



Manuscript Title	Construction Disputes Causes and Resolution Methods: A Case Study from a Developing Country
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EARLY VIEW

Construction Disputes Causes and Resolution Methods: A Case Study from a Developing Country

Abstract The increasing complexity of the construction industry, characterised by diverse multidisciplinary project teams, various stakeholders, distinctive site conditions and uncertainties, can contribute to an antagonistic environment, which may result in disputes arising between the contractual parties. Identifying the most common causes of disputes is important for an efficient contract management process. This study aims to help project stakeholders incorporate consolidative contract management strategies before commencing a new project by identifying the most common causes of construction disputes in Jordanian construction projects. Key causative factors of disputes were analysed through a literature review, a questionnaire survey and a case study analysis of construction projects in Jordan. The results revealed that the main factors leading to disputes in Jordan are incomplete technical drawings/specifications, variations initiated by the owner/consultant (additive/deductive) and errors and omissions in the contract documents. Moreover, the results show that the most popular methods of dispute resolution in the Jordanian construction industry are negotiation and arbitration. The findings can enable local and international construction stakeholders to initiate contract management strategies before commencing projects. More effective planning can help to reduce the negative impacts of known causes of disputes.

Keywords Disputes; Causes of Disputes, Dispute Resolution Method, Construction Industry; Jordan.

1. INTRODUCTION

The construction sector is crucial to any economy due to its significant contribution to economic performance and growth. The size of the global construction industry was \$8.2 trillion in 2022 (Statista, 2022), and it is expected to reach \$17 trillion by 2029, with a compound annual growth rate (CAGR) of 7.3% (Consultancy, 2022). Construction projects have continually evolved to become much more dynamic in nature, contributing to increased complexity in the technical and physical aspects of projects (Jaffar et al., 2011). In this ever-changing and dynamic environment, construction projects are subject to intense competitiveness, with owners demanding tight budget control and

rigid time constraints while ensuring compliance with the highest quality standards. All of this has predictably led to a substantial increase in the volume of disputes and litigation between project parties (Rumane, 2017).

It is inevitable that due to the diversity of stakeholders' involvement in construction projects and the heterogeneity of situations originating from construction processes, disputes among stakeholders will arise and necessitate specific consideration (Moura and Teixeira, 2010; Institute, 2017). Conflicts between project stakeholders tend to disturb the flow of work and lead to cost and time overruns, which in turn have a negative impact on both the current and future business relationship and communication (Narh, 2015).

Existing research reveals that the average value of disputes has increased worldwide in the past decade (Statista, 2022). The most notable increase has been in the construction industry in the Middle East, which reached a value of \$82M in 2015, the highest in the world (Wilkinson, 2016). Most studies on this topic in the Middle East region have focused on two primary aspects: the causes of disputes and resolution methods. For example Daoud and Azzam studied dispute causative factors in construction projects in the Middle East region (Daoud and Azzam, 1999; Awwad et al., 2016)

Other researchers have focused on identifying the cause of disputes in specific countries in the Middle East (Hassanein and El Nemr, 2007; El-Razek et al., 2008, Dmairi, 2013; El-Sayegh et al., 2020). However, there is no extensive work in the literature that has addressed construction disputes in the Jordanian construction industry while also focusing on the different perspectives of

stakeholders. Hence, this study aims to shed light on the main causative factors of disputes in the Jordanian construction industry, which is limited in terms of the financial and economic strength, complexity and scale of its projects in comparison to other Middle East and North Africa (MENA) countries. According to the Chinese government, one of the most prominent risks in investing in the Jordanian construction market is construction contract risks, and thus Chinese companies are advised to engage professional agencies before signing contracts (Lun, 2021).

Moreover, most of the existing studies have been based on surveys targeting industry practitioners (Marzouk et al., 2011; Dmadi, 2013; Hardjomuljadi, 2014; Ejohwomu et al., 2016; Assaf et al., 2019). Very few studies were found that adopted case study analysis to compare different methods and their results and generate reliable outcomes based on current practices. Some of these studies analysed court cases (Zaneldin, 2006; Cakmak and Irlayici Cakmak, 2014; Kalyan and Prakash, 2019), while others examined documentation from actual construction projects (Enshassi et al., 2009; Mohamed et al., 2014; Getahun et al., 2016).

