution rather than going to court. Choosing an arbitrator or panel of arbitrators with experience in the maintenance industry is a big factor in this. Arbitrators may be architects, engineers, or contractors, but they are more often attorneys. Also, the procedure is thought to be simplified in arbitration. Arbitrators have

some leeway in deciding what discovery to award the parties, therefore the length of the procedure might vary widely depending on the nature of the dispute.

Table 33: Resolution Duration using Arbitration.

Resolution Duration using Arbitration	Number of participants	Percent (%)
Less than 2 months	2	6%
2 to less than 6 months	20	56%
6 to less than 12 months	7	19%
12 to less than 18 months	5	14%
Equal to 18 months or more	2	6%
Total	36	100%

The result of the study suggests that arbitration method duration used for settling government building maintenance project disputes is 2 to less than 6 months as this accounts for the majority of participants answers, 56% which is about 20 participants. In addition, according to Article 30 of the Saudi Center for Commercial Arbitration's guidelines, the parties can decide when the arbitration decision should be given, as long as it's done within 60 days after the sessions' conclusion. Taking into account the time it takes for all parties to submit the relevant documents, hearings, and the time for the arbitration decision, the study's result of the time frame in regard to the arbitration method duration for settling government building maintenance project disputes is consistent with that specified duration in the center's guidelines.

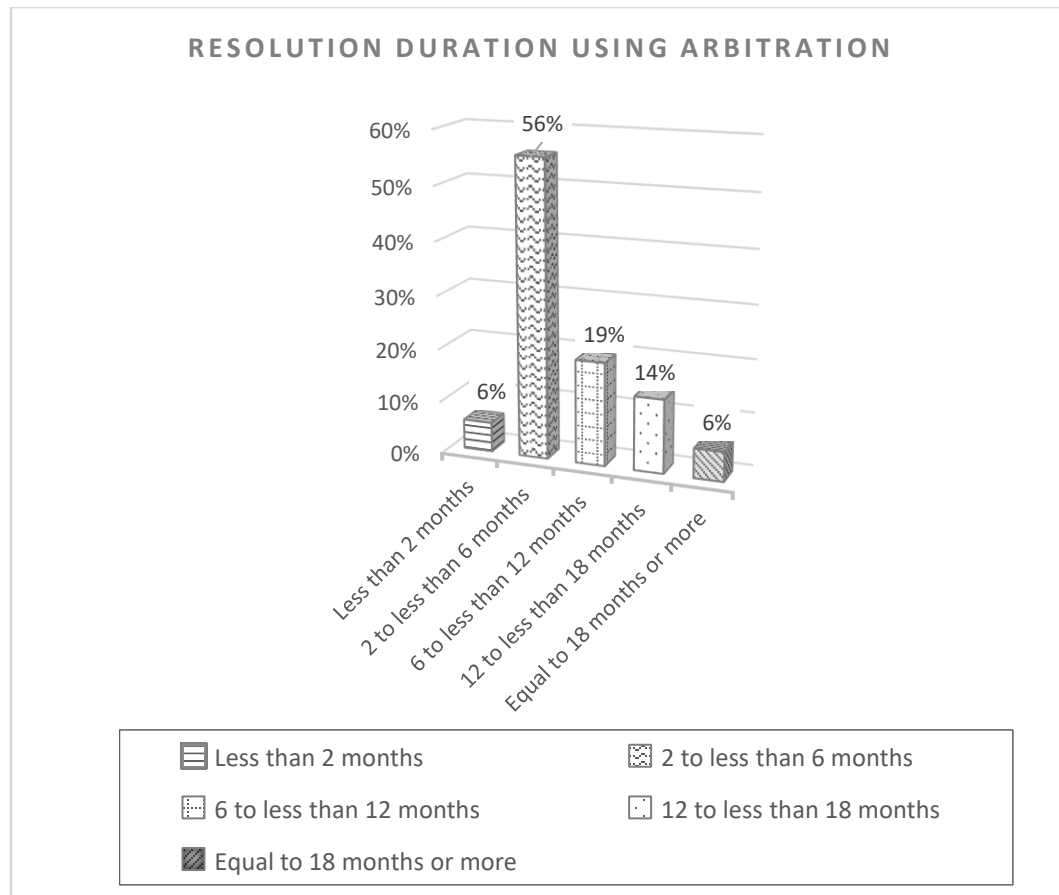


Figure 24: Resolution Duration using Arbitration.

Although some may claim that the arbitration process is not as quick as would be preferred, there is no data that shows that courts are more effective than arbitration in government maintenance disputes. Assumption holds false when considering arbitration's less rigid formality of the Saudi Arabian system.

Furthermore, the arbitrator's ruling regarding the parties' rights and obligations shall be final and binding on all parties according to SCCA. Arbitration is distinct from mediation in that the impartial third-party issues a binding ruling. However, mediation and arbitration are not alternatives to one other. Most contracts have a clause for resolving disputes

between the parties that allows for, or even requires, them to try to work out their differences through mediation first, with arbitration as a fallback if that fails.

The study findings have shown that the arbitration method is used to settle anywhere from 1% -25% of government building maintenance disputes, with participants accounting for the majority of 50% agreeing for this percentage of method use in Saudi maintenance industry.

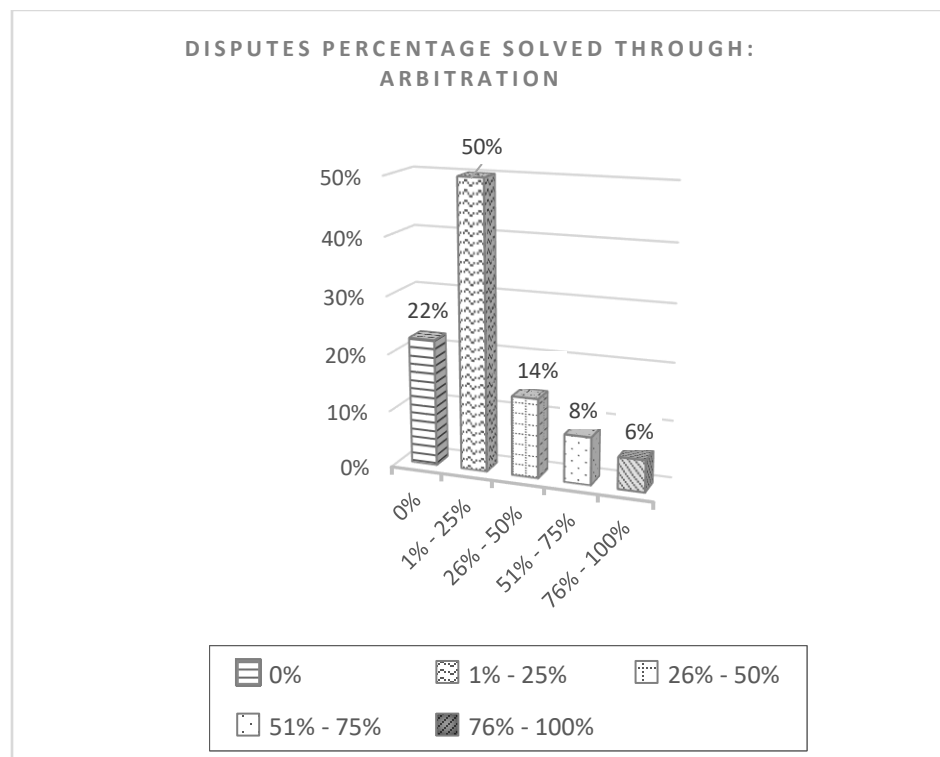


Figure 25: Disputes percentage solved through: Arbitration.

In most cases, the procedure of arbitration is less time-consuming as suggested by the result of the last section. However, results suggest that this is not the most common way for resolving disputes involving government building maintenance projects, perhaps because contractors/owners are inexperienced with this sort of dispute resolution technique and other, less expensive options such as the court system exist.

4.8.3 Court System

The third method is court or litigation which involves a judge or jury making a decision. Litigation begins with the filing of a lawsuit and continues through discovery, trial, and any necessary appeals which oftentimes involves a defendant and a plaintiff arguing their cases before a judge and a jury. A judge or jury must consider all the evidence and make a decision based on their findings. Any testimony or evidence presented in a public trial or hearing will be entered into and preserved in the official record.

Litigation or court system, as opposed to arbitration, may be preferred if one of the disputed parties has a solid legal argument. This is true because judges and juries must strictly adhere to the law. While arbitrators still follow the law while making their judgment, they do have greater discretion to do so in a fair manner. Decisions made by a judge or jury are more likely to be overturned on appeal than those made by an arbitrator. Moreover, arbitration is a less formal procedure than litigation. However, arbitration and litigation both often result in monetary awards to one side.

A new phase in the Saudi judicial system began with the implementation of judicial costs starting from 13th of Mar 2022, which require litigants to pay sums to courts in some cases in order to reduce malicious and sham lawsuits and promote alternative means of dispute settlement. The estimation of lawsuit cost in Saudi Arabia Court system currently is based on the lawsuit value which an amount not exceeding (5%) of the value of the claim, with a maximum limit of one million riyals according to Ministry of Justice.

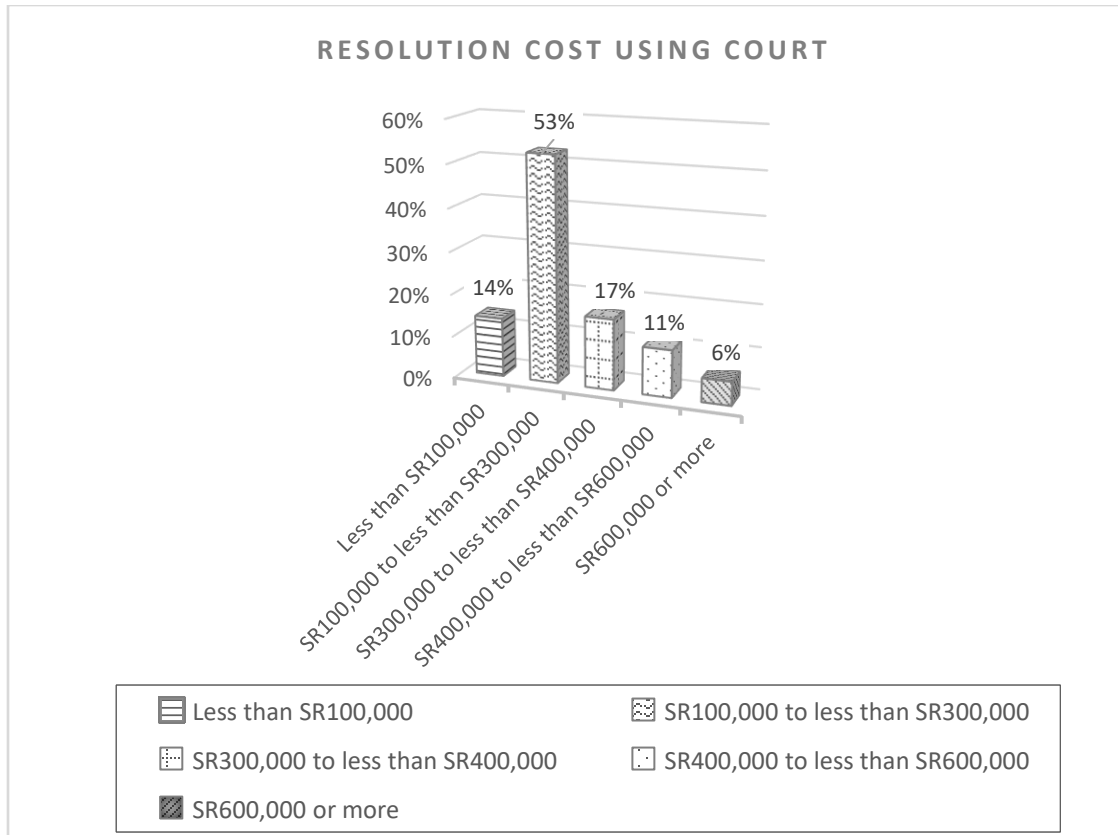


Figure 26: Resolution Cost using Court.

According to the findings of the study that court costs range from SR100,000 up to SR300,000. This suggests that litigation costs less than arbitration, which can be attributed to a number of factors specific to the local justice system. The Saudi government fully backs its courts, and the aforementioned charge first went into effect in 2022. The second reason is that in contrast to litigation, where each side can choose an attorney or choose to represent themselves, the arbitration system is more efficient and requires the services of more than one arbitrator oftentimes, resulting in additional costs.

