

# An Analysis of Causes of Construction Disputes: A Case Study from a Developing Country

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## **Abstract**

*Increasing complexity of the construction industry, diverse multidisciplinary project teams, various stakeholders, distinctive site conditions and uncertainties can contribute to an antagonistic environment, which may potentially result in disputes arising between the contractual parties. Identifying the most common causes of disputes could be a sound strategy for an efficient contract management process. This study aims of helping project stakeholders incorporate consolidative contract management strategies before commencing a new project. This study identifies the most common causes of construction disputes in Jordanian construction project, key dispute causative factors were analysed by reviewing the literature review in different research studies. It then incorporated the literature with questionnaire survey and case studies analysis of construction projects in Jordan. Results revealed that the top major factors affecting disputes in Jordan are incomplete technical drawings/specifications, variations initiated by the owner/consultant (additive/deductive, and error and omissions in the contract documents. Moreover, results show that first ranked methods of dispute resolution in the Jordanian construction industry are the negotiation and arbitration methods. The results can enable local and international construction stakeholders to initiate contract management strategies before commencing projects to reduce the negative impact of known dispute causes with more effective planning.*

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

## 1. Introduction

The construction sector is of vital importance to any economy due to its significant contribution to economic performance and growth. The construction industry size amounted to \$8.2 trillion in 2022 (Statista, 2022) and 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 which contributes specifically to an increased complexity to project's technical and physical aspects (Jaffar et al., 2011). In this ever-changing and dynamic environment, construction projects are subject to intense competitiveness, with clients demanding tight budget control and rigid time constraints all whilst ensuring the highest quality standards are achieved. 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 wide 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's stakeholders tend to disturb the flow of work, and lead to overruns in costs and time, which in turn have a negative impact on both the current and future business relationship and communication (Narh, 2015).

Existing extant literature reveals that the average value of disputes has increased worldwide in the past decade (Statista, 2022). The most notable increase was in the Middle East construction industry, which reached a value of \$82M in 2015, the highest in the world (Wilkinson, 2016). Most literature on the topic in the Middle East region focused on two primary aspects, namely the causes of dispute and resolution methods. Dispute causative factors in construction projects in the Middle East region were studied by Daoud and Azzam (Daoud and Azzam, 1999, Awwad et al., 2016).

Other researchers focused on identifying these causes in specific countries in the Middle East (Hassanein and El Nemr, 2007, El-Razek et al., 2008, Dmaid, 2013, El-Sayegh et al., 2020). However, there is no extensive paper in the body of literature that addresses construction disputes in the Jordanian construction industry, whilst also focusing on the different perspectives of stakeholders. Moreover, most of the existing studies generate their outcomes based on surveys targeted at industry practitioners (Marzouk et al., 2011, Dmaid, 2013, Hardjomuljadi, 2014, Ejohwomu et al., 2016, Assaf et al., 2019). Very few studies were found which adopted case study analysis to compare different methods and their results and generate reliable outcomes based on current practices. Some of these studies analyzed court cases (Zaneldin, 2006, Cakmak and Irlayici Cakmak, 2014, Kalyan and Prakash, 2019). Other studies analyzed actual construction projects documentation (Enshassi et al., 2009, Mohamed et al., 2014, Getahun et al., 2016).

With all above in mind, the aim of this paper is to address these gaps by performing a comprehensive study specifically tailored to explore dispute causative factors in construction projects in Jordan, chosen forms of dispute resolution methods and the key criteria influencing their selection. The main study objectives can be summarized 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 to be used; and (3) explore the most common practices and methods adopted for the settlement of disputes.

## **2. Objectives**

The main study objectives can be summarized 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 to be used; and (3) explore the most common practices and methods adopted for the settlement of disputes.

## **3. Literature review**

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

Dispute has been associated with a variety of terms, such as claim and conflict. These terms have been used interchangeably in the literature related to dispute in construction projects. Although these terms are similar, some differences can be observed. According to the PMI (2017), 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.” A more concrete and clear description of the definition would be as defined by Hadikusumo and Tobgay (2015): “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 gives greater clarity of the concept of claims in a project context.

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

### **3.1. Causes of Disputes in Construction Projects**

The key causes of disputes are greatly varied and can be categorized 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 engineer, poor contractor performance and owner changes or delay in approvals etc. Disputes in construction projects are a global issue across 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 (Aryal, 2018, Ejohwomu et al., 2016).