With all of the above in mind, this paper seeks to address these gaps by performing a comprehensive study specifically exploring dispute causative factors in construction projects in Jordan, dispute resolution methods and the key criteria influencing their selection. The main study objectives can be summarised as follows: (1) identify and rank the major causes of disputes in the Jordanian construction industry as perceived by different stakeholders; (2)

study the intrinsic factors affecting the selection of dispute resolution techniques; and (3) explore the most common practices and methods adopted for the settlement of disputes.

2. LITERATURE REVIEW

The increasing complexity of the construction industry, characterised by diverse multidisciplinary project teams, various stakeholders, distinctive site conditions and uncertainties, can contribute to an antagonistic environment, which may result in disputes arising between the contractual parties (Kassab et al., 2006; Harmon, 2009).

The term dispute has been associated with a variety of other terms, such as claim and conflict. These terms have been used interchangeably in the literature on disputes in construction projects. While these terms are similar, some differences can be observed. According to the Project Management Institute (PMI) (2017), a claim is defined as 'A request, demand, or assertion of rights by a seller against a buyer, or vice versa, for consideration, compensation, or payment under the terms of legally binding contract, such as for a disputed change'. Hadikusumo and Tobgay (2015) offered a more concrete description: 'When one party believes that the other party has not met the contractual obligations or expectations and that they deserve monetary and/or time compensation, they may submit a claim'. This description provides greater clarity on the concept of claims in a project context.

Dada (2013) stated that although the concepts of conflicts and disputes are similar, researchers emphasise that conflict is the primary driving force of disputes. Therefore, the dispute represents the result of the rejection of claims and the subsequent inability to settle the conflicts. Thus, disputes are undesirable events in construction projects that have many adverse effects at a project level and in a wider business context. Almutairi et al. (2015) stressed the fundamental difficulty of avoiding disputes in construction projects, as disputes are inherent because of the complex nature of construction projects. Likewise, it has been argued that the construction industry is a fertile source of disputes, which are a by-product of construction life (Speaight, 2010).

2.1 Causes of Disputes in Construction Projects

The key causes of disputes vary greatly and can be categorised generally as problems related to poor design, incomplete or inaccurate specifications, poor or contradictory engineering drawings, poor contract administration and/or poorly drafted contract clauses, unforeseen circumstances, biased engineers, poor contractor performance and owner changes or delays in approvals etc. Disputes in construction projects are a global issue affecting all nations, regardless of their status, developing and/or developed. The results of previous studies have confirmed the increasing number of disputes in the construction sector worldwide in recent years (Ejohwomu et al., 2016; Aryal, 2018).

Acharya and Lee (2006) found that most of the problems facing construction projects in Korea are related to financial factors, material shortages, sudden

price fluctuations, design errors and contract management deficiencies. Alkhamali et al. (2010) pointed to seven main causes of disputes in the construction industry, the most important of which are contractual problems due to the poor drafting of a contract, cultural differences between the contracting parties, the inefficiency of the workforce and frequent changes in the design and implementation stages.

Contract errors and discrepancies in contract documents are the leading causes of disputes between parties in construction projects (Abwunza et al., 2021). In many cases, the texts of the contract are modified in a way that holds the contractor solely responsible, putting the entire risk on the contractor. Sayed-Gharib et al. (2010) concluded that project stakeholders conflicts increase the probability of disputes in the contracts of construction projects at various stages of the project, both in the design and implementation stages. Sayed-Gharib et al. (2010) stressed that the main causes of disputes are technical issues, issues related to the contracting mechanism and financial issues.

According to Dmaidid et al. (2013), unforeseen circumstances are another cause of disputes in construction projects. Unforeseen circumstances can arise after the contract is signed, which may create new obligations on the parties to the contractual relationship that were not considered in advance. This may lead to disputes between the parties to the contract. Klinger (2009) argued that drafting a construction contract accurately can help to prevent potential disputes. Abwunza et al. (2021) proposed several ways in which construction

contracts could be prepared to avoid disputes, including identifying contract risks, stipulating dispute clauses and applying binding arbitration.