The finding of this study also suggests that the duration of litigation in Saudi Arabia for settling government building maintenance project disputes takes anywhere from 12 to less than 18 months, the longest duration when compared to the other settlement alternatives.

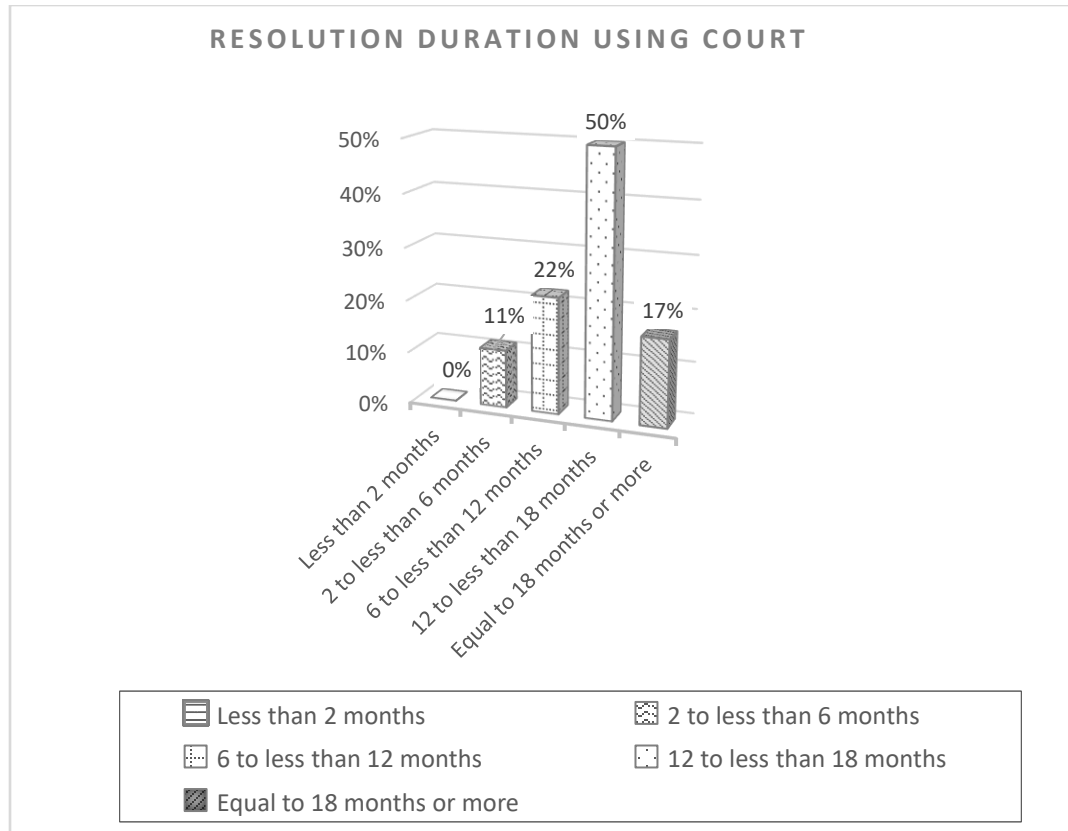


Figure 27: Resolution Duration using Court.

There are two litigation systems that serve disputes settlement in Saudi Arabia, which are the Commercial Court and the Board of Grievances (BOG). The two systems are somewhat similar; however, the Board of Grievances used to concern more litigation between individuals and the government but currently, it is the responsibility of the Commercial Court

Table 34: Resolution Duration using Court.

Resolution Duration using Court	Number of Participants	Percent (%)
Less than 2 months	0	0%
2 to less than 6 months	4	11%
6 to less than 12 months	8	22%
12 to less than 18 months	18	50%
Equal to 18 months or more	6	17%
Total	36	100%

The contract is a very important tool in avoiding disputes in the maintenance industry. A reliable contract spells out the roles of the parties involved, what is expected of them, and the consequences of any breach of contract. It is common for contracts to incorporate resolution methods for settling disputes between the parties. Litigation is the second most common method of dispute resolution according to the findings of the study as the majority of participants 56% agree that 50% - 75% of government building maintenance disputes are resolved through the court system.

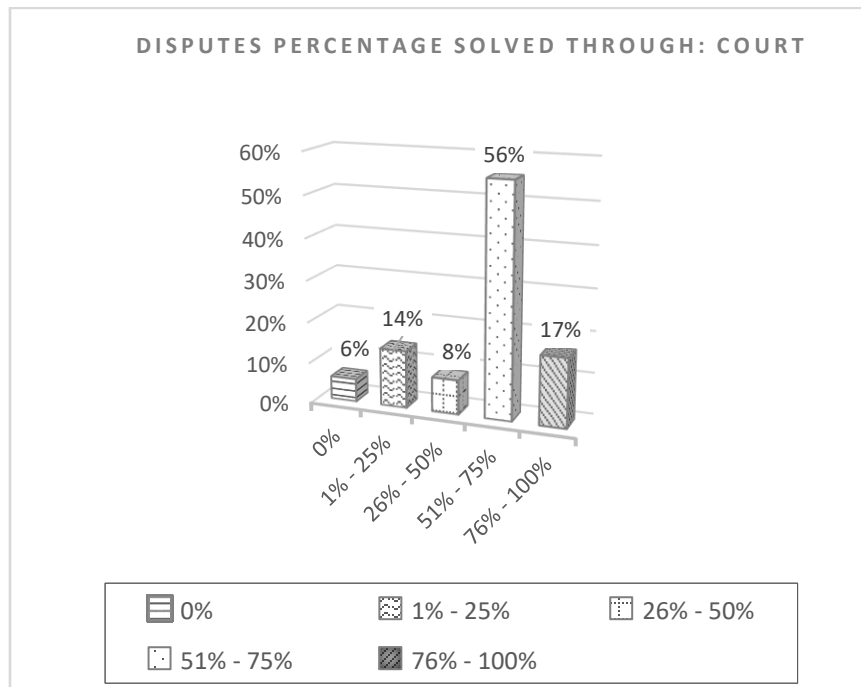


Figure 28: Disputes percentage solved through: Court.

Litigation or court system is the second most common used method for dispute resolution in Saudi maintenance industry because of its relative simplicity. In the Saudi legal system, neither the defendant nor the plaintiff is required to retain legal counsel in order to represent oneself in court. The court system is also common because it provides a reliable and low-cost option for resolving disputes in the government building maintenance projects.

CHAPTER 5

CASE STUDIES

5.1 Introduction

Case studies are employed as a second method to learn more about the dispute causes in government building maintenance projects and the effects of these disagreements on contractors. A case study is a detailed look at a current occurrence in its actual setting. The real-world evidence is found in case studies, which may then be analyzed and researched. The case studies are all collected from the Scientific Judicial Portal which is the largest database specialized in the field of judiciary in the Kingdom of Saudi Arabia. The portal provides valuable information for specialists in the judicial and legal field, academics, and others. The site has been home to thousands of judicial records, since August of 2021, including appeals, supreme court decisions, the Sharia pleading system, a monthly summary of new laws, implementing regulations and rules.

This chapter also includes a comparison between the conceptual data from the first portion of the study and the actual data in the cases studies. Each of the following case studies was chosen after a thorough screening to verify that it provides relevant information on maintenance disputes, its duration, the approaches taken to resolve them, and how those factors compared to the survey results.

5.2 Case Studies Procedure

Finding the right case studies for this thesis required a search through thousands of legal documents. However, numerous considerations had to be considered during the search for each case study, such that it should be regarding building maintenance projects, and that the government was involved in the dispute.

It is planned to include a case study relevant to each resolution system (Mediation, Arbitration, Litigation). However, upon further investigation and research, it was found that a case study relevant to mediation or arbitration is extremely difficult to find given that Article 154 and 92 of the Government Competition and Procurement System Regulations states that in order to have the option of arbitration as a resolution method in the contract document, then the contract value has to be above SR100 million and approved by the Minister of Finance first. As a result, it was decided to continue with the research objective by studying three litigations from Saudi Judicial system.

The selection of the case studies focuses on the litigations caused by disputes in government maintenance projects, preferably in buildings. The search of case studies also accounted for the involvement of government entities and a maintenance contractor as the other disputed party. The case studies are collected from the Scientific Judicial Portal which is specialized in the field of judiciary in the Kingdom of Saudi Arabia. The website had search features which were useful in determining the litigation classification (commercial) and also a subclassification for the type of litigation (maintenance). However, the search pulled up multiple litigations which had to be viewed and sorted out for the ones that best satisfy the requirements of this study. Then, the selected case studies had to be screened carefully to verify that they provide relevant information on

maintenance dispute causes, cost, and duration a dispute takes to be resolved, and how those factors compared to the survey results. Finally, only three litigations were considered in this study that focused on government building maintenance projects in Saudi Arabia.

5.3 Description, Analysis and Results of Case Studies

In Saudi Arabia, the Commercial Court and the Board of Grievances are the two main venues for resolving legal disputes. The Board of Grievances and the Commercial Court both deal with disputes between individuals and government entities, however, the Commercial Court now handles the majority of these cases. Najiz center was established by the Ministry of Justice, in conjunction with the private sector. It's an online portal for individuals and corporations seeking the full range of ministry support services. The portal provides many services, such as a judgment, appeal to the Supreme Court, reconsideration, intervention, reinstatement of a previously dismissed case, delay or restart of proceedings, addition of a representative, or correction and rationale of a ruling (Saudi Gazette, 2023).

This section presents three of the case studies that were gathered and analyzed to achieve the study's objective. The root cause of dispute, its consequences, and the methods used for settlement are explored in detail for each case study.

5.3.1 Case Study One

Contractors appreciate being paid promptly. Oftentimes, there is a possibility that some owners might pay contractors later than anticipated. As a result, contractors may find themselves in a position where you need to take on additional debt to keep up with daily operations. This case study took place in Taif City, Makkah Region, where a prime contractor had contracted with the local Taif City Police department for a maintenance

project of the police building, and such contracts are not uncommon in local government entities, where the winner takes over the maintenance of a building based on a fixed unit price agreement for the different specified items. In this scenario, the prime contractor had subcontracted some the police building maintenance work, which is permissible in government contracts unless specified otherwise. The subcontractor had paid an amount of SR450,000 to the prime contractor as contribution payment to the police building maintenance project which is considered a joint venture between the two parties. However, the subcontractor had not received any payments after working with the prime contractor for over one year, and on May 23, 2018, the subcontractor resorted to the court system to claim the initial amount of SR450,000 paid to the prime contractor.

The prime contractor had stated that the project is still standing and had not received any payment from the Taif Police, which is the owner of the project. Furthermore, the contract between the two parties (the prime contractor and subcontractor) stipulated that the parties are bound to profit and loss in this contract, and that profits are only distributed after payments are received from the owner of the project. Therefore, the court had rejected the case for that reason.

This case study embodies one of the most frequent dispute causes in government building maintenance projects. The delay in payment by the owner that had led to a litigation in the Commercial Court. The risk mapping technique had identified the delay in payment by owners as a High Risk in terms of cost and time, which supports the dispute cause found in this case study. Payment delays can have a detrimental effect on contractors. However, it is important to keep the lines of contact open with owners so that no payments are missed. Also ensuring that all project invoices and bills include transparent late payment

conditions. Also, in cases where payment delays continue, mediation should be attempted first before resorting to litigation or the legal system.

The commercial court issued its judgement about eight months after the case was filed, which is a reasonable amount of time for a complete resolution of the disagreement. According to the survey's findings, the typical time frame for a court to rule on a dispute is from 12 to 18 months, which is close to the time period the dispute took place to be resolved in the case study. This time period difference can be explained by many reasons including the fact that no proof was presented to the court by the subcontractor to show that the prime contractor had received payments from the owner, and the fact that the lawsuit was not particularly complex, and the cause of dispute is obvious.

To assess the lawsuit expenses in this case study, first we must realize that there are two expenses associated with any lawsuit. First is the court cost and the expenses associated with an attorney. According to the executive regulations of the judicial costs system, Council of Ministers Resolution No. (519) dated 12/04/2022, Chapter One: Estimating Judicial Costs, the judicial costs of a fixed-value lawsuit are estimated as a percentage of claim value, as follows:

A- (5%) if the claim amount is less than SR100,000.

B- (4%) if the claim amount is SR100,000 or more but less than SR500,000.