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 out to seven main causes of dispute in the construction industries, 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.

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

Dmaidi et al. (2013) added that unforeseen circumstances are another cause of disputes in construction projects. Construction projects are exposed to unforeseen circumstances after the contract is signed. Thus, these circumstances may create new obligations on the parties to the contractual relationship that have not been considered in advance. This may become a reason for a dispute between the parties to the contract. Klinger (2009) argued that the accuracy of drafting a construction contract is an effective factor in avoiding disputes that could arise. Abwunza et al. (2021) proposed a set of ways in which construction contracts could be prepared in an appropriate manner to avoid disputes, such as identifying contract risks, identifying 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 face a shortage of engineering plans (Alkhamali, 2010). The contractor may also be a significant cause of conflict, as the contractor's profession is considered severe and complicated, and it is 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 lack of effective communication between project parties. Global Construction Disputes Report (2017) classified the causes of disputes into six major causes, 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, lack of communication between contract parties, modifying the design, and cultural differences are among the leading causes of dispute in construction projects (Sambasivan and Soon, 2007, Ruuska and Teigland, 2009, Alamri et al., 2017, Adnan et al., 2012). Jaffar et al. (2011) added that violation of the contract terms and the attempts to manipulate it are crucial factors in increasing the level 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 the terms of the contract is a significant cause of disputes in the construction sector in Middle East. Awwad et al., (2016) confirmed that the 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 dispute in the construction sector in Egypt are amendments to the terms of the contract, the non-compliance of the contractor with specifications, in addition to the inability of contractors to comply with the terms of contracts and a shortage in the submitted design drawings. Dmadi et al. (2013) conducted a study to investigate the causes of disputes in the construction sector in Palestine. The study found that problems related to the career ethics, contract administrative problems, political problems, problems related to the 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 of the previous studies examined the reasons for delays in construction projects but did not examine the causes of conflicts in the construction sector. Gharaibeh et al. (2021) conducted a study to identify design changes factors in construction projects in Jordan. The study applied a mixed method approach using a survey and case studies analysis to compare between the findings and conclude that owner's requirements; design errors and omissions and value engineering are the main causative factors of design changes. Tarawneh et al. (2020) conducted a study to determine the causes for delays in construction projects in Jordan. The results confirmed that the main reasons for delays in construction projects are primarily related to the contractor, including ineffective delay penalties, unavailability of incentives for contractor for finishing ahead of schedule, and inability to manage the project's contract rationally.

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

**Table 1:** Main causes of disputes in construction projects in Middle East countries

Source	Country	Dispute causes
(Zaneldin, 2006)	UAE	- Change in design and implementation. - Extra implementation time - Change the work location
(Marzouk et al., 2011)	Egypt	- Non-compliance with specifications - Design issues - The inaccuracy of information in the construction contract - The contractor's failure to comply with the terms of the contract

(Dmaid, 2013)	Palestine	<ul style="list-style-type: none"> <li>- Problems related to career ethics.</li> <li>- Administrative problems</li> <li>- Political problems</li> <li>- Problems related to the tender documents (contracts, drawings)</li> <li>- Changing laws</li> <li>- Cultural influences</li> </ul>
(Almutairi et al., 2015)	KSA	<ul style="list-style-type: none"> <li>- Change orders.</li> <li>- Change the scope of work.</li> <li>- Design issues</li> <li>- Lack of clarity of contract condition</li> </ul>
(Awwad et al., 2016)	Middle East (ME)	<ul style="list-style-type: none"> <li>- The inaccuracy of information in contract documents</li> <li>- Failure to extend the time and compensation by the owner.</li> <li>- Variations from the owner or consultant (additive/deductive)</li> <li>- Amending the terms of the contract to transfer the risk to the contractor</li> </ul>
(Alshahrani, 2017)	KSA	<ul style="list-style-type: none"> <li>- Financial issues</li> <li>- Contractual issues</li> <li>- Owner</li> <li>- The design</li> <li>- The contractor behavior</li> </ul>
(El-Sayegh et al., 2020)	UAE	<ul style="list-style-type: none"> <li>- Variations initiated by the owner (additive/deductive)</li> <li>- Obtaining permit/approval from the municipality/different government author</li> <li>- Material changes and approval during the construction phase</li> <li>- Slowness of the owner's decision-making process</li> <li>- Time limitation in the design phase</li> <li>- Lack of communication and coordination between parties during construction</li> </ul>