In addition, the owner may be a direct and significant cause of disputes in construction projects. The owner may request changes and modifications in the contract to meet new technological developments or may need to use new materials or lack adequate engineering plans (Alkhamali, 2010). The contractor may also be a significant source of conflict, as the contracting profession is highly complicated and affected by external conditions (Sabri et al., 2019). Dada (2013) agreed that disputes in construction projects could arise because of poor planning, sudden changes in the prices of goods and products, sudden changes in design and implementation, unexpected conditions in the work environment and a lack of effective communication between project parties. The Global Construction Disputes Report (2017) classified six major causes of disputes, including employer-related factors, contractor-related factors, consultant-related factors, material-related factors, contract relationship-related factors and external factors .

Recent studies have confirmed that ambiguity in contract documents, a lack of communication between contract parties, design modifications and cultural differences are among the leading causes of disputes in construction projects (Sambasivan and Soon, 2007; Ruuska and Teigland, 2009; Adnan et al., 2012; Alamri et al., 2017). Jaffar et al. (2011) added that violations of the contract terms and attempts to manipulate contracts are crucial factors in increasing the amount of disputes in the construction industry.

Specifically in the Middle East, the causes of disputes in the construction sector have not been extensively discussed. El Sayegh et al. (2020) found that the failure to comply with contract terms is a significant cause of disputes in the construction sector in the Middle East. Further, Awwad et al. (2016) confirmed that a lack of contract management capacity is a significant cause of disputes in the Middle East. Other studies have explored these causes in different Middle Eastern countries. Marzouk et al. (2011) found that the major causes of disputes in the construction sector in Egypt are amendments to the terms of the contract, non-compliance of the contractor with specifications, the inability of contractors to comply with the terms of contracts and inadequate design drawings. Dmaidid et al. (2013) investigated the causes of disputes in the construction sector in Palestine. Their study found that problems related to career ethics, contract administration, political issues, tender documents (contracts, drawings, quantities and specifications), changing laws and cultural influences are the leading causes of disputes in the Palestinian construction sector.

In Jordan, most previous studies have examined the reasons for delays in construction projects, but little attention has been given to the causes of conflicts in the construction sector. Gharaibeh et al. (2021) conducted a study to examine design changes in construction projects in Jordan. Their study applied a mixed-method approach, using a survey and a case study analysis, concluding that owner's requirements, design errors and omissions and value engineering are the main causes of design changes. Tarawneh et al. (2020)

sought to determine the causes of delays in construction projects in Jordan. The results of their study indicated that the main reasons for delays are primarily related to the contractor, including ineffective delay penalties, a lack of incentives for contractors to finish ahead of schedule and an inability to manage the project contract rationally.

Only one study was identified during the literature review that addressed the causes of disputes in construction projects in various countries including Jordan. Alkhamali et al. (2010) summarised the causes of disputes in construction projects in several countries, including the US, Turkey, Canada, Jordan and the United Arab Emirates. They concluded that although the environments differ from each other, they are largely similar in terms of the cause of disputes in the construction sector. The most prominent causes are administrative problems, contractual problems, cultural differences, workforce inefficiencies, design modifications and changes and unexpected events. Table 1 summarises the causes of disputes in the most recent studies.

Insert Table 1: Main causes of disputes in construction projects in Middle Eastern countries

Here

Table 1 depicts the main causes of disputes in construction projects in the Middle East. It is evident that differing cultural, social and environmental factors affect the nature of disputes in these countries. While the environments of the states differ, in many cases the causes of disputes are similar due to the similar nature of construction projects worldwide. Changing orders, unclear and modified contract terms and cost overruns are common causes of

construction disputes, including within the MENA region. Considering the countries in Table 1, factors related to construction contracts and change orders/variations are among the most significant causes of construction disputes.

Based on the literature review, most of the existing studies on this topic have used a survey method to identify factors that cause disputes. Moreover, there is a lack of studies focusing on the causes of disputes in the construction sector in Jordan. Most of the existing research related to Jordan have investigated the causes of construction project overruns in terms of costs and time. Accordingly, there is a need for more research to study the primary causes of disputes in construction projects in Jordan in depth. This study aims to fill this research gap by studying and comparing disputes in the Jordanian construction industry. Additionally, this study aims to shed light on dispute resolution techniques and the criteria affecting their selection.