C- (3%) if the claim amount is SR500,000 or more but less than one million.

D- (2%) if the claim amount is one million SR or more.

The following equation represents court cost: claimed value is SR450,000. Therefore, the Court Cost = $450,000 \times 4\% = \text{SR}18,000$. This amount is only the court cost, which does not include the cost of hiring an attorney. Furthermore, Samar Al-Mogren, (2016) explains the local Saudi attorney expenses as “What draws one’s attention is the fees charged by law offices. They differ completely from one firm to another. This is due to fees for legal services being unregulated. Furthermore, there is no floor or ceiling for a lawyer’s fees in a legal case” (P.1).

By reviewing previous studies that concern the local law office’s expenses and consulting with law professionals on how to estimate the attorney’s fees in the Saudi Arabia, it was determined that fees are usually estimated by one of two ways: either by a fixed upfront payment and another fixed payment after the judge ruling. The alternative approach is a predetermined initial payment plus a percentage of the awarded amount by the judge. In light of these considerations, it is reasonable to place the lawyer fees for this lawsuit at between SR75,000 and SR95,000. Subsequently, by taking the average of the two estimates to be SR85,000, which brings the total lawsuit cost to approximately $18,000 + 85,000 = \text{SR}103,000$. The calculated expenses that are associated with the litigation in this case study fall within the estimated resolution costs identified in this study when using the court system which is SR100,000 to SR 500,000.

5.3.2 Case Study Two

On Mar 11, 2014, a semi-government university owner in Dammam City, Eastern Province had contracted with a contractor to operate and maintain the buildings of the university which includes providing the required materials, necessary equipment, and labor for the execution of the project. The contractor then had a delay in issuing the required work visas

for the labor which prompted the university owner to bring labor at his own expense to try to fill the shortage, which costs the owner an amount of SR1,284,900. The owner then resorted to the court system to claim for the incurred expenses plus an attorney's fees in the amount of SR195,613. However, based on clause (15) of the contract of the disputed parties, which reads: "Any dispute that may occur, God forbid, between the two parties during the implementation of this contract now or in the future, this contract shall be subject to the applicable regulations in the Kingdom of Saudi Arabia, and shall first be subject to amicable resolution, and if the dispute cannot be resolved, then it shall be referred to the jurisdiction," the court then dismissed the case.

This case study is an indication of the potential dispute that may arise in the maintenance industry. Due to the delay in obtaining the required work visas for the operation and maintenance project of university buildings in Dammam, the owner incurred some expenses to attempt to cover the shortage. The contractor was fully aware of the number of work visas they needed to issue in order to run and maintain the university building; however, the unawareness of government rules and regulations in issuing the visas may have been the main reason for the delay prompting the owner to sue for the incurred losses. The unawareness of government rules and regulations is one of the most frequent disputes causes and a High Risk in terms of cost identified in this study.

Furthermore, another potential reason for this dispute occurrence which led to the litigation between the two parties is outsourcing all university activities to one single contractor. The owner could have avoided part of the incurred losses by subcontracting, for instance the operation activities of the university buildings to one contractor and maintenance to another. Furthermore, one of the causes which promoted the occurrence of this dispute is

the shortage of skilled workers for maintenance services which is clearly present in this case study.

The lawsuit was rejected according to Article (58) of the Commercial Courts Law which mandates that before filing lawsuits, the parties must first attempt to resolve their differences through negotiation or mediation in the case of a contract includes - in writing - to resort to amicable methods before resorting to the judiciary. Therefore, mediation is important in such cases, and according to Ministry of Finance, Government Competition and Procurement System, below are the steps for initiating a mediation process to resolve dispute occurrences in the maintenance industry:

To begin, if a dispute arises between the government agency and the contractor, and if the failure of the project or damage to the government agency or its facilities is a direct result of the dispute, then the dispute shall be resolved amicably through meetings between the two parties within a period of 14 fourteen days. In the event that these discussions do not result in a resolution of the dispute, the Ministry of Finance will appoint a person from either the public or private sector to serve as the council's chair, and the council's members will consist of a representative from the government agency and a representative from the contractor.

Second, each side must provide the Council with a report outlining its position on the issue and accompanied by any relevant documents and communications. In addition to the required documentation, the entity's representative must also report to the Council on the entity's estimations or past decisions pertaining to the topic of the dispute. The council has the authority to enter the premises and conduct on-site inspections at any time.

Third: The council is to provide a decision within 30 days of receiving the report and supporting documentation. The council may consult an expert for guidance; the expense of this will be split evenly between the disputing parties.

Fourth: The council issues its decision by majority, and the dissenting opinion, if any, is clarified. If the disputing parties accept the council's decision, it will be binding on all parties involved in the dispute. If either party has a problem with the decision, it must be sent back to the council with an explanation of their disagreement and the Council must make a final decision on the matter within fifteen (15) days. The decision against both parties is binding, and the aggrieved party has the right to resort to the appropriate court.

Fifth: No dispute is considered unless the contractor continues to implement their obligations.

Sixth: The resolution of disputes through the Council is limited to technical disputes between the government agency and the contractor. For the purposes of applying this clause, the phrase “technical dispute” contains any technical dispute that occurs during the implementation of the contract over technical matters such as technical conditions, conformity of works to technical specifications, quality of materials used, or manufacturing assets.

The court cost according to the executive regulations of the Judicial Cost System, is 2% of the claim value since the claim amount is above one million, which is equal to SR25,698, and an attorney’s fees of SR195,613 which brings it to a grand total of SR221,311. The calculated expenses for this lawsuit are in conformance with the results obtained from the

questionnaire survey which indicated that the estimated resolution cost using the court system is SR100,000 up to SR300,000.

Furthermore, this study case exemplifies many of the most frequent consequences of disputes, including increases in project cost, reduction in productivity, lost business viability, tension and dampness of team spirit, and profitability loss. Consequences of this nature can have far-reaching effects on the project contractual relationship and the project as a whole. Therefore, if such disputes are not handled properly it would end up affecting the maintenance contractor and owner.

5.3.3 Case Study Three

The Comprehensive Rehabilitation Center's owner, in Al Ahsa City, Eastern Province, had contracted the maintenance and follow-up work of the center's equipment on 3/19/2013 for a period of one year. During the contract period, the contractor performed maintenance work and provided spare parts for some equipment from unknown suppliers which prompted the owner to step in when the installed parts had caused some malfunction to the center's equipment. Furthermore, the owner is suing the contractor for incurred losses from repairing the equipment caused by the faulty spare parts in the amount of SR333,465 plus SR90,000 for the spare parts divided into two payments. The contract stipulates that the contractor must submit a technical report on the condition of the Rehabilitation Center's equipment, and after conducting the inspection in detail, then submit a quotation, and the owner had to approve it, then the contractor can proceed with the repair. However, the owner asked the contractor to provide a cheaper quotation for faulty spare parts which the contractor did, and the owner approved it afterwards. Therefore, the owner was fully aware of the condition of the center's equipment and the parts that would be installed.

The contractor might have violated the regulations of the Operation and Maintenance Department of the Ministry of Social Affairs by installing spare parts from unknown sources that are not identical to the original spare parts. Nevertheless, the owner was aware of the supplied spare parts and how they could have an impact on the center's equipment. Therefore, the claim was rejected by the court since there is no evidence that the contractor breached the contractual obligation, as the owner was satisfied with the price quotation and spare parts presented by the contractor at the time.

This case study opens the door for academics, attorneys, and practitioners to promote new methods of dispute settlement. If both parties had been able to consider alternative dispute resolution methods like mediation or arbitration before resorting to litigation, this case would have been avoided. Misunderstandings are inevitable in any contractual relationship between partners; nevertheless, those that escalate to litigation are never beneficial due to the time and money they consume. It is evident that the primary reason for this dispute is the low quality of spare parts used in the maintenance work. Poor quality of materials is identified as one of the most severe dispute causes in terms of cost and time in the study.

Another primary reason for the dispute in this case study is the owner's interference in contract execution by giving the contractor the instructions to provide a cheaper price quotation knowing that those parts would be not identical to the original ones. The owner's interference in contract execution had been identified as a high risk and a frequent dispute cause in this study.

The other reasons which clearly led the disputed parties to litigation are poorly defined scope of work and ambiguity in project boundaries and responsibility. A maintenance

project's scope is a crucial contracting document that lays out the responsibilities of each party. This document also lays out in detail what, how and when each activity must be done. As noticed in this litigation, the scope of work was interpreted differently by each party, resulting in various understandings of each party's responsibilities. Ambiguities in the scope of work with regards to the material suppliers and specification also led the disputed parties to resort to litigation during project execution.

The lack of setting a dispute resolution reference between contract parties might have escalated the situation to litigation. This is essential to the success of the project as it also ensures that any arising disputes are dealt with in accordance with the contract's terms and procedures that were originally agreed upon by the parties involved. Alternative dispute resolution methods can save time, money, and effort for both parties as compared to the expenses and delays associated with the court system. The dispute resolution method that could have been beneficial in this case before resorting to litigation is arbitration. The steps for arbitration process in Saudi Arabia according to the Saudi Center for Commercial Arbitration is as follows:

1. The plaintiff completes and sends the arbitration request form to the Saudi Center for Commercial Arbitration, along with a copy to the defendant, and the required registration costs.
2. the Center will contact the defendant to let him know about the arbitration demand and ask for a response within a time frame that does not go beyond what is required under the arbitration rules.

3. Once the responder provides a response, the center will forward the response to the plaintiff and request a rebuttal.
4. The Center shall coordinate a collective administrative call between the parties to determine the necessary points in the arbitration procedures, with regard to the place, language, rules, number of arbitrators, and means of communication.
5. After the parties agree on the mechanism for appointing arbitrators, the Center will communicate with them and inform them of the appointment, and follow the administrative procedures regarding appointment, response requests and disclosure in accordance with the provisions of the arbitration rules.
6. The parties shall pay the final fees to the Centre before presenting the matter to the arbitral tribunal.
7. The arbitral tribunal sets an initial call with the parties for the purpose of hearing a summary of the dispute, and sets a timetable for the procedures, including the dates of the arbitration sessions and the dates of submitting notes and responses to them.
8. After the parties have submitted their requests and responses, the arbitral tribunal shall inquire of the parties whether they have further evidence to present, other witnesses to hear, or other statements to make. If they do not have any of that, or the Commission is satisfied that the case file is complete, it shall announce the conclusion of the hearing sessions.
9. The arbitral tribunal shall study and deliberate on what the parties submitted during the hearing sessions and issue the arbitral award within a period not exceeding 60 days from the date of closing the hearing sessions.

The court cost according to the executive regulations of the Judicial Cost System, is 4% of the claim value since it is more than SR100,000 but less than SR500,000. The claim value is SR333,465 + SR90,000 which brings the court cost to is equal to SR16,939 and an attorney's fees of an average of approximately SR85,000. The attorney's fees for this case study are estimated by reviewing previous studies that concern the local law office's expenses and consulting with law professionals in the Saudi Arabia. Therefore, the grand total cost of this lawsuit is approximately $SR16,939 + 85,000 = SR101,939$ which is in conformance with the results obtained from the questionnaire survey that indicates the estimated resolution cost using the court system is SR100,000 up to SR300,000.

The commercial court issued its judgement on Oct 10, 2017, about twelve months after the first session was held between disputed parties on Oct 5, 2016. Therefore, the time frame for this lawsuit is in conformance with the results of this study from the previous chapter which indicates that the resolution duration using court is 12 to 18 months.

5.4 Case Studies Summary and Conclusion

Case studies are another way to study government building maintenance project disputes and their consequences on contractors and owners. Case studies examine contemporary events in their context and provide real-world evidence for the study. All case studies are collected from The Scientific Judicial Portal which is the Saudi Arabia's largest judicial database. Three litigation case studies were collected and evaluated to fulfil the study's objective. Each case study was examined for the dispute's cause, consequences, cost, duration, and ruling results.

The dispute causes identified from case studies are causes which have been discussed in the in this study's result. Some of the clear dispute causes in the case studies are delay in payment by the owner, misunderstanding between the owner and the contractor, poorly defined scope of work, ambiguity in project boundaries and responsibility, lack of setting a dispute resolution reference between contract parties, unawareness of government rules and regulations, poor quality of materials, subcontracting/outsourcing all project activities and shortage of skilled workers for maintenance.