Table 1 depicts the main causes of dispute in construction projects in the Middle East countries. In this table, it is evident that differing cultural, social, and environmental factors affect the nature of disputes in countries. Nevertheless, the environment of states differs from one another, in many cases they are similar causes of dispute due to the similar nature of construction projects worldwide. It is noted that changing orders, unclear contract terms, modified contract terms, and exceeding specified costs are common causes of construction disputes, including within the MENA Region. Considering different countries in the above table, the factors related with construction contracts and change orders/variations are among the most significant causes of construction disputes.

Through reviewing previous studies, it has been observed that most of the existing studies on the topic used a survey method to identify disputes causative factors. 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 focused on investigating the causes of construction project overruns in terms of cost and time. There is a real need for more research to deeply study the primary causes of dispute in construction projects in Jordan. Thus, this study aims to fill this void in research and identify the major factors leading to disputes in construction projects in

Jordan. Moreover, this study aims to shed some light on the dispute resolution techniques and factors utilized, the criteria affecting their selection and provide some contrast to existing literature by studying and comparing disputes in the Jordanian construction industry.

### **3.2. 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 relationships between project parties (Davis et al., 2010). Disputes contribute to both increasing the cost of the project and reducing the performance level. Dada (2013) agreed with this and clarified that disputes in construction projects can lead to deviation of the project from the main objective and prevent the completion of the project within the specified cost, time, and to the required quality level. These negative effects may also include the disintegration of the relationship between the project parties. Nevertheless, these disputes can be controlled, and their harmful effects can be minimized.

Almutairi et al. (2015) emphasized the need to resolve construction project disputes forthwith because the impediment in resolving them may have a negative impact at project level, such as delays projecting completion. The project includes various stakeholders such as the client, consultant, contractor, and project team, and it is necessary to effectively manage the relationship between the projects' stakeholders to avoid any disputes (or minimize their impact wherever possible) and ensure the completion of the project within the specified time and cost. Disputes inevitably affect impact on quality of the project, its level of productivity and impact the project completion date. 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 the loss of work, strained relations between project personnel, and defamation of the parties involved.

Hosseinian & Torghabeh (2012) added that growing disputes in the construction industry entail additional financial costs and a reduced likelihood of resolving them. The negative impact of disputes in the construction industry affects all parties in the project, binding management to additional costs. Parties in the dispute may resort to judicial methods that also necessitate high costs. Klinger (2009) pointed to the negative effects on the company, such as reputation damage, decline in profitability, increase in turnover rate, delay in the completion of projects and project cost overrun.

## **4. Research Methodology**

The aim of this study is to identify the key factors leading to disputes to enhance the control over their future occurrence in construction projects. To achieve this aim, a mixed-method approach is used, whereby a combination of qualitative and quantitative techniques is utilized to test the research proposition of the data collection and evaluation stage, with the goal of achieving the research aim and objectives.

The qualitative techniques used for collecting the research data were based on the literature review and "Key informant" Interviews, which are presented as semi structured interviews with experts in the construction sector. In order to ensure that these interviews reflect the perspective of all main contract parties, and the outcomes of the interviews are reflective of all perspectives

and opinions, six interviews with experts from different concerned parties were conducted as per the following: General tendering directorate manager to represent the client perspectives, board member in one of the biggest first-class contracting companies in Jordan, a chief executive officer for a consulting company specializing in project management and disputes resolution, and three of the most experienced arbitrators in Jordan.

As a result of these interviews certain comments and modifications were introduced to customize the collated factors according to the Jordanian construction market to be later used 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 owner.

The quantitative technique used for collecting the research data was based on the questionnaire that was prepared based on the final list of disputes causes which was collected, analysed, and verified from an extensive literature review and semi-structured interviews. The questionnaire was distributed using the online survey method. Collected data primarily targeted consultants working in the supervision field, first and second grade registered firms, first and second tier contracting firms specialized in buildings and clients/client's representatives from both the public and private sectors. The sample size was determined based on Yamane (Yamane, 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 the quota sampling based on Kish, (Kish, 1965) sampling technique and the population size is determined earlier as (842), using the above equation, the sample size needed is 265 respondents.