2.2 Effect of Disputes on Construction Projects

Disputes in construction projects vary in size and nature. However, they are also comparable, as they are expensive, time consuming and ultimately affect the relationships between project parties (Davis et al., 2010). Disputes contribute to both increasing the costs and reducing the performance of projects. Dada (2013) further clarified that disputes in construction projects can cause projects to deviate from their main objectives and even prevent their completion within the required time, budget and quality level. These negative effects may also result in the disintegration of the relationship between the project parties.

However, these disputes can be controlled, and their harmful effects can be minimised.

Almutairi et al. (2015) emphasised the need to resolve construction project disputes quickly because failing to do so may have a negative impact at the project level, such as delays in project completion. Projects involve various stakeholders, including owners, consultants, contractors and project teams, and it is necessary to effectively manage the relationship between them to avoid any disputes (or minimise their impact wherever possible) and ensure project completion within the specified time and budget.

Disputes inevitably affect the quality of projects, their level of productivity and their completion dates. Abwunza et al. (2021) found that disputes also result in direct and indirect costs. Direct costs are related to the value of the project contract, while indirect costs are related to a loss of work, strained relations between project personnel and defamation of the parties involved. Hosseinian and Torghabeh (2012) added that the increasing number of disputes in the construction industry leads to additional financial costs and a reduced likelihood of resolution. The negative impacts of disputes in the construction industry affect all project parties, binding management to additional costs. Parties in the dispute may resort to judicial methods, which can also lead to high costs. Klinger (2009) pointed to the negative effects on companies, such as reputational damage, declining profitability, an increased turnover rate, delays in the completion of projects and project cost overruns.

3 RESEARCH METHODOLOGY

The aim of this study is to identify the key factors leading to disputes to help reduce their occurrence in future construction projects. A mixed-method approach was used to accomplish this aim, employing a combination of qualitative and quantitative techniques to test the research proposition in the data collection and evaluation stages.

The qualitative techniques used for collecting the research data were based on the literature review and key informant interviews, which involved semi-structured interviews with experts in the construction sector. In order to ensure that these interviews reflected the perspectives of all main contract parties and that the outcomes of the interviews were reflective of all perspectives and opinions, six interviews were conducted with experts from different concerned parties: a general tendering directorate manager, representing the owner perspective; a board member of one of the largest first-class contracting companies in Jordan; a chief executive officer for a consulting company specialising in project management and dispute resolution; and three of the most experienced arbitrators in Jordan.

These six interviews are considered to be enough since the responses repeated the same outcomes, and saturation was achieved. As a result of these interviews, certain comments and modifications were introduced to customise the factors related to the Jordanian construction market to be used later in the

questionnaire survey. This resulted in grouping some repetitive factors under one umbrella heading (i.e., all factors related to change orders initiated by the owner).

The quantitative technique utilised for collecting the research data involved the use of a questionnaire. The questionnaire was prepared based on the final list of dispute causes, which was collected, analysed and verified following an extensive literature review and the semi-structured interviews. The questionnaire was distributed using the online survey method. It was primarily targeted to consultants working in the supervision field, first- and second-grade registered firms, first- and second-tier contracting firms specialised in buildings and owner/owner's representatives from both the public and private sectors. The sample size was determined based on Yamane's (1967) sample size equation: $[n = N/(1+Ne^2)]$, where, n is the sample size, e is the margin of error and N is the population size. Using a confidence level of 95% for quota sampling (Kish, 1965) and the population size determined earlier (842), using the above equation, the necessary sample size was 265 respondents.

The questionnaire was sent using a web-based form to 300 practitioners. Of these, 86 were returned and completed. The sample was then classified by sector (private and public), role (owner, consultant contractor), participants' years of experience and the positions they held. Of the 86 respondents, 36 were engineers from consulting firms and 48 were from contracting firms. A total of 27% of the respondents were from the public sector, while 73% were from the private sector. More than 67% of the participants had more than ten years of experience, 18% had five to ten years of experience and 15% had less

than five years of experience.

To achieve better comprehensiveness and variation, six case studies were selected based on data availability, as it is inherently difficult to obtain detailed information on construction project disputes due to disclosure legalities. In terms of project value, the minimum value was JOD 5m, which represents medium- to large-scale projects. Such projects typically involve better documentation and contract management. Cases were selected in differing locations throughout Jordan, with varying types of building functions (e.g. residential educational, commercial and process projects). Moreover, three main types of construction contracts (remeasured, lump sum and engineering procurement contracts [EPC]), different types of project delivery methods (design-bid-build, design-build and design-build-operate projects) and ownership type (public or private) were considered.