The litigation costs identified from the three case studies are in in conformance with the results obtained from the questionnaire survey that indicates the estimated resolution cost using the court system is SR100,000 up to SR300,000. However, the litigation duration of each case study varies depending on several variables. The most influential factor in determining the litigation duration identified through the analysis of the collected case studies is the number of adjournments during the litigation period, which basically postpones the trial to a later date in order for a party to prepare a response, collecting the necessary evidence, or seek a representative. Litigation is clearly not the greatest method for solving disputes due to cost and time it consumes which primarily affects maintenance projects and the disputed parties. Setting alternative dispute resolution methods in any contractual relationship is crucial to the success of the project which may include mediation and arbitration. However, litigating is typically preferred by the disputed parties due to the cheap expenses associated with using the local judicial system.

CHAPTER 6

SUMMARY OF THE STUDY, CONCLUSION AND RECOMMENDATIONS

This section provides a brief overview of the study, the methods employed to gather data to answer the study's central questions, the study's major and minor findings, and suggestions for owners, contractors, and future researchers.

6.1 Summary of the Study

According to BS 3811, maintenance is the sum of all technical and administrative measures, including supervisory actions, taken on an item in order to preserve or return it in such condition that it can carry out its intended purpose. The contentment of government owners with building maintenance services is a global concern. However, to obtain the desired satisfaction level, maintenance contractors are required to minimize those concerns (Dzulkifli et al., 2021). Building maintenance is a universal issue that affects the long-term performance of a building. It is currently acknowledged as an issue that is important to consider (Arditi & Nawakorawit, 1999). Researchers' focus is almost exclusively on construction, which has led to the negligence of the maintenance studies in Saudi Arabia (Al-Hammad et al., 1996, pp. 2). Government buildings locally are heavily dependent on maintenance contractors to operate and maintain facilities in all different aspects.

Therefore, this research explored disputes in Saudi Arabian government building maintenance projects. The objectives of the study are to identify the causes of disputes in from the perspective of government building maintenance contractors, determine the

resolution systems utilized in the building maintenance industry, and consequences of those disputes on the contractors and maintenance projects.

These objectives were fulfilled through the analysis of data gathered from a designed questionnaire survey which was distributed to the targeted population of fifty-three contractors in Eastern Province. Contractors with first, second, and third-degree classifications in building maintenance services and construction activities for government buildings from the Ministry of Municipality and Rural Affairs and housing (MOMRA) are the only ones included in the study.

The study's objective was also fulfilled by Case studies which were employed as a second method to learn more about the dispute causes in government building maintenance projects and the effects of these disagreements on contractors. The case studies are all collected from The Scientific Judicial Portal which is the largest database specialized in the field of judiciary in the Kingdom of Saudi Arabia.

6.2 Findings

The findings of this study focus on the critical leading causes of disputes, important aspects in regard to dispute resolution cost, duration and methods, high risk causes of dispute. The findings are gathered from chapter four and five and presented as follows:

- The owners, contractors, and project documents are the main sources for causing disputes in government building maintenance projects.
- The owners in government building maintenance projects cause disputes through the constant interferences in contract execution, delay in response/decision making, and delay in payments which impacts the project cost, time and quality.

- The contractors in government building maintenance projects cause disputes through the mistakes in devolving the bidding/estimation that have an impact mostly on project cost or the contractor's unskilled manpower/labor which a direct effect on the project quality.
- The project documents in government building maintenance projects cause disputes through the lack of original as-built drawings for government buildings, and poorly defined scope of work which impact the project cost, time and quality.
- The owner related high risks which impact the government building maintenance projects cost and time are the delay in payments, delay in response/decision making, and constant interferences in contract execution.
- The contractor related high risks which impact the government building maintenance project cost are the delay of material procurement, mistakes in devolving the bidding/estimation, and unawareness of government rules and regulations.
- Another contractor related high risk that impacts the government building maintenance project time is improper sequencing of work.
- The project document related high risks which impact the government building maintenance projects cost, time or quality are the lack of original as-built drawings for government buildings, inaccurate BOQ in the lump-sum contract, and poorly defined scope of work.
- The only external factor related high risk which impacts the government building maintenance project cost is the fluctuation of materials costs during project execution.

- The cost of mediation for resolving disputes in government building maintenance projects is less than SR100,000.
- The cost of arbitration for resolving disputes in government building maintenance projects falls within SR300,000 to less than SR400,000 per dispute resolution.
- The cost of litigation or court system for resolving disputes in government building maintenance projects ranges from SR100,000 up to SR300,000.
- The most probable duration of mediation process for dispute resolution in government building maintenance projects is less than 2 months.
- The most probable duration of arbitration method for dispute resolution in government building maintenance projects is 2 to less than 6 months.
- The most probable duration of litigation in Saudi Arabia for settling government building maintenance project disputes takes anywhere from 12 to less than 18 months, the longest duration compared to the other settlement alternatives.
- Mediation resolution method is used anywhere from 76%-100% to resolve disputes in government building maintenance projects.
- The arbitration method is used to settle anywhere from 1% -25% of government building maintenance disputes.
- Court system is used anywhere from 50% - 75% for dispute resolution in government building maintenance projects.
- The increment in project cost, reduction in productivity, loss of business viability, tension and dampness of team spirit, and profitability loss are the leading consequences of government building maintenance project disputes.

- The delay in payment by the owners, misunderstanding between the owner and the contractor, poorly defined scope of work, ambiguity in project boundaries and responsibility, lack of setting a dispute resolution reference between contract parties, unawareness of government rules and regulations, poor quality of materials, subcontracting/outsourcing all project activities and shortage of skilled workers for maintenance are the identified dispute causes from the collected case studies.

6.3 Conclusion

This study demonstrated its importance and ability in identifying the leading causes of disputes in government building maintenance projects in Saudi Arabia and determining the resolution cost, duration and methods utilized in the government building maintenance industry. The maintenance industry in Saudi Arabia has been neglected, and this is evident by the fact that Scientific Judicial Portal revealed sizable disputes in government building maintenance projects. Most disputes that arise during government maintenance projects end up negatively impacting everyone involved. The absolute authority and control that owners frequently exercise over many aspects of maintenance projects raises the probability of conflicts and dispute occurrences, giving contractors little window to express their concerns and thoughts to the owners. The probability of disputes stemming from project documents is equally high in the maintenance industry. This is because many building maintenance projects rely on the original as-built drawing, which, if it is not available, frequently necessitates additional costs that are not accounted for to locate various building's utilities.

Furthermore, the share of contractors causing disputes is obvious from the study's results, but because they are usually the weak link in the chain, and they must comply to the

owner's requests, those disputes are not escalated and easily resolved. Contractors often fall far behind the project time schedule due their lack of awareness of the essential permits and approvals from many governmental entities that are directly involved in the maintenance project. The initial necessary steps prior to the project execution are typically not mentioned in the scope of work, and if they are, they are too generic.

However, communication is the first step towards the resolution of any dispute. Therefore, establishing a well communication strategy is a critical in minimizing disputes occurrences in maintenance projects. In maintenance projects, each party has a responsibility, and only with their cooperation and commitment, a project may succeed.

In conclusion, this study raises the awareness of the dispute consequences in government building maintenance projects in Saudi Arabia, which occurs as result of dispute occurrences. Owners and contractors might always choose mediation as the initial step in resolving a dispute as opposed to litigation or the judicial system. Therefore, it is the mutual effect that is required from both sides owners and contracts to contribute to the success of the projects.

6.4 Recommendations

The following recommendations have been made to owners, contractors, and for future researchers based on the findings of this study.

6.4.1 Recommendations to Owners

The owners in government building maintenance projects are advised to:

- Spend enough time developing the scope of work. This can be done by either the in-house staff or a third party experienced in developing the project scope of work which is more recommended for complex maintenance projects.
- Ensure BOQ is accurate before the bidding stage for the lump-sum contracts.
- Limit the interference in contract execution and follow the procedures specified in the contract to ensure that the completed work is in conformance with the specification and within the quality standards.
- Limit the excessive variation orders during project execution by investing more time and resources during the project initiation phase.
- Incorporate alternative dispute resolution methods in maintenance contracts such as mediation and arbitration.

6.4.2 Recommendations to Contractors

The contractors in government building maintenance projects are advised to:

- Carefully review the tender documents before submitting a bid.
- Always ensure that the as-built drawings are available in the tender document, and in case they are missing, request a tender clarification before submitting your bid.
- Familiarize yourselves with the government rules and regulations before entering a contractual relationship with government agencies.
- During project execution, submit a clear detailed method of statement of the executed activities and get it approved by the client to limit unwanted interferences during execution.

- Establish a response plan which requires both parties to response within the specified duration during the project execution to avoid delay in response or decision making by either party.
- Ensure that all project invoices and bills include transparent late payment conditions.
- Always ensure that the manpower/labor performing the work are skilled to avoid extra reworking job expenses.
- Project materials have to be supplied from a well-known manufacturer and approved by the owner.
- Site supervision is important to the success of the project as it ensures on time project progress and high quality of completed work.
- For complex maintenance projects, ensure that the fluctuation of material costs is addressed in the contract by limiting the rate to a percentage otherwise, the owner has to incur some of the material rate change costs.
- Try to resolve your differences through mediation before resorting to the legal court system (litigation).

6.4.3 Recommendations for Future Work

- There is a need for more research in dispute causes in government building maintenance project in the other regions of Saudi Arabia.
- Future studies on dispute causes in government building maintenance projects could consider the owner's perspective.
- This research focuses only on the causes of disputes in government building maintenance projects. Consequently, it is interesting to study this problem in the

context of several other government large-scale projects that are becoming more prevalent recently in Saudi Arabia, such as water desalination and power plants.

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APPENDICES

Appendix – A: Data Collection Form



Questionnaire

Dear participant,

This questionnaire survey is part of a research requirement for the fulfilment of a master's degree in Construction & Engineering Management from King Fahd University of Petroleum & Minerals. The study focuses on the causes of disputes in government maintenance building projects. This study considers the perception of government maintenance building contractors which will provide a deeper understanding of the current causes of disputes, resolution methods, and effects on contractors.

The purpose of this letter is to invite you to participate in this study to achieve the intended objectives of the study by providing the required information in the attached survey. The questionnaire survey should not take more than 15 minutes of your valuable time. Your contribution to this study is highly appreciated.

If you would like to be briefed on the results of this study, kindly leave your contact information in the designated space at the end of the survey.

Research Student:
Eng. Mouath Alghamdi
Construction Engineering &
Management Department
King Fahd University of Petroleum &
Minerals.
Mobile: +966 553962960
Email: g202001380@kfupm.edu.sa

Under the supervision of:
Dr. Ali A. Shash
Professor, Construction Engineering &
Management King
Fahd University of Petroleum &
Minerals.
Mobile: +966 505851368
Email: aashash@kfupm.edu.sa

QUESTIONNAIRE

Section 1: Participants

Please answer the following questions by filling the spaces or by placing a tic (×) in the boxes next to the selected answer:

1. What is your job title in the organization:

- a. Project manager ☐
- b. Construction manager ☐
- c. Senior project engineer ☐
- d. Others, please specify: _____

2. What are your total years of experience in the building maintenance field:

- a. Less than 5 years ☐
- b. 5 to less than 10 years ☐
- c. 10 to less than 15 years ☐
- d. Equal 15 years or more ☐

3. Have you participated in government building maintenance projects:

- a. Yes ☐ if yes, please continue
- b. No ☐ if no, please go to question No. 6

4. How many government building maintenance projects have you participated in:

- a. Less than 3 projects ☐
- b. 3 to less than 6 projects ☐
- c. 6 to less than 12 projects ☐

d. Equal 12 projects or more ☐

5. What was your role in the government building maintenance projects:

a. Project manager ☐

b. Construction manager ☐

c. Senior project engineer ☐

d. Supervisor ☐

e. Project/site engineer ☐

f. QC/QA engineer ☐

g. Others, please specify: _____

6. How many years have you been working with your current employer:

a. Less than 5 years ☐

b. 5 to less than 10 years ☐

c. 10 to less than 15 years ☐

d. Equal 15 years or more ☐

7. What is your educational level:

a. Diploma ☐

b. Bachelor Degree ☐

c. Master Degree ☐

d. PhD ☐

e. Others, please specify: _____

8. What is your degree discipline:

a. Civil Engineering ☐

b. Mechanical Engineering ☐

c. Electrical Engineering ☐

d. Industrial Engineering ☐

e. Others, please specify: _____

9. What is your nationality:

a. Saudi ☐

b. Expatriate ☐

Section 2: Organization

Please answer the following questions by filling the spaces or by placing a tic (×) in the boxes next to the selected answer:

1. Location of your company:

a. Dammam ☐

b. Khobar ☐

c. Dhahran ☐

d. Al Ahsa ☐

e. Ras Tanura ☐

f. Jubail ☐

g. Khafji ☐

d. Other, please specify _____

2. How many years has the company been in the building maintenance business:

- a. Less than 5 years ☐
- b. 5 to less than 10 years ☐
- c. 10 to less than 15 years ☐
- d. 15 to less than 20 years ☐
- e. Equal 20 years or more ☐

3. What is the total number of employees in your company:

- a. Less than 500 employees ☐
- b. 500 to less than 1000 employees ☐
- c. 1000 to less than 1500 employees ☐
- d. 1500 to less than 2000 employees ☐
- e. Equal 2000 employees or more ☐

4. What is your company classification in building maintenance (Ministry of Municipal and Rural Affairs and Housings classification):

- a. Grade 1 ☐
- b. Grade 2 ☐
- c. Grade 3 ☐
- d. Other, please specify, _____

5. How many maintenance projects for government buildings are executed annually:

- a. Less than 2 projects ☐
- b. 2 to less than 10 projects ☐

c. 10 to less than 20 projects []

d. 20 to less than 40 projects []

e. Equal 40 projects or more []

e. Other, please specify_____

6. What is your company's annual government building maintenance volume in millions of Saudi Riyals:

a. Less than 50 []

b. 50 - less than 100 []

c. 100 - less than 300 []

d. Equal 300 or more []

Section 3: Evaluation

The following is a list of potential dispute causes. You are kindly requested to rate the frequency of those causes in government building maintenance contracts:

Dispute Cause		Frequency				
		Never	Rarely	Sometimes	Often	Always
A. Owner Related	Excessive variation orders					
	Delay in material/drawing approval					
	Delay in payments					
	Delay in response/decision making					
	Constant interferences in contract execution					
	Late site handover to the contractor					

	Apply penalty without conducting a proper investigation					
	Contradiction directions enforced on the contractor by different personnel from the owner side					
	Others, please specify and evaluate: a. ----- b. ----- c. -----					
B. Contractor Related	Lack of site supervision					
	Subcontracting/outsourcing all project activities					
	unskilled contractor's manpower/labour					
	Poor quality of completed work					
	Poor site management					
	Delay of material procurement					
	Improper sequencing of work					
	Mistakes in devolving the bidding/estimation					
	Unawareness of government rules and regulations					
	Poor quality of material					
	Unsuitable project leadership					
	incompetent subcontractors					
	Others, please specify and evaluate: a. ----- b. ----- c. -----					
C. Project Documents	Inadequate/incomplete technical plans/specification					

	Lack of the original as-built drawings for government buildings					
	Weakness in contract language					
	A contradiction between project documents					
	Unrealistic project schedule					
	Inaccurate BOQ in the lump-sum contract					
	Ambiguity in project boundaries and responsibility					
	Poorly defined scope of work					
	Lack of setting a dispute resolution reference between contract parties					
	Mixing lump-sum and unit-price impractically in the same contract					
	Ambiguity in the contract document					
	Others, please specify and evaluate: a. ----- b. ----- c. -----					
D. Owner & Contractor	Lack of communication and coordination					
	Misunderstanding between owner and contractor					
	Lack of team spirit					
	Others, please specify and evaluate: a. ----- b. ----- c. -----					

E. External Factors	Delay of permit/approval from other government authority					
	Differing site conditions					
	Shortage of skilled workers for maintenance services					
	Unavailability of required spare parts					
	Materials delay due to custom clearance					
	Fluctuation of materials costs during project execution					
	Weather conditions					
	Inflation					
	Unforeseen problems					
	Force majeure					
	Others, please specify and evaluate: a. ----- b. ----- c. -----					

The following is a list of potential dispute causes. You are kindly requested to rate the severity of those causes on cost, time and quality of the government building maintenance projects:

The numbers below table represents the following level of severity:

1. No effect 2. Very moderate 3. Moderate 4. Very severe 5. Immense

Dispute Cause		Level of Severity														
		Cost					Time					Quality				
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
A. Owner Related	Excessive variation orders															
	Delay in material/drawing approval															
	Delay in payments															
	Delay in response/decision making															
	Constant interferences in contract execution															
	Late site handover to the contractor															

	Apply penalty without conducting a proper investigation															
	Contradiction directions enforced on the contractor by different personnel from the owner side															
B. Contractor Related	Lack of site supervision															
	Subcontracting/outsourcing all project activities															
	unskilled contractor's manpower/labour															
	Poor quality of completed work															
	Poor site management															
	Delay of material procurement															
	Improper sequencing of work															
	Mistakes in devolving the bidding/estimation															

	Unawareness of government rules and regulations															
	Poor quality of material															
	Unsuitable project leadership															
	incompetent subcontractors															
C. Project Documents Related	Inadequate/incomplete technical plans/specification															
	Lack of the original as-built drawings for government buildings															
	Weakness in contract language															
	A contradiction between project documents															
	Unrealistic project schedule															
	Inaccurate BOQ in the lump-sum contract															
	Ambiguity in project boundaries and responsibility															
	Poorly defined scope of work															

	Lack of setting a dispute resolution reference between contract parties															
	Mixing lump-sum and unit-price impractically in the same contract															
D. Owner & Contractor	Ambiguity in the contract document															
	Lack of communication and coordination															
	Misunderstanding between owner and contractor															
E. External Factors	Lack of team spirit															
	Delay of permit/approval from other government authority															
	Differing site conditions															
	Shortage of skilled workers for maintenance services															
	Unavailability of required spare parts															

	Materials delay due to custom clearance															
	Fluctuation of materials costs during project execution															
	Weather conditions															
	Inflation															
	Unforeseen problems															
	Force majeure															
	Others, please specify and evaluate: a. ----- b. ----- a. -----															

Please answer the following questions by filling the spaces or by placing a tic (×) in the boxes next to selected answer/s:

Based on your experience, what are the percentages of disputes in government building maintenance projects are resolved through the following resolution methods:

- a. Mediation -----% []
- b. Arbitration -----% []
- c. Court -----% []
- d. Other, please specify, -----% []

Total: 100%

2. Based on your experience, what is the required resolution time under each of the available resolution methods:

Resolution Method	Resolution Time				
	Less than 2 months	2 to less than 6 months	6 to less than 12 months	12 to less than 18 months	Equal to 18 months or more
Mediation					
Arbitration					
Court					
Others, please specify and choose: a. ----- b. ----- c. -----					

3. Based on your experience, what is the contractor's average cost associated with dispute resolution under each of the available resolution methods

Resolution Method	Resolution Cost				
	Less than SR100,000	SR 100,000 to less than SR300,000	SR300,000 to less than SR400,000	SR400,000 to less than SR600,000	SR600,000 or more
Mediation					
Arbitration					
Court					
Others, please specify and choose: a. ----- b. ----- c. -----					

The following is a list of potential consequences for the maintenance contractor. You are kindly requested to indicate your level of agreement on the dispute's consequences by placing a tic (x) in the box next to the consequences.

Dispute Consequences	Level of Agreement				
	Strongly Agree	Agree	Somewhat Agree	Disagree	Strongly Disagree
Abandonment of the project					
Increment in project cost					
Delay in project delivery date					
Profitability loss					
Loss of business viability					

Loss of company reputation					
Diminution of respect between parties					
Damages to business relationships					
Tension and dampness of team spirit					
Reduction in productivity					
Breakdown in communication and professional relationship					
Underutilization of resources					
Delay in the progress of work					
Others, please specify and evaluate: a. ----- b. ----- c. -----					

Based on your experience, please list three applicable methods used to avoid/reduce dispute occurrences:

Thank you for your participation.

If you are interested in obtaining a copy of the results of this study, please provide your contact information below:

Name: ----- **Mobile:** -----**Email:** --

Appendix – B: Case Studies

بيانات الحكم

محكمة: المحكمة التجارية

المدينة: الدمام

رقم القضية - القرار: ٤٨٩

تاريخها: ١٤٤٢/٤/٣

محكمة الاستئناف: محكمة الاستئناف

المدينة: المنطقة الشرقية

رقم القرار: ٧٠٠

تاريخه: ١٤٤٢/٦/٤

التصنيف

الدعوى أضرار الدعوى مطالبة بمصروفات الدعوى

الدعوى نظر الدعوى صرف النظر ورد الدعوى

التجاري التشغيل

التجاري التشغيل دعوى تعويض

التجاري مقولة بالباطن

عنوان الحكم

القضية رقم ٤٨٩ لعام ١٤٤٢ هـ

نص الحكم

الحمد لله والصلاة والسلام على رسول الله أما بعد:

فلدى الدائرة التجارية السابعة وبناءً على القضية رقم ٤٨٩ لعام ١٤٤٢ هـ

المقامة من/ شركة (...) للمقاولات سجل تجاري (...)

ضد/ شركة (...) للمقاولات غير ذلك (...)

القاضي عثمان بن صالح العنزي رئيساً

القاضي عمر بن عبدالعزيز بن سليمان الصبي عضواً

القاضي عدنان بن جمال بن رباح الحربي عضوا

(الوقائع)

ادعى وكيل المدعية تعاقد المدعية -من الباطن- مع المدعى عليها، بتاريخ (١٠/٥/١٤٣٥هـ)، على أن تقوم المدعية بتنفيذ الأعمال الموكلة إليها من المدعى عليها بصفتها المقاول الرئيس في مشاريع التشغيل والصيانة والنظافة التي ترسو عليها، وقد وقعت المدعى عليها- بصفتها المقاول الرئيسي- عقداً مع جامعة (...) لتنفيذ مشروع صيانة وتشغيل ونظافة مباني فرع جامعة (...). بما في ذلك تقديم المواد والمعدات اللازمة لتنفيذ المشروع، والتزمت المدعية بالتنفيذ، وقد أخلت المدعى عليها بالعقد، وتأخرت في استخراج تأشيرات عمالها، مما ألجأ المدعية إلى جلب عمالة على نفقتها الخاصة لمحاولة سد النقص الكامل في العمالة لدى المدعى عليها، وقد كلف ذلك المدعية مبلغاً قدره (١,٢٨٤,٩٠٠) ريال، وقد تغير اسم المدعى عليها من شركة (...) إلى شركة (...) للمقاولات بذات السجل التجاري، وطلب وكيل المدعية إلزام المدعى عليها بدفع مبلغ قدره (١,٢٨٤,٩٠٠) ريال، ودفع أتعاب المحاماة وقدرها (١٩٥.٦١٣) ريال. واستند المدعي على العقد المبرم بين الطرفين، المؤرخ في (١٠/٥/١٤٣٥هـ)، المتضمن في البند (١٥) ما نصه: "أي نزاع قد يحدث لا قدر الله بين الطرفين أثناء تنفيذ هذا العقد حالياً أو مستقبلاً فيخضع هذا العقد للأنظمة المعمول بها في المملكة العربية السعودية، وتخضع أولاً لحلها بالطرق الودية، وإذا تعذر حل النزاع تحال إلى جهة الاختصاص" وفي جلسة اليوم حضر مدير المدعية (...). وحضر وكيل المدعى عليها (...). ورأت الدائرة صلاحية الفصل في الدعوى، ورفعت الجلسة للمداولة والحكم.

(الأسباب)

بما أن المدعي وكالة يطلب إلزام المدعى عليها بدفع مبلغ قدره (١,٢٨٤,٩٠٠) ريال مقابل إخلال المدعى عليها بالعقد، ودفع أتعاب المحاماة وقدرها (١٩٥.٦١٣) ريال. وبما أن المادة (٥٨) من اللائحة التنفيذية لنظام المحاكم التجارية قد نصت على أنه: "يجب اللجوء إلى المصالحة والوساطة قبل قيد أي من الدعاوى الآتية: ... د- الدعاوى المتعلقة بالعقود التي تتضمن الاتفاق -كتابة- على اللجوء إلى المصالحة والوساطة والتسوية الودية قبل اللجوء إلى القضاء"، وبما أن العقد المبرم بين الطرفين قد نص كتابة على اللجوء للطرق الودية قبل إحالة النزاع للجهة المختصة، وبما أن المدعي وكالة لم يقدم ما يثبت اللجوء للمصالحة والوساطة والتسوية الودية قبل قيد هذه الدعوى، لذا فإن الدائرة تنتهي إلى ما يلي.