The questionnaire was sent using a web-based form to 300 practitioners, the number of questionnaires that were returned and completed was 86 with a response rate of 28%, the sample was then characterized by sector (private and public), role (Client, Consultant Contractor), participants years of experience and the position held by the participant. Out of the 84 respondents, 30 were engineers from consulting firms, 42 were from contracting firms, while 12 were representing the owner's side. 27% of the respondents were from the public sector and 73% of the respondents were from the private sector. More than 67% of the participants had more than ten years of experience, 18% for 5-10 years of experience, while the respondents with experience less than 5 years represented only 15%.

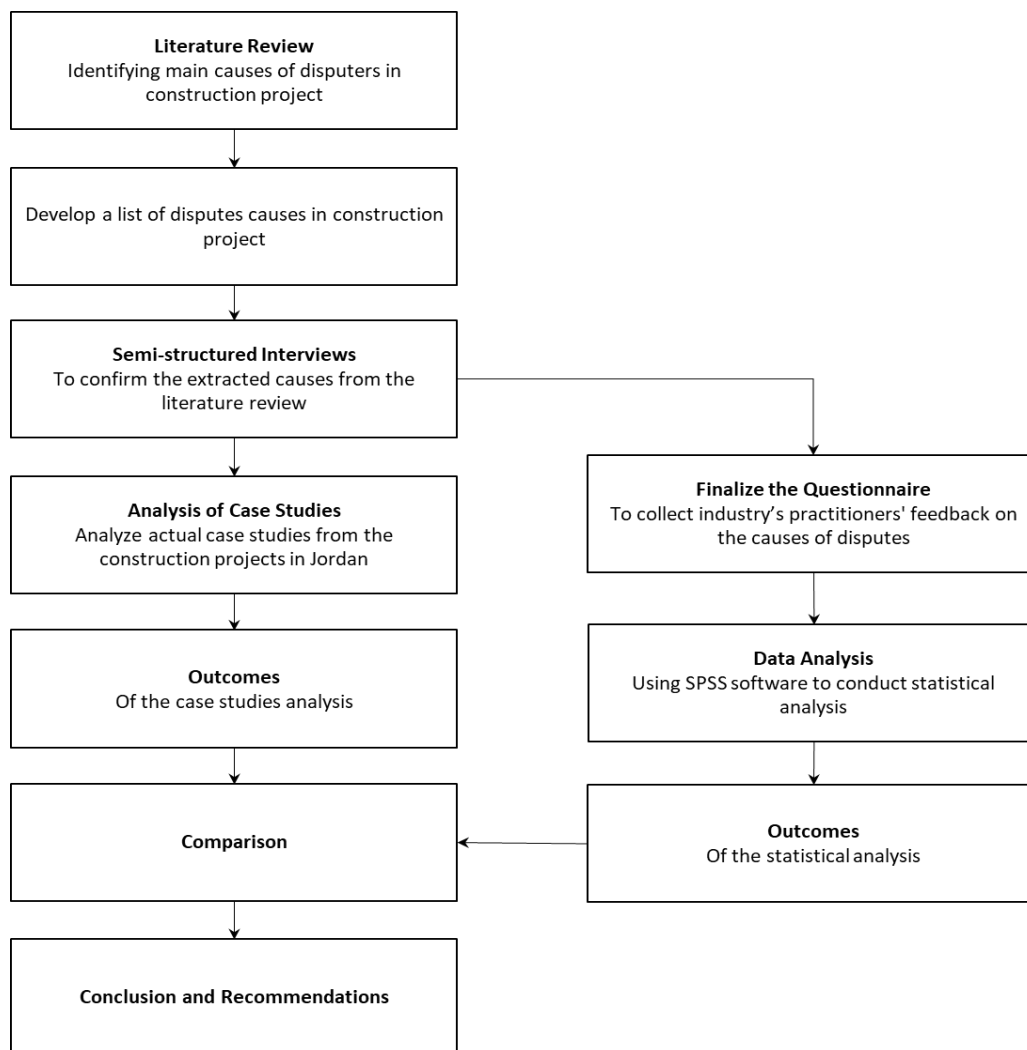
To achieve better comprehensiveness and variation, six case studies were selected based on data availability as it is inherently difficult to obtain detailed information on construction project disputes owing to disclosure legalities. In terms of project value, the minimum value is JOD 5m which represents the medium to large scale projects. Such projects are characterized by having better documentation and contract management. Cases were selected in differing locations throughout Jordan with varying types of building function (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 type of client (public or private) were considered.