Another source of information regarding construction disputes in the case studies was documentary data, such as the change order logs, monthly reports and project documents. The selected projects characteristics are shown in Table 5, which summarises the six cases in terms of characteristics and findings. Additionally, the cases were distributed between the southern and central regions of Jordan. Four of the six cases were from the private sector, while only two cases were public projects, and the base contract amounts of the cases varied between JD 5m and JoD 160m.

Statistical methods were used to answer the study questions and hypotheses. Means, standard deviations and percentage means (relative weight frequency index) were calculated utilising SPSS software. The ranking was

performed using the Relative Importance Index. The research methodology is visualised using a methodology map in Figure 1.

Insert Figure 1: Research framework for this study **here**

4. DATA ANALYSIS

This section presents the survey results grouped into three main categories: (1) the main causes of disputes, with an emphasis on the differences in views between stakeholders; (2) the preferred method of dispute resolution; and (3) the factors affecting the selection of the resolution method. The reliability of the measurement instrument was first evaluated using SPSS software to ensure data reliability before conducting further statistical analysis. The values of Cronbach's alpha (α) for each construct used in the questionnaire survey indicated very good reliability (range 0.708–0.822).

Content validity was subjectively evaluated by industry practitioners, and the selection of the measurement elements was based on a thorough review of the relevant literature. Spearman's correlation coefficient was calculated to test the construct validity of the research instrument. The p-values were found to be less than 0.05, indicating that the correlation coefficients of all the fields were significant at $p = 0.05$.

4.1 Causes of Construction Disputes

Fourteen dispute causes were mentioned in the questionnaire based on the literature review, which indicated that these elements are the main causes of disputes in the Middle East. The questionnaire asked the respondents to rate

the importance of all 14 dispute causes in terms of their frequency of occurrence in the Jordanian construction industry on an ordinal scale ranging from 1 to 5, with 5 indicating strong agreement.

A ranking analysis, which was based on the Relative Importance Index (RII) method, was used to rate the 14 causes of disputes in Jordan from the three perspectives discussed in the previous section. The RII method output is a value from 0 to 1, with a value close to 1 indicating strong agreement regarding the importance of the cause. Based on the results, overall, the respondents agreed that 'incomplete technical drawings/specifications' is the most significant cause of disputes in Jordan (RII=0.8128), followed by 'errors and omissions in the contract documents' (0.8097 RII) and 'failure by the owner to issue interim awards on time extensions and compensation' (RII= 0.7904), as shown in Table 2.

In order to gain a better understanding of the statistical results, the viewpoints of the different parties were analysed for the data collected from group P1 (contractors) and P2 (consultants) (Table 2 below). According to Table 2, 'incomplete technical drawings/specifications' is the main cause of disputes in Jordan from the perspective of consultants and contractors, which strengthens the validity of its overall ranking. From the contractors' point of view, 'conflict over nonpayment of claims' is the second leading cause of disputes in Jordan (0.8177 RII). While the consultants ranked 'variations initiated by the owner/consultant (additive/deductive)' as the fourth leading cause of disputes (0.7666 RII), contractors ranked it sixth (0.7884 RII).

Insert Table 2: The ranking of causes of disputes in Jordan **here**

However, the main difference can be seen in 'poor construction quality', which was ranked fifth by the consultants but tenth by the contractors. This could be because contractors are unwilling to admit to poor construction quality.

4.2 Selection of a Dispute Resolution Method

The preferred dispute resolution method in the Jordanian construction industry was the focus of the second main part of the research study. Ten dispute resolution methods were included in the questionnaire based on the literature review, which indicated that these methods are commonly utilised and/or currently available in the Middle East.

The ranking analysis was performed to rank the ten most commonly used dispute resolution methods in Jordan from the perspective of the project parties. Overall, the respondents agreed that the 'negotiation' method is the main used method for dispute resolution in Jordan (0.8266 RII), followed by 'mediation' (0.7809 RII) and 'dispute resolution board (DRB)' (0.7797 RII), as shown in Table 3. Interestingly, while all project parties agreed that 'negotiation' is the main method used for dispute resolution in Jordan, the contractors (P1) ranked 'dispute resolution board (DRB)' as the second leading method (0.7941 RII) and 'mediation' as the third leading method (0.7732 RII) (Table 3).