(منطوق الحكم)

حكمت الدائرة بعدم قبول الدعوى المقامة من المدعية/شركة (...) للمقاولات، ذات السجل التجاري رقم (...). ضد المدعى عليها/شركة (...) للمقاولات، ذات السجل التجاري رقم (...).

عضو

عدنان بن جمال بن رباح الحربي

عضو

عمر بن عبدالعزيز بن سليمان الصبي

رئيس الدائرة

عثمان بن صالح العنزي

الاستئناف

الحمد لله والصلاة والسلام على رسول الله أما بعد:

فلدى الدائرة التجارية الثالثة وبناءً على القضية رقم ٧٠٠ لعام ١٤٤٢ هـ

المقامة من/ شركة (...) للمقاولات سجل تجاري (...)

ضد/ شركة (...) للمقاولات غير ذلك (...)

القاضي عبدالعزيز بن أحمد العمير رئيساً

القاضي محمد بن إبراهيم اللحيدان عضواً

القاضي سعد بن محمد القحطاني عضواً

(الوقائع)

تتلخص واقعات هذه القضية بما أورده الحكم محل الاعتراض؛ وتحيل إليه الدائرة وفقاً للمادة (٧٦/٢) من نظام المحاكم التجارية، وقد أصدرت الدائرة ناظرة القضية حكمها فيها القاضي برفض الدعوى؛ وذلك للأسباب الواردة في الحكم وتحيل إليها الدائرة وفقاً للمادة (٧٦/٢) من نظام المحاكم التجارية. وبإحالة القضية إلى هذه الدائرة، نظرتها تدقيقاً، وحددت لذلك جلسة اليوم، حيث افتتحت هذه الجلسة عبر الاتصال المرئي (عن بعد)، في هذا اليوم افتتحت هذه الجلسة العلنية (عبر الاتصال المرئي)، وفيها حضر وكيل المدعية (...) بموجب وكالة رقم (...) هوية وطنية رقم (...) كما حضر وكيل المدعى عليه (...) بموجب وكالة رقم (...) هوية وطنية رقم (...) وبعد الاطلاع على ملف القضية والحكم الصادر فيها والاعتراض المقدم عليه، قررت الدائرة رفع الجلسة للمداولة وإصدار الحكم.

(الأسباب)

بما أن الاعتراض قُدم خلال المدة النظامية فيكون مقبولاً شكلاً، وأما عن الموضوع، فبما أنه بعد دراسة أوراق القضية، وتفحص مستنداتها والحكم الصادر فيها والاعتراض المقدم عليه، لم يظهر للدائرة ما يحول دون تأييد الحكم، وتشيد به الدائرة حكمها في هذه القضية محمولاً على أسبابه الواردة فيه.

(منطوق الحكم)

حكمت الدائرة: بتأييد حكم الدائرة التجارية السابعة بالمحكمة التجارية بالدمام الصادر بتاريخ ١٤٤٢/٤/٣ في القضية رقم ٤٨٩ لعام ١٤٤٢ القاضي بعدم قبول الدعوى المقامة من المدعية/شركة (...) للمقاولات، ذات السجل التجاري رقم (...). ضد المدعى عليها/شركة (...) للمقاولات، ذات السجل التجاري رقم (...) لما هو مبين بالأسباب، وبالله التوفيق وصلى الله وسلم على نبينا محمد، وعلى آله وصحبه أجمعين.

عضو

سعد بن محمد القحطاني

عضو

محمد بن إبراهيم اللحيدان

رئيس الدائرة

عبدالعزیز بن أحمد العمير

26	طباعة	مشاركة	حجم الخط
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إجمالي الوثائق
٥٤٥٤٨
عدد الزيارات
٢٠٩٨٩٨٨٥
عدد مرات البحث عن أحكام
١٠٩١٥٩٢٠

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بيانات الحكم

محكمة: المحكمة التجارية

المدينة: الدمام

رقم القضية - القرار: ٣/١٢٧٨٠/ق

تاريخها: ١٨ / ٨ / ١٤٣٨

محكمة الاستئناف: محكمة الاستئناف

المدينة: المنطقة الشرقية

رقم القرار: ٤١٣٤/ق

تاريخه: ٢٠ / ١ / ١٤٣٩

التصنيف

الحقوقي البيع الثمن إعادة ثمن مبيع

التجاري الصيانة

التجاري الصيانة إثبات مقاوله صيانة

عنوان الحكم

الحكم في القضية رقم (٣/١٢٧٨٠/ق/ لعام ١٤٣٦ هـ)

نص الحكم

الحكم في القضية رقم (٣/١٢٧٨٠/ق/ لعام ١٤٣٦ هـ)

المقامة من المدعية: شركة مجموعة (...) - سجل تجاري رقم (...)

ضد المدعى عليه: (...) - هوية وطنية رقم (...)

صاحب مؤسسة (...)

الحمد لله وحده والصلاة والسلام على من لا نبي بعده،،

في يوم الأحد ١٨/٨/١٤٣٨ هـ، انعقدت جلسة الدائرة التجارية الخامسة بمقر المحكمة الإدارية بالدمام، برئاسة:

القاضي/ فيصل بن أحمد الزهراني رئيساً

وبحضور أمين الدائرة (...)، وذلك للنظر في القضية الموضحة أعلاه، والمحالة لها بتاريخ ٢٢/١١/١٤٣٦ هـ، وبعد اطلاع الدائرة

على القضية وسماع المرافعة أصدرت حكمها المائل.

(الوقائع)

تتحصل وقائع هذه القضية بالقدر اللازم لإصدار هذا الحكم بتقديم وكيل المدعية/ (...) – هوية وطنية رقم (...)، بموجب الوكالة رقم (٣٧٩٦٠٩٧٤)، والمؤرخة في ١٤٣٧/٧/١٠ هـ، والصادرة من كتابة العدل بالرياض - إلى المحكمة الإدارية بالدمام بلانحة ادعاء يختصم فيها المدعى عليها، مفاده أن موكلته تعاقدت مع المدعى عليه على أعمال صيانة وإصلاح ومتابعة للأجهزة الخاصة بمركز التأهيل الشامل بالأحساء بتاريخ ٢٠١٣/٣/١٩م وذلك لمدة عام، وأخل المدعى عليه بالعقد المتفق عليه ولم يقدّم بالأعمال الموكلة إليه، كما قدم قطع غيار لبعض الأجهزة من شركات غير معروفة وغير مطابقة للقطع الأصلية، مما اضطر موكلته للقيام بما وجب على المدعى عليه، وكلفها ذلك مبلغ (٣٣٣.٤٦٥) ثلاثمائة وثلاثة وثلاثون ألفاً وأربعمائة وخمسة وستون ريالاً، طالباً إلزام المدعى عليه برد المبلغ المقدم وقدره (٥٠.٠٠٠) خمسون ألف ريال، وتعويض موكلته على الخسائر التي نالتها، وأتعاب المحاماة، قيدت قضية بالرقم المشار إليه بعالية، وأحيلت إلى هذه الدائرة، وفي سبيل ذلك حددت لها عدة جلسات لم يحضرها المدعى عليه، وبجلسة يوم الأربعاء ١٤٣٨/١/٤ هـ، حضر وكيل المدعية المشار إليه بعالية، وحضر لحضوره وكيل المدعى عليه/ (...) – هوية وطنية رقم (...) بموجب الوكالة رقم (٣٨١٤١٦٧٣) والمؤرخة في ١٤٣٨/١/٢٣ هـ، والصادرة من كاتب العدل بالأحساء -، ويسأل وكيل المدعية عن دعوى موكلته أحال على صحيفة الدعوى، وبعرضها على وكيل المدعى عليه طلب نسخة منها إثر ذلك قامت الدائرة بتزويده نسخة منها، وباطلاعه عليها استمهل الإجابة، وبجلسة يوم الأربعاء ١٤٣٨/٢/٢ هـ، قدم وكيل المدعى عليه مذكرة من أربع ورقات مع عدد من المرفقات مفادها أن العقد المتفق عليه نص على مجرد الفحص والتشبيك دون أي عمل آخر، وبعد القيام بذلك يقوم فريق الكشف بتقديم تقرير عن الأجهزة وحالتها، ومن ثم يتم الاتفاق مجدداً على أعمال الصيانة وتغيير القطع، وهو ما حدث بالفعل قام موكله بالاتصال على المدعية لأجل دفع مبلغ (٥٠.٠٠٠) خمسون ألف ريال على دفعتين، الأول بتاريخ ٢٠١٣/٥/١٢م، والآخر قدره (١٠.٠٠٠) عشرة آلاف ريال بتاريخ ٢٠١٣/٦/٨م، وذلك للقيام بأعمال الإصلاح عاجلاً، على أن يكون هناك اتفاق فيما بعد على أعمال التركيب، وفيما يخص جهالة الشركة الموردة لقطع الغيار، فأرفق بمذكرته مستخرج من وزارة التجارة عنها، مما يؤكد صحتها، زود وكيل المدعية بنسخة منها، وباطلاعه عليها استمهل الإجابة، وبجلسة يوم الخميس ١٤٣٨/٣/٣٠ هـ، قدم وكيل المدعية مذكرة من أربع ورقات وعدد من المرفقات تضمنت بأن ما أورده المدعى عليه بمذكرته مجرد أقوال مرسلة لا تستند للواقع ولا تمت للحقيقة بصله، ومردود عليه، وتفصيل ذلك كالآتي: إن ما أثاره المدعى عليه من الإشارة إلى بنود هذا الاتفاق تتعلق بمجرد الفحص والكشف دون القيام بأي أعمال صيانة أو تركيب قطع غيار أو غيره، هو كلام مغلوط ومتناقض، فالمدعى عليه ملتزم بأعمال الصيانة للأجهزة المذكورة كما تشتمل على خدمة فحص الأجهزة، وما نص عليه البند الأول من عقد الاتفاق واضح به طبيعة التزام المدعى عليه حيث جاء نصه ((يتعهد الطرف الأول بأعمال الصيانة للأجهزة المذكورة أعلاه (...)) والمدعى عليه يحاول تبرير عدم التزامه وتهربه بقوله ((حيث أن العقد المبرم ينص على مجرد التشبيك دون القيام بأي أعمال صيانة أو تركيب (...)) متناسية ما يقع عليه من مهام والتزام وفق البند المشار إليه من فحص وصيانة الأجهزة المذكورة معاً، فالمدعى عليه يقوم بتقديم تقرير فني عن حالة أي أجهزة لدى مركز التأهيل المتعاقد معها موكلتي وذلك بعد إجراء الفحوصات المحددة على وجه التفصيل بنفس البند ثم تتقدم بعرض وفي حال اعتماده بالموافقة تقوم المدعى عليه بالإصلاح، ثانياً: ما دفع به المدعى عليه بأن البند الثالث في العقد المبرم بينه وبين موكلته أنه في