Another source of information regarding construction disputes in the case studies is the documentary data, such as the change order logs, monthly reports and project documents. However, the selected projects characteristics are shown in Table 5, which summarizes the six



cases in terms of characteristics and findings. Additionally, the cases were distributed between the southern and central regions of Jordan, four out of the six cases were from the private sector, while only two cases are public projects, and the base contract amounts of the cases varied between JD 5m and JD 160m.

To answer the study questions and hypotheses, the following statistical methods were used: Mean, standard deviation and percentage mean (relative weight frequency index) were performed utilizing SPSS software. The ranking method was performed utilizing the Relative Importance Index. The research methodology is elaborated through a methodology map. Figure 1 represents the research framework of this study.



**Figure 1:** The research framework

### 5. Data Analysis and Discussion

This section demonstrates the survey results grouped under three main areas: (1) the main causes of disputes with emphasis on the difference in views between stakeholders; (2) the preferred method of dispute resolution, and (3) the selection factors affecting its choice. The reliability of the measurement instrument was evaluated first using Cronbach’s coefficient

alpha ( $\alpha$ ) using SPSS software to ensure the data reliability before conducting further statistical analysis. The values of Cronbach's alpha ( $\alpha$ ) for each construct used in the questionnaire survey revealed a very good reliability. In general, the values of Cronbach's alpha ( $\alpha$ ) ranged between (0.708) and (0.822).

Content validity was subjectively judged and evaluated by industry practitioners; moreover, 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 are significant at  $p = 0.05$ .

### 5.1.Causes of Construction Disputes

Fourteen dispute causes are mentioned in the questionnaire based on the literature reviews that considered these elements as the main causes of dispute in the Middle East. The questionnaire asks the respondents to rate the importance of all the 14 dispute causes regarding their frequency of occurrence in the Jordanian construction industry on an ordinal scale of 1 to 5 with 5 indicating strong agreement considering the significance of the cause.

The ranking analysis was based on the RII method to rate the 14 causes of disputes in Jordan from the perspective of the three perspectives discussed in the previous section. The RII method output is a value from 0 to 1, while the value near 1 indicates strong agreement on the importance of the cause. Results indicate that overall, the respondents agreed that "incomplete technical drawings/specifications" is the most significant cause of disputes in Jordan with 0.8128 RII followed by "Errors and omissions in the contract documents" with 0.8097 RII, and "Failure by the owner to issue interim awards on time extensions and compensation" with 0.7904 RII as shown in Table 2.

In order to gain a better understanding of the statistical results, the viewpoints of the different parties' analysis were performed for the data collected from group P1 (contractors) and P2 (consultants) as shown in Table 2 below. According to the table, the "incomplete technical drawings/specifications" is the main cause of disputes in Jordan from the consultants and contractors' perspective which strengthens the validity of the overall rank. While from the contractors' point of view that "Conflict over non-payment of claims" is the second cause of disputes in Jordan with 0.8177 RII. The "Variations initiated by the owner/consultant (additive/deductive)" is ranked as the fourth cause of dispute by consultants with 0.7666 RII but the contractors ranked it as the sixth cause of dispute as per the overall rank with 0.7884 RII.

**Table 2:** The rank of causes of disputes in Jordan

Cause of Disputes	Overall		P1		P2	
	Rank	RII	Rank	RII	Rank	RII
Incomplete technical drawings /specifications	1	0.8128	1	0.8277	1	0.7961
Errors and omissions in the contract documents	2	0.8097	3	0.8084	2	0.7833