Insert Table 3: The ranking of dispute resolution methods in Jordan **here**

Further, the consultants' (P2) perspective matched the overall outcome regarding 'mediation', which was the second leading method. However, there were some differences, as 'local arbitration' was ranked sixth and 'partnering' was ranked fifth overall, whereas the consultants ranked them fourth and third, respectively.

4.3 Critical Factors in Selecting a Dispute Resolution Method

The main factor that affects the choice of dispute resolution method in the Jordanian construction industry was the third main focus of this study. Twelve factors were mentioned in the questionnaire based on the literature review, which indicated that they are the main factors affecting the choice of resolution method in the Middle East. The questionnaire asked the respondents to rate, based on their own experience, the importance of each factor in the choice of a dispute resolution method in terms of their frequency of use in the Jordanian construction industry on an ordinal scale ranging from 1 to 5, with 5 indicating strong agreement regarding the factor's importance.

A ranking analysis was performed to rank the 12 main factors in Jordan from the perspective of the project parties. Overall, the respondents agreed that 'maintaining a good relationship between the parties' is the primary factor when choosing a dispute resolution method in Jordan (0.8019 RII), followed by 'time to reach a settlement' (0.7986 RII) and 'cost of implementing the method' (0.7745), as shown in Table 4. Moreover, all project parties agreed on the rankings of the top three factors: 'maintaining a good relationship

between the parties', 'time to reach a settlement' and 'cost of implementing the method' (Table 4).

Insert Table 4: The ranking of factors affecting the choice of dispute resolution method in Jordan **here**

5. MULTIPLE CASE STUDY ANALYSIS

A multiple case study approach was adopted to observe the behaviour of parties in the conflicts and identify the main causative factors of disputes in construction projects. Six cases were examined to observe and hypothesise causal patterns to deduce (1) similar results (a literal replication) and (2) contrasting results but for known reasons (a theoretical replication) (Yin, 2011).

The following six cases were selected based on the fact that they all represent genuine contractual conflicts in construction projects (in Jordan) that were discussed during the time of the interviews, with one or more of the interview subjects also being directly involved in the project implementation. It should also be noted that due to the confidential nature of the projects discussed and evaluated here, the main information regarding each project, including project names and identities of the different project parties, will not be revealed. The projects will simply be referred to as Project A, Project B and so on (Table 5). These cases were analysed independently to identify the real causes of the disputes. The analysis was limited to the available data provided by each project and any necessary clarifications through direct questions raised to key project personnel. Fourteen factors were identified from the

literature review and semi-structured interviews, and their effects were examined in the six case studies.

Insert Table 5: Summary of Cases Data **Here**

The analysis of the case study data included the determination of the dispute factors and their cost impact as a percentage of the original contract price. These determinations were made based on in-depth analysis of the case study documentation, including claims, progress reports, final reports and meetings with key project personnel.

The most common factors were 'variations initiated by the owner/consultant (addition/deduction)' and 'incomplete technical drawings/specifications', both of which were observed in all six cases, with combined value percentages (total claim) of 53.34% and 39.59%, respectively. These were followed by 'errors and omissions in the contract documents (3.17%) and 'nonconformity of contractual obligations' (2.83%). The impacts of three other identified factors, 'poor contract administration', 'failure by the owner to issue interim awards on time extensions and compensation' and 'legislation and regulations are always being modified (leading to changes in material prices and other unexpected circumstances)', were negligible in comparison, as shown in Table 6. Finally, the case study analysis showed that the most common dispute resolution method in Jordan is local arbitration, with four of the six cases following this approach.