حال أن استلزم الإصلاح يكون هناك اتفاق جديد بينهما فهذا ليس صحيحاً، حيث ما نص عليه هذا البند هو أنه في حالة إذا استلزم الإصلاح يقوم المدعى عليه بتقديم عرض خاص بخصوص قطع الغيار في حينه بعد أن تقوم بالفحوص اللازمة وفي حال اعتماده يبدأ المدعى عليه في الإصلاحات تنفيذاً لنص البند الأول من العقد، ولا يعقل بأي حال من الأحوال ما تزعمه من أن ذلك يتطلب اتفاقاً جديداً، فقيام المدعى عليه بالإصلاح والتركيب هو التزام أصيل بمحل هذا العقد إلى جانب الصيانة والفحص، وقد استلم المدعى عليه قيمة الصيانة عن نصف مدة العقد المذكور وقيمتها (٤٠.٠٠٠) أربعون ألف ريال عن المدة من ٢٠١٣/٠٤/٠١م وحتى ٢٠١٣/٠٩/٣٠م وذلك بالشيك المؤرخ في ٢٠١٣/٠٤/٠٤م وسند القبض رقم (٢٠٦٥) وتاريخ ٢٠١٣/٠٤/٠٨م، وهذا دليل على التزام المدعى عليه بفحص الأجهزة والإصلاح والتركيب والتي قام بتنفيذها على نحو مخالف وتسبب لهعطى تلك الأجهزة فيما بعد. (مرفق رقم ١)، ثالثاً: يكرر المدعى عليه وقائع غير صحيحة بزعمه أنه قام تطوعاً بأخذ المبلغ المدفوع له من قيمة هذا العقد وهو مبلغ (٥٠.٠٠٠) خمسون ألف ريال بداعي شراء قطع الغيار وتركيبها على أن يكون الاتفاق فيما بعد على قيمة التركيب، وهذا يكذب واقع الحال وأن المدعى عليه تدعي خلاف الحقيقة ولا يوجد ما يثبت صحة زعمه، إذ إن الأصل كما سبق وأن أشرنا هو قيامها بشراء قطع الغيار وفق ما جاء بالبند الثالث من العقد بعد تقديمه عرضاً بذلك ويتم اعتماده ثم تبدأ في الإصلاح، رابعاً: يتحجج المدعى عليه بأن عمال موكلتي موجودين بالمركز طوال الوقت وأنه لا يقوم بتركيب أي قطع غيار إلا بعد التنشيط من مسئول يعمل لدى موكلتي، هو ادعاء غير صحيح ولم يقدم دليل ذلك وتؤكد موكلته أن المدعى عليه قام بهذا دون الرجوع إليها، وأن الأصل أن يلتزم المدعى عليه بتركيب قطع غيار أصلية وفق العرض المقدم منه والمعتمد من موكلته، ولا يوجد مبرر لعد التزام المدعى عليه بمواصفات العرض المقدم منه، خامساً: بالنسبة إلى ما جاء برد المدعى عليها بشأن المؤسسة صاحبة الفاتورة المقدمة، فالمفترض أن تكون قطع الغيار المقدمة قطع أصلية وأن يكون شرائها من شركات أو مؤسسات معروفة تكون وكيل لبيع هذه القطع، حيث يقع على عاتق المدعى عليه كامل المسؤولية بسبب تعامله مع مؤسسات مجهولة، بالإضافة أنه عند السؤال عن تلك المؤسسة اتضح عدم وجودها واتضح أن الأرقام الموجودة في الفاتورة غير مستعملة مما يثير الريبة، وبغض النظر عن كل ذلك فنحن بصدد إثبات مخالفة المدعى عليه لتركيبه قطع غيار من مصادر مجهولة وغير مطابقة لقطع الغيار الأصلية المذكورة بالعرض المقدم منها وهذا محل دعوانا، وأن الخطاب رقم (١٢٣٤٨١) وتاريخ ١٤٣٤/١٢/٠٩ هـ الصادر من إدارة التشغيل والصيانة بوزارة الشؤون الاجتماعية لهو أكبر دليل على عدم تقديم المدعى عليها الصيانة على الوجه المطلوب ولم تلتزم بمواصفات قطع الغيار، لأن قطع الغيار التي تم تركيبها للأجهزة قد تسببت في عطل بعض الأجهزة مما دفعها إلى تعميم الإصلاح إلى شركة (...) لخدمات التكيف لإصلاحها، وعليه فإن موكلته إذ تبادر بتعديل طلباتها الواردة بصحيفة الدعوى على النحو التالي: إلزام المدعى عليه بدفع مبلغ (٥٠.٠٠٠) خمسون ألف ريال التي استلمها كدفعة مقدمة من قيمة أعمال الصيانة، وإلزام المدعى عليه بدفع مبلغ (٤٠.٠٠٠) أربعون ألف ريال قيمة ما استلمه من مقدم قيمة العقد محل الدعوى، وتعويض موكلته عما لحقها من ضرر واضطرابها لعمل الصيانة على حسابها بمبلغ (٣٣٣.٤٦٥) ثلاثمائة وثلاثة وثلاثون ألفاً وأربعمائة وخمسة وستون ريالاً، وأتعاب المحاماة، زود وكيل المدعى عليه بنسخة منها، وباطلاعه عليها استمهل الاجابة، ثم تبادل طرفا الدعوى المذكرات المقدمة والتي لا مزيد فيها عما قُدم سابقاً، وبجلسة يوم الخميس ١٤٣٨/٤/٢٨ هـ، قرر طرفا الدعوى

اكتفاءهما بما سبق تقديمه، وعليه قررت الدائرة حجز القضية للدراسة، وبجلسة يوم الخميس ١٤٣٨/٧/٢ هـ، وبعد دراسة الدائرة لأوراق القضية قررت فتح باب المرافعة، وسألت وكيل المدعى عليه هل قدم عرض سعر لما تم صيانتها، فأفاد بأنه قام بتقديم عرض سعر من شركة (...)، وتم رفضه بسبب ارتفاع السعر، إثر ذلك اتفق مع المدعي على تقديم عرض سعر أرخص من ذلك فقام بتوريد المواد اللازم للصيانة بسعر أرخص مما قدم، وبعث بالفاتورة إلى المدعية وتم دفع قيمتها، وبعرض ذلك على وكيل المدعي أفاد بأن موكله ينكر ذلك وأن المدعي عليه قدم عرض سعر مخالف لما يطالب بقيمته، واكتفيا بذلك عليه قررت الدائرة إلزام طرفي النزاع بحضور موكليهما في الجلسة القادمة، وبجلسة يوم الخميس ١٤٣٨/٨/٨ هـ، أفاد وكيل المدعية بأن موكلته تحصر دعواها في المذكرة المقدمة في جلسة ١٤٣٨/٣/٣٠ هـ، إثر ذلك ذكر وكيل المدعي عليه بأنه فيما يخص الطلب الأول فإن المدعية بعد تقديم عرض السعر من شركة (...) رفضت العرض المقدم بحجة ارتفاع سعره وتم تسليم عن طريق المندوب مبلغ (٥٠.٠٠٠) خمسون ألف ريال، لشراء أغراض الصيانة المطلوبة دون النظر إلى عرض السعر المقدم، وفيما يخص الطلب الثاني فإن موكله بعد توقيع العقد قام بما وجب عليه من الصيانة والإشراف طيلة فترة العقد، واكتفى بذلك، كما اكتفى وكيل المدعية بما سبق تقديمه، وعليه قررت الدائرة حجز القضية للدراسة، وبجلسة يوم الخميس ١٤٣٨/٨/١٣ هـ، بعد دراسة الدائرة لأوراق القضية قررت فتح باب المرافعة، وأفهمت طرفي النزاع بتقديم أصول المستندات المقدمة، فاستعدا لذلك كما طلبت الدائرة من وكيل المدعية تقديم بيينة موكلته على اعتماد عرض السعر المقدم من شركة (..) فاستعد لذلك، وبجلسة هذا اليوم ١٤٣٨/٨/١٨ هـ، حضر المشار إليهما بعالية، وقدا أصول بيناتهما، واكتفيا بذلك، وعليه قررت الدائرة رفع الجلسة وإصدار الحكم.

(الأسباب)

بعد سماع الدعوى والإجابة؛ والاطلاع على أوراق القضية ومستنداتها؛ وحيث يهدف وكيل المدعية من دعوى موكلته إلى إلزام المدعى عليه بدفع مبلغ قدره (٥٠.٠٠٠) خمسون ألف ريال استلمها كدفعة مقدمة من قيمة أعمال الصيانة، وإلزام المدعى عليه بدفع مبلغ قدره (٤٠.٠٠٠) أربعون ألف ريال قيمة ما استلمه من مقدم قيمة العقد محل الدعوى، وتعويض موكلته عما لحقها من ضرر واضطرابها لعمل الصيانة على حسابها بمبلغ (٣٣٣.٤٦٥) ثلاثمائة وثلاثة وثلاثون ألفاً وأربعمائة وخمسة وستون ريالاً، وأتعاب المحاماة، وقدم سنداً لدعواه عدد من البيانات تمثلت في أصل العقد المتفق عليه – تمت مطابقته بالصورة المرفقة – والذي لا ينزاع فيه المدعى عليه، وعدد من الخطابات الموجهة إلى المدعى عليه، وسندات قبض المدعى عليه لمبلغ (٥٠.٠٠٠) خمسون ألف ريال، وحيث دفع المدعى عليه بأن العقد يقوم على أعمال الكشف والتشبيك دون أي تغيير أو صيانة على الأجهزة، وقدم عدداً من الصور الضوئية لعدد من الفواتير والمستندات يستند إليها في قيام موكله ببند العقد من الإصلاح والتشبيك والصيانة، ولما كان العقد المبرم بين الطرفين هو المنظم للعلاقة التعاقدية بينهما، بما تضمنه من شروط وأحكام؛ هي محل الالتزام بين الطرفين، والدائرة وهي في مقام تصديها لهذا النزاع تتطرق من خلال تفحصها لأوراق القضية من خلال بنود هذا العقد، دون الاستطراد فيما أسهب به طرفا الدعوى في أمور ليست من صلب التعامل، وحيث إن العقد المبرم نص في البند الأول على أن المدعى عليه يتعهد بأعمال الصيانة للأجهزة المذكورة في العقد بفحصها بشكل مستمر، وفي البند الثاني نص على أن يقدم المدعى عليه تقريراً فنياً على الأجهزة المذكورة يبين

حالة الأجهزة، مرفق به توصيات لتحسين أداء الأجهزة، كما نص في البند الثالث عند حدوث أي عطل يتم تقديم عرض سعر من قبل المدعى عليه وبعد اعتماده من قبل العميل، يقوم المدعى عليه بإجراء الإصلاحات فور موافقة العميل وشراء القطع اللازمة، ولما كانت طلبات المدعية مؤداها فسخ العقد المبرم بين الطرفين واسترداد ما تم دفعه والتعويض، وحيث إن المدعية حصرت أسباب دعواها في قيام المدعي عليه بتقديم فاتورة مخالفة لعرض السعر المقدم ومن مؤسسة مجهولة، إضافة إلى أن قطع الغيار مخالفة للقطع الأصلية، فضلاً عن عدم التزام المدعي عليه بالكشف الدوري على الأجهزة، كل ذلك رتب ضرراً على المدعية تمثل في صيانة الأجهزة بمبلغ (٣٣٣.٤٦٥) ثلاثمائة وثلاثة وثلاثون ألفاً وأربعمائة وخمسة وستون ريالاً، ولما كانت بيانات المدعية قاصرة في إثبات ما تدعيه، ولا تنهض دليلاً يستند إليه، الأمر الذي تنتهي معه الدائرة إلى رفض دعوى المدعية، وتنفيذ ذلك على النحو الآتي: ففيما يخص طلب استرداد مبلغ (٥٠.٠٠٠) خمسون ألف ريال قيمة القطع الموردة وأعمال الصيانة، وبإمعان النظر والاطلاع على بيانات المدعية التي تستند إليها لدعم أسباب دعواها، تقضي الدائرة بأنه لا يصلح الاحتجاج بها لأسباب حاصلها أنها صوراً ضوئية لا يصلح الاحتجاج بها استناداً إلى المادة (١٤٧) من نظام المرافعات الشرعية، كما أنه ليس فيها ما يثبت إخلال المدعى عليه بالتزامه التعاقدية، فليس هناك اعتماد لعرض السعر المُقَدَّم من شركة (...)، ليثبت به إخلال المدعى عليه للبند الثالث من العقد، فضلاً أن المدعية رضىت بما قدمه المدعى عليه من فواتير وقطع غيار ولم تنازع في حينه، كما هو واضح بخطابات المدعية والمرفقة في صحيفتها، وخصوصاً الخطاب الموجه من قبل المدعية إلى المدعى عليه بتاريخ ١٣/٤/٢٠١٤م يخص جهالة المؤسسة الموردة لقطع الغيار ورداءة القطع الموردة، فلم تقدم المدعية دليل يستند إليه في ذلك، وإنما اكتفت بالقول المرسل المجرد عن الدليل، وفيما يخص عدم التزام المدعى عليه بالكشف الدوري على أجهزة التكييف وطلب المدعية استرداد قيمة العقد المقدم لمدة ستة أشهر والبالغ قدره (٤٠.٠٠٠) أربعون ألف ريال، فهذا يناقض ما تتخذه المدعية سنداً لها، حيث إن العقد بدأ بتاريخ ١٩/٣/٢٠١٣م وذلك لمدة عام، والمدعية سلمت المدعى عليه سني قبض الأول بتاريخ ١٢/٥/٢٠١٣م والسند الآخر بتاريخ ٨/٦/٢٠١٣م، ما مؤداه قيام المدعى عليه بأعمال الصيانة والفحص حسب العقد لتلك الفترة، فضلاً عن عجز المدعية تقديم بينة تثبت صحة قولها، ما تنتهي معه الدائرة إلى رفض هذه الطلبات، وأما ما يتعلق بطلب المدعية التعويض عن الأضرار، فحيث أخفقت المدعية في نسبة الخطأ إلى المدعى عليه، فلا تستحق معه التعويض لانتهيار أركان دعوى التعويض بعدم ثبوت الخطأ من جانب المدعى عليه، وبالتالي يكون طلبها حري بالرفض، وحيث إن الدائرة ذهبت إلى رفض الطلب الأصلي فإنها تبعاً لذلك تذهب إلى رفض طلبها مصاريف الدعوى لعدم وجود الموجب الشرعي له.