Failure by the owner to issue interim awards on time extensions and compensation	3	0.7904	4	0.8054	3	0.7726
Variations initiated by the owner/consultant (additive/deductive)	4	0.7841	6	0.7884	4	0.7666
Nonconformity of contractual obligations	5	0.7703	5	0.7973	7	0.7435
Conflict over nonpayment of claims	6	0.7601	2	0.8177	6	0.7596
Poor contract administration	7	0.7510	7	0.7749	9	0.7288
Improper documentation and record keeping	8	0.7421	9	0.7577	8	0.7335
Poor construction quality	9	0.7393	10	0.7424	5	0.7610
Lack of coordination between project teams/contractors	10	0.7233	11	0.7365	10	0.7185
Differing site conditions	11	0.7159	12	0.7286	11	0.7066
Modifying clauses in standard forms of construction contract to transfer the risk to the contractor	12	0.7093	8	0.7646	12	0.6982
Unbalanced bidding, underestimation, and incompetence of contractors	13	0.6949	13	0.7130	13	0.6753
Legislation and regulations are always being modified (leading to changes in material prices and other unexpected circumstances)	14	0.6810	14	0.7033	14	0.6693

However, the main difference is noticed in the ninth cause in the overall “Poor construction quality” ranked as the tenth by contractors, which could be understood from their perspective since the contractors will not admit the poor quality of construction and ranked as the fifth by the consultants.

## 5.2. Selection of a Dispute Resolution Method

The selected dispute resolution method in the Jordanian construction industry is the second main part of the research study. Ten dispute resolution methods are mentioned in the questionnaire based on the literature review based upon these methods being considered as the primary methods utilized and/or currently available in the Middle East.

The ranking analysis was performed to rank the ten most utilized dispute resolution methods in Jordan, from the perspective of the project’s parties. The analysis results show that the overall respondents agree that the “Negotiation” method is the main used method for disputes resolution in Jordan with 0.8266 RII followed by “Mediation” with 0.7809 RII, and “Dispute resolution boards (DRB)” with 0.7797 as shown in Table 3. Interestingly, all projects' parties agree that “Negotiation” method is the main used method for disputes resolution in Jordan. However, from the contractor (P1) perspective, the “Dispute Resolution Board (DRB)” is the

second method of dispute resolution in Jordan with 0.7941 RII while the “Mediation” is ranked as the third method of dispute resolution with 0.7732 RII.as shown in Table 3.

**Table 3:** The rank of disputes resolution methods in Jordan

Dispute Resolution Method	Overall		P1		P2	
	Rank	RII	Rank	RII	Rank	RII
Negotiation	1	0.8266	1	0.8162	1	0.7941
Mediation	2	0.7809	3	0.7732	2	0.7833
Dispute resolution boards	3	0.7797	2	0.7941	6	0.7326
Early nonbinding neutral evaluation	4	0.7121	6	0.6903	5	0.7563
Partnering	5	0.7052	7	0.6568	3	0.7796
Local arbitration	6	0.6934	4	0.7324	4	0.7616
Risk allocation	7	0.6845	5	0.7054	8	0.7052
Litigation	8	0.6648	8	0.6297	9	0.6952
Mini trials	9	0.6569	9	0.5703	7	0.7189
International arbitration	10	0.6328	10	0.5270	10	0.6815

Furthermore, the consultants (P2) match with the outcome of the overall for the second method of dispute resolution which is “Mediation”. However, the main difference is noticed in the third method, since in the overall “Local Arbitration” is ranked as the sixth and the “Partnering” method as fifth while the consultants ranked both as the fourth and third method.

### 5.3.Factors Critical to Dispute Resolution Method Selection

The main factor that affects the choice of the dispute resolution methods in the Jordanian construction industry is the third main part of the research study. Twelve factors are mentioned in the questionnaire based on the literature reviews that considered these factors as 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 all the 12 factors affecting the choice of dispute resolution method regarding their frequency of use in the Jordanian construction industry on an ordinal scale of 1 to 5, with 5 indicating strong agreement on the importance of the factor.

The ranking analysis was performed to rank the 12 main factors in Jordan from the perspective of the project’s parties. Results show that overall, the respondents agree that “Maintaining a good relationship between the parties” is the main considered factor in Jordan when choosing the dispute resolution method with 0.8019 RII followed by “Time to reach a settlement” with 0.7986 RII, and “Cost of implementing the method” with 0.7745 as shown in Table 4. Moreover, results reveal that all project parties agree on the ranking of the first three main factors which are: “Maintaining a good relationship between the parties”, “Time to reach a settlement”, and “Cost of implementing the method respectively” as shown in Table 4.