Insert Table 6: Causes of disputes in the case study analysis **Here**

6. DISCUSSION

Different authors have identified the key disputes in different construction industries (Table 1), which vary depending on the country and project type. It is crucial to identify the most influential causes of disputes in the Jordanian construction industry to reduce the value of construction disputes in the country. The survey revealed that incomplete technical drawings/specifications, errors and omissions in the contract documents and failure by the owner to issue interim awards on time extensions and compensation are the top causes of disputes in Jordan. These results align with Awwad et al. (2016) and McGinley (2022) as well as the Consultancy-me report (2022), which indicated that claimed time extensions averaged 22.5 months – equal to 83% of the original planned project duration in the Middle East. The survey results also agree with the Consultancy-me report (2022), which highlighted that 'Projects are tendered and launched when designs are still immature. Change is inevitable in major construction projects and unless managed, inexorably leads to a wave of claims mounting into disputes'. According to McGinley (2022), the majority of disputes and claims in the Middle East are design centric and stem from lower levels of maturity in the construction and engineering industry. The failure of owners to issue interim awards on time extensions and compensation may be due to increased employer determination to engage in the close review of claims, perhaps stemming from liquidity concerns.

The case study analysis revealed that the most common causative factors of disputes are 'variations initiated by the owner/consultant (addition/deduction)' and 'incomplete technical drawings/specifications', followed by 'errors and omissions in the contract documents'. Synergy exists between the results of the case study and survey analysis approaches. Although the variations initiated by the owner ranked as the most causative factor of disputes. Normally, additional work instructions are regulated under variation clauses, which usually entitle the contractor to the value of the extra work. However, contractors may perform extra work based on invalid instructions or without instructions at all. In such cases, variation provisions might not provide the appropriate remedy.

Overall, the respondents agreed that the 'negotiation' method is most commonly used for dispute resolution in Jordan. This reflects the culture of negotiation that is prominent in Jordan. In addition, negotiation as an early resolution method is effective due to its ease of use and flexibility in resolving disputes.

Understanding the multiple reasons for disputes in construction projects can help project owners and all parties in the construction and engineering industry better mitigate the main causative factors of disputes, ultimately leading to better project outcomes.

7. CONCLUSION

This study sheds light on the dispute resolution process in construction projects in Jordan, a previously under-researched area, by investigating the main causative factors leading to construction disputes, the primary dispute resolution methods used in construction projects in Jordan and factors affecting their selection. A comprehensive questionnaire survey was developed based on an extensive literature review and distributed to industry practitioners in Jordan, including contractors and consultants. The RII statistical method was used to analyse and rank the dispute factors and then triangulate the findings with those from the multiple-case study.

Based on the extensive analysis of the distinct and combined perceptions of construction stakeholders regarding dispute causes in construction projects in Jordan, the results revealed that 'incomplete technical drawings/specifications' was the main causative factor. In addition, consultants lack the necessary expertise to prepare consistent and accurate contract documents. Owners also fail to provide timely interim awards of extensions, which can cause numerous problems for both the project and contractor. Of particular interest is the overall ranking of 'variations initiated by the owner/consultant (additive/deductive)', which was the fourth leading factor in disputes. However, in the analysis of real case studies, 'variations initiated by the owner/consultant (additive/deductive)' was the main causative factor of disputes in construction projects in Jordan, followed by 'incomplete technical drawings/specifications'. Although there were differences in the rankings between the questionnaire analysis and the real

case studies, they shared three main factors that cause disputes: 'incomplete technical drawings/specifications', 'errors and omissions in the contract documents' and 'variations initiated by the owner/consultant (additive/deductive)'. While 'variations initiated by the owner/consultant (additive/deductive)' was identified as the main cause of disputes in all real case studies as well as in the experts' feedback in the interviews, it was only ranked as the fourth leading cause by the respondents overall.

Moreover, the statistical analysis showed that the most common dispute resolution method in the Jordanian construction industry is negotiation, followed by mediation. The third ranked dispute resolution method was the use of a DRB. Conversely, according to the case study analysis, local arbitration is one of the primary dispute resolution methods in Jordan. Further, the statistical analysis revealed that the main construction parties in Jordan are focused on maintaining good relationships, which is the primary factor that influences the selection of an appropriate dispute resolution method. The cost of the resolution method, the time needed to settle the dispute and the complexity of the disputes are additional factors that are considered.

This study examined several topics that are worthy of further investigation: (1) developing causal models that can be used to describe the factors that lead to disputes, making it possible to assign responsibility; and (2) examining the preferred dispute resolution methods for moderating the impact of disputes on construction projects, both in terms of time and costs.

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