(فلهذه الأسباب)

حكمت الدائرة برفض الدعوى المقامة من المدعية/ شركة مجموعة (...) - سجل تجاري رقم (...) ضد المدعى عليه/ (...) - هوية وطنية رقم (...)، صاحب مؤسسة (...) للتكييف المركزي، والله الموفق، وصلى الله وسلم على نبينا محمد وعلى آله وصحبه أجمعين.

(...)(أمين السر)

فيصل بن أحمد الزهراني رئيس الدائرة

الاستئناف

الحكم في قضية الاستئناف رقم ٤١٣٤/ق لعام ١٤٣٨ هـ

المتعلقة بالقضية التجارية رقم ١٢٧٨٠/٣/ق لعام ١٤٣٦ هـ

المقامة من/ شركة مجموعة (...)

ضد (...)/

الصادر بشأنها حكم الدائرة التجارية الخامسة بالمحكمة التجارية بالدمام بتاريخ ١٤٣٨/٨/١٨ هـ

الحمد لله رب العالمين، والصلاة والسلام على نبينا محمد وعلى آله وصحبه أجمعين، وبعد:

ففي يوم الثلاثاء ١٤٣٩/١/٢٠ هـ انعقدت دائرة الاستئناف التجارية الثانية بمقرها بمحكمة الاستئناف بالمنطقة الشرقية بتشكيلها المكون من القضاة التالية أسماؤهم:

القاضي / محمد بن صالح البجعي رئيساً

القاضي / سلمان بن غرم الشهراني عضواً

القاضي / خالد بن سعود الرشود عضواً

وبحضور / (...) أميناً للسر، وذلك للنظر في القضية المذكورة أعلاه والمحالة لهذه الدائرة في ١٤٣٨/١١/١٤ هـ وقد اطلعت الدائرة على أوراق القضية والحكم الصادر فيها وعلى الاعتراض المقدم، وبعد دراسة القضية والمداولة فيها أصدرت الدائرة الحكم المائل. (الدائرة)

بما أن واقعات هذه القضية قد أوردتها الحكم محل الاعتراض فإن الدائرة تحيل إليه منعاً للتكرار وبإحالة الدعوى إلى الدائرة الناضرة للقضية بشأن الحكم محل الاعتراض المنتهي إلى رفض الدعوى، وبتسليم وكيل المدعية نسخة من إعلام الحكم اعترض عليه وطلب تدقيقه. وأحيلت القضية إلى هذه الدائرة فقامت بدراسة أوراقها ومستنداتها والحكم الصادر فيها والاعتراض المقدم عليه وما بني عليه من أسباب فظهر لها أن الاعتراض قدم خلال المهلة النظامية وبالتالي فهو مقبول شكلاً. أما عن موضوع الدعوى فقد استبان للدائرة صحة النتيجة التي خلصت إليها الدائرة في قضائها، وأن في الأسباب التي أقامت عليها هذا القضاء ما يكفي لتأييد هذا الحكم، ولذلك فإن هذه الدائرة تؤيده محمولاً على أسبابه.

(لذلك)

حكمت الدائرة بقبول الاعتراض شكلاً ورفضه موضوعاً وتأييد الحكم الموضح أعلاه محمولاً على أسبابه. والله الموفق وصلى الله وسلم على نبينا محمد وآله وصحبه أجمعين.

(...) أمين السر

د. خالد بن سعود الرشود عضو

سلمان بن غرم الشهراني عضو

د. محمد بن صالح الجحى رئيس الدائرة

 26	 طباعة	 مشاركة	 حجم الخط
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	إجمالي الوثائق ٥٤٥٤٨ عدد الزيارات ٢٠٩٨٩٨٨٥ عدد مرات البحث عن أحكام ١٠٩١٥٩٢٠	تطبيقات الأجهزة الذكية قريبًا على أجهزة الأيفون والأيباد والأندرويد  	الرئيسية عن الموقع التصنيف اتصل بنا دليل المستخدم
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بيانات الحكم

محكمة: المحكمة التجارية

المدينة: جدة

رقم القضية - القرار: ٤٦٠٥

تاريخها: ١٤٣٩/١١/٢٥

محكمة الاستئناف: محكمة الاستئناف

المدينة: منطقة مكة المكرمة

رقم القرار: ٤٠٧

تاريخه: ١٤٤٠/٥/٤

التصنيف

الدعوى نظر الدعوى صرف النظر ورد الدعوى
الحقوقي العقار مساهمات عقارية مطالبة برأس المال والأرباح

عنوان الحكم

الحكم في القضية رقم ٤٦٠٥ لعام ١٤٣٨ هـ

نص الحكم

الحكم في القضية رقم ٤٦٠٥ لعام ١٤٣٨ هـ

المقامة من (...):

ضد (...):

الحمد لله والصلاة والسلام على رسول الله، وبعد: فإنه يوم الثلاثاء ١٤٣٩/١١/٢٥ هـ وبمقر المحكمة التجارية بجدة عقدت الدائرة

التجارية الثامنة جلستها المشكلة من:

القاضي عبد العزيز بن علي الغامدي رئيساً

القاضي سليمان بن خالد بابطين عضواً

القاضي صهيب بن جميل نور عضواً

وبحضور أمين السر أحمد بن خلف الثقفي، وذلك للنظر في هذه القضية المحالة للدائرة في ١٤٣٩/٨/٢٣ هـ.

(الوقائع)

تقدم (...) بوكالته عن المدعي بلائحة دعوى طلب فيها إلزام المدعى عليه بسداد مبلغ ٤٥٠.٠٠٠ ريال تمثل المبلغ المسلم للمدعى عليه للمساهمة في مشروع صيانة مبنى الشرطة في الطائف وفقاً للتفصيل المبين بلائحة الدعوى ومرفقاتها. وبجلسة ١٤٣٩/٩/٨ هـ حضر وكيل المدعي (...) كما حضر (...) بوكالته عن المدعى عليه وأكد المدعي وكالة على ما ورد في لائحة الدعوى المتضمنة مطالبة المدعى عليه بمبلغ ٤٥٠.٠٠٠ ريال المسلم للمدعى عليه لصيانة مبنى الشرطة بمحافظه الطائف وبسؤال وكيل المدعى عليه الجواب استمهل للرد. وبجلسة اليوم تبين عدم حضور المدعي وأفاد المدعى عليه الحاضر بأن المشروع محل الدعوى لازال قائماً وأنه لم يتسلم أي مستخلص من شرطة الطائف مالكة المشروع.

(الأسباب)

وبما أن المدعي يطلب إلزام المدعى عليه برد رأس المال المسلم له للمساهمة في مشروع صيانة مبنى الشرطة بمحافظه الطائف وفقاً للعقد المبرم بين الطرفين في ١٤٣٨/٦/٢٠ هـ الذي ينص على المشاركة في الربح والخسارة فإن الاختصاص الولائي منعقد للمحاكم التجارية، وبما أن التصفية تكون بتسلم المستخلصات من مالكة المشروع كما أشار لذلك البند السادس من العقد وكما هو معتبر شرعاً وعرفاً وعقلاً، وإذ لم يقدم المدعي ما يثبت تسلم المدعى عليه لأي مبالغ عن المشروع فإن الدعوى تكون مفتقرة لشرط قبولها وهو الاستحقاق لمبلغ الدعوى.

(وبناء على ذلك)

حكمت الدائرة بعدم قبول الدعوى. وبالله التوفيق وصلى الله وسلم على نبينا محمد وآله وصحبه أجمعين.

أمين السر

أحمد الثقفي

القاضي

صهيب بن جميل نور

القاضي

سليمان بن خالد بابطين

رئيس الدائرة

عبد العزيز بن علي الغامدي

الاستئناف

الحكم في القضية رقم ٤٠٧ لعام ١٤٤٠ هـ

المقامة من / (...) هوية وطنية (...)

ضد / (...) هوية وطنية (...)

الحمد لله وحده والصلاة والسلام على من لا نبي بعده، وبعد:

فإنه في يوم الخميس ٠٤/٠٥/١٤٤٠ هـ وبمقر محكمة الاستئناف بمنطقة مكة المكرمة (جدة) عقدت الدائرة التجارية الثانية جلستها

بتشكيلها التالي:

القاضي حسن بن علي الثبتي رئيساً

القاضي إبراهيم بن صالح السحيباني عضواً

القاضي عبداللطيف بن محمد السبيل عضواً

وبحضور عطيه بن عيضة بن محمد القاسمي أميناً للسر، وذلك للنظر في القضية المشار إليها أعلاه المحالة للدائرة في ٠٣/٠٤/١٤٤٠ هـ، وفيها بعد المداولة أصدرت الدائرة هذا الحكم.

(الوقائع)

بعد الاطلاع ودراسة أوراق القضية والحكم الصادر فيها والاعتراض المقدم عليه، وبما أن وقائع هذه القضية قد أوردتها الحكم محل الاستئناف المشار إليه أعلاه، فإن الدائرة تحيل إليه منعاً للتكرار وتتلخص بطلب إلزام المدعى عليه بسداد مبلغ (٤٥٠.٠٠٠) ريال، تمثل المبلغ المسلم للمدعى عليه للمساهمة في مشروع صيانة مبنى الشرطة في الطائف، وحيث اطلعت هذه الدائرة على أوراق القضية والحكم الصادر فيها والاعتراض المقدم عليه فاستبان لها أن الاعتراض قد قدم خلال الأجل المحدد نظاماً ومن ثم فهو مقبول شكلاً، أما من حيث الموضوع فإنه لم يظهر لهذه الدائرة من خلال الاعتراض على الحكم ما يوجب الملاحظة عليه وتنتهي إلى تأييده محمولاً على أسبابه.

(لذلك)

حكمت الدائرة بتأييد الحكم الصادر من الدائرة التجارية الثامنة بالمحكمة التجارية بجدة في القضية رقم ٤٦٠٥ لعام ١٤٣٨ هـ القاضي:

بعدم قبول الدعوى. والله الموفق، وصلى الله على نبينا محمد وعلى آله وصحبه وسلم.

أمين السر

عطيه بن عيضة بن محمد القاسمي

عضو

عبداللطيف بن محمد السبيل

عضو

إبراهيم بن صالح السحيباني

رئيس الدائرة

حسن بن علي الثبتي

 26	 طباعة	 مشاركة	   حجم الخط
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	إجمالي الوثائق ٥٤٥٤٨ عدد الزيارات ٢٠٩٨٩٨٨٥ عدد مرات البحث عن أحكام ١٠٩١٥٩٣٠	تطبيقات الأجهزة الذكية قريبًا على أجهزة الأيفون والأيباد والأندرويد  Download on the App Store  Get it on Google play	الرئيسية عن الموقع التصنيف اتصل بنا دليل المستخدم
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Vitae

Name	:Mouath M. Alghamdi
Nationality	:Saudi
Date of Birth	:11/30/1994
Email	:AlghamdiMouath@gmail.com
Address	:Riyadh, Saudi Arabia, 13264

Academic Background

Mouath is the recipient of a scholarship awarded by the Custodian of The Two Holy Mosques Scholarship Program which he earned his bachelor's degree through back in 2018 in Civil Engineering from Cleveland State University, Ohio, United States, with a GPA of 3.10 out of 4.0. During his undergraduate studies, Mouath developed a robust knowledge in regards with structural engineering and reinforced concrete design using various computer-aided programs. Professionally, Mouath has worked as a Civil Engineer for Saline Water Conversion Corporation (SWCC) on several projects, where he has worked on initiating the technical project scopes with a detailed work plan including sequences of the activities. At that time, Mouath was enrolled in the Construction Engineering and Management graduate program at KFUPM as a part-time student, enhancing his scientific knowledge along with his work experience, and maintaining a 3.81 out of 4.0 CGPA. His research interests include project risk management, project control, building maintenance and maintenance management.