**Table 4:** The rank of factors affecting the choice of dispute resolution methods in Jordan

Factors affecting the choice of DRMs	Overall		P1		P2	
	Rank	RII	Rank	RII	Rank	RII
Maintaining a good relationship between the parties	1	0.8019	1	0.8108	1	0.8011
Time to reach a settlement	2	0.7986	2	0.7894	2	0.7960
Cost of implementing the method	3	0.7745	4	0.7627	3	0.7870
Complexity of dispute/defends	4	0.7512	3	0.7743	7	0.7300
Method that is more suitable in the local law system	5	0.7331	7	0.7103	5	0.7685
Flexibility of implementation	6	0.7119	8	0.7095	4	0.7759
Appropriate method for differing legal systems between parties	7	0.6914	11	0.6178	8	0.7231
Enforceability of the method	8	0.6801	9	0.6495	6	0.7411
Presence of a ruling family/government/public entity as an opposing	9	0.6752	6	0.7265	9	0.6941
Preserving confidentiality	10	0.6491	5	0.7519	11	0.6681
Appropriate method for cultural differences between parties	11	0.6330	10	0.6232	10	0.6793
Avoiding third-party interference in the process	12	0.6203	12	0.6092	12	0.6470

#### 5.4. Multiple Case Studies Analysis

A multiple case study method has been used to observe the behaviour of contractual conflicts and identify the main causative factors of disputes in construction projects. Six cases have been used to observe and hypothesize 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 have been selected based on the fact that they all represent genuine contractual conflicts of construction projects (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 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 was not revealed and the projects will just be referred to as only “Project A”, “Project B” and so on as shown in Table 5. These cases were analysed independently to identify the real causes of disputes. The analysis of the case studies will be limited only to the available data provided by each project and any clarifications wherever needed 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 selected six case studies.

**Table 5: Summary of Cases Data**

Project Name	Project Type	Sector	Contract value	Actual cost	Claim value	Impact	Factors leading to dispute
A	Mech. Plant	Public	42,467,810.00	51,655,049.60	581,567.94	6.19%	Nonconformity of contractual obligations
					8,820,674.00	93.81%	Variations initiated by the owner/consultant (additive/deductive)
B	Office Building	Private	12,504,112.00	15,897.211.45	246,710.00	16.34%	Failure by the owner to issue interim awards on time extensions and compensation
					294,196.00	19.49%	Nonconformity of contractual obligations
					256,312.60	16.98%	Incomplete technical drawings/specifications
					418,540.00	27.72%	Variations initiated by the owner/consultant (additive/deductive)
					293,958.89	19.47%	Errors and omissions in the contract documents
C	Educational	Public	5,611,345.00	6,920,192.12	326,195.00	24.92%	Incomplete technical drawings /specifications
					276,819.67	21.15%	Errors and omissions in the contract documents
					389,675.45	29.77%	Variations initiated by the owner/consultant (additive/deductive)
					199,368.00	15.23%	Poor contract administration
					116,789.00	8.92%	Nonconformity of contractual obligations
D	Mixed-use development	Private	159,700,000.00	197,049,211.32	12,676,155.07	33.94%	Variations initiated by the owner/consultant (additive/deductive)
					22,566,505.98	60.42%	Incomplete technical drawings /specifications

Project Name	Project Type	Sector	Contract value	Actual cost	Claim value	Impact	Factors leading to dispute
					1,229,345.60	3.29%	Errors and omissions in the contract documents
					866,083.00	2.32%	Nonconformity of contractual obligations
E	High-end residential	Private	39,624,719.90	43,891,697.50	3,687,203.67	86.41%	Variations initiated by the owner/consultant (additive/deductive)
					97,222.98	2.28%	Poor contract administration
					87,912.45	2.06%	Errors and omissions in the contract documents
					394,638.50	9.25%	Incomplete technical drawings /specifications
F	Golf Course	Private	9,262,311.21	15,203,888.22	5,732,609.61	96.48%	Variations initiated by the owner/consultant (additive/deductive)
					120,000.00	2.02%	Nonconformity of contractual obligations
					88,967.40	1.50%	Legislation and regulations are always being modified

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

The most common factors were "Variations initiated by the owner/consultant (addition/deduction)", and "Incomplete technical drawings/specifications "as both were observed in all six cases with a combined value percentage (total claim) of 53.34% and 39.59% respectively. This was followed by "Errors and omissions in the contract documents", and "Nonconformity of contractual obligations" with total percentage value of 3.17% and 2.83% respectively. Whereas the impacts of the other identified three 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 comparing to other factors as shown in Table 6. Finally, the case studies analysis shows that the most common method use in Jordan for dispute resolution is Local Arbitration with a total of four cases out of six following this route.

**Table 6:** Causes of disputes in case studies analysis.

No.	Factors leading to dispute	Total value	%
1	Variations initiated by the owner/consultant (additive/deductive)	31,724,857.81	53.34%
2	Incomplete technical drawings /specifications	23,543,652.08	39.59%
3	Errors and omissions in the contract documents	1,888,036.61	3.17%
4	Nonconformity of contractual obligations	1,684,439.94	2.83%
5	Poor contract administration	296,590.98	0.50%
6	Failure by the owner to issue interim awards on time extensions and compensation	246,710.00	0.41%
7	Legislation and regulations are always being modified	88,967.40	0.15%

## 6. Conclusion

This study sheds light on the previously under researched area of the dispute resolution process in construction projects in Jordan 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 process. A comprehensive questionnaire survey was developed based on extensive literature review and distributed to industry practitioners in Jordan including contractors, developers, and consultants. Different statistical analysis tools such as RII method and Kruskal-Wallis tests were used to analyze the responses and triangulate the findings with the multiple case studies analysis findings.

Over the extensive analysis of the distinct and combined perceptions of construction stakeholders about dispute causes in construction projects in Jordan, the study revealed that “Incomplete technical drawings /specifications”, was the main causative factor. In addition, consultants lack the necessary expertise in preparing consistent and accurate contract documents and furthermore, owners fail to make timeous interim awards on extensions of time which can cause myriad problems for both the project and contractor. of particular interest in the findings is that the overall ranking of factors shows that “Variations initiated by the owner/consultant (additive/deductive)” is the fourth main causative factor of disputes. Meanwhile, the analysis of real case studies revealed that “Variations initiated by the owner/consultant (additive/deductive)” is the main causative factor of disputes in construction projects in Jordan followed by “Incomplete technical drawings /specifications”. Although there were differences in ranking the main factors between the questionnaire analysis and the real case studies as shown above, three causative factors of disputes were common between the two which are: “Incomplete technical drawings/specifications”, “Errors and omissions in the contract documents”, and “Variations initiated by the owner/consultant (additive/deductive)”. The “Variations initiated by the owner/consultant (additive/deductive)” was identified as the main contributor of disputes in all real case studies as well as from the expert’s feedback obtained during interviews, although only ranked as fourth by overall respondents.



Moreover, the statistical analysis shows that highest ranked method of dispute resolution in the Jordanian construction industry is the Negotiation method followed by the Mediation method. The third ranked method of dispute resolution is the utilization of the Dispute Resolution Board (DRB). However, in contradiction, real case study analysis shows that Local Arbitration is considered as one of the primary dispute resolution methods used in Jordan. Finally, the statistical analysis shows that the main construction parties in Jordan are focused on maintaining good relationships and that was the primary factor that influences the selection of an appropriate dispute resolution method. Further to that, the cost of the method, time consumed to settle the dispute and the complexity of the disputes are the next factors taken into consideration.

The research findings form several lessons to be learned which construction organizations and industry clients should address to mitigate the risk of disputes as part of a wider dispute avoidance strategy. e. These include:

1. Clients are advised to pay more attention to identifying a specific list of requirements to generate more specific scope and develop more effective change management.
2. Clients and consultants may consider getting the contractor involved earlier in the design phase to avoid changing orders during construction phase due to design errors, omissions, and contractibility issues.
3. Effective change management control should be implemented resulting in a clear impact assessment of each change in terms of cost, time, and quality prior to issuing the change order.
4. The construction industry in Jordan may consider the “Building Information Modelling” approach, which will control and significantly minimize the project and design related factors, design errors and omissions.

The research presented in this study has tackled several subjects that are worthy of further investigation. These include: (1) developing causal models that can be used to describe the factors that lead to disputes so that responsibility can be assigned, and (2) examine the dispute resolution methods that are preferred to control disputes impact in the construction project in terms of time and cost.

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