Dispute Occurrences During Construction Stages of Building Project: A Systematic Literature Review

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Abstract

Disputes arise during construction phases have a negative impact on the outcomes of projects. It is widely known from earlier studies that dispute is one of the factors contributing to the abandonment of building projects in Malaysia. Thus, there is a need to investigate the root causes of it because it leads to delay which affects the overall project performance and loss of money. The study on this research domain in Malaysian construction projects has only been conducted in the general context of the construction industry, without specializing in any specific type of projects or focusing on the phases of project. Hence, this paper aims to investigates the occurrences of dispute throughout the entire process of building construction project based on the traditional approach of project procurement, i.e., starting from the initiation stage until the defect liability period. This study was using systematic literature review and was conducted through searches of relevant publications from multiple electronic sources to review information using specific criteria. The results were presented in two major themes to serve as a theoretical base for the development of framework to minimise occurrence of construction dispute in building projects.

Keywords*: building construction projects, construction phase, disputes, minimising, strategy*

1. INTRODUCTION

The Malaysian construction industry only accounts for less than five percent (5%) of gross domestic product (GDP) in 2019 (Negara, 2019). However, the significance of this industry cannot be underestimated because it serves as a strong growth catalyst due to its extensive linkages with the rest of the sectors. Therefore, anything that impacts the building and construction industry has the possibility to affect the whole economy. Levy (2007) stated that the construction industry is a risky endeavour producing a unique, durable and complex output. It is naturally complicated, bound to unexpected situations and hazardous. Therefore, as claimed by Kwakye (1997) it is not surprising that this industry frequently faces problems. There are various problems faced by the construction industry such as unanticipated extra work, delay, substandard work, over-expenditures and accidents. Disputes too are inevitable in the construction industry. Soni, Pandey and Agrawal (2017) highlighted that dispute is a substantial factor that may prevent the accomplishment of a project.

Research conducted by Gomarn and Pongpeng (2018) has revealed that both Thailand and Malaysian engineers perceived dispute and litigation as among the contributor to project failure with a weightage of approximately thirteen percent (13%). Looking from the business perspective, Awakul and Ogunlana (2002) claimed that disputes have the potential to disrupt the interest of various stakeholders who have invested in the project, indirectly influencing their profit of returns as resolving disputes may involve a huge amount of money and time-consuming. Furthermore, several researchers (Cheung, Lam & Sin, 2001; Cheung & Pang, 2013) opined that dispute can also lead to unsuccessful projects, waste of time, cost overruns and negatively harm the relationships between project participants, if it is not resolved promptly. Given the severe damages that the disputes caused to the construction industry raise remarkable questions about why the situation happened. Ilter and Bakioglu (2018) explained that the slow decision-making, progress behind the schedule, poor quality control, changes, cost overruns and contractual term interpretation are the basis of solid claims, which later escalate into disputes.

The issue of disputes in construction is compounded by the fact that disputes are also among the major reasons of abandon building projects in Malaysia. Zairul and Ibrahim (2010) highlighted that dispute and conflict between project consultants and the developers is one of the reasons for housing project abandonment. Additionally, the study by Dahlan (2011) concluded that conflicts and disputes between project investors as one of the reasons for abandoned projects in Malaysia. Besides, as cited by Hussin and Omran (2011) the Ministry of Housing and Local Government identified that 26 or 16% of project abandonment is the result of poor company management and the occurrence of disputes between developers and the landowners. Thus, it emphasizes the need to investigate the root causes of it because it leads to delay which affects the overall project performance and loss of money (Fenn, 2007).

Over the last few decades, many initiatives have been taken by the construction industry especially in those developed countries, to avoid litigation and to minimise the occurrences of disputes in a project. The initiatives range from the simplest strategies that are adopted throughout the phases of the construction projects to a more complex resolution (Chai, 2009). Extensive literature has proven that immediately resolving the issue once it was detected rather than dragging it towards the end of the project, provides a better chance of avoiding the issue from getting involved with litigation. This is strongly agreed by Cheung, Suen and Lam (2002) who emphasized that disputes must be resolved immediately, if not, the prolonged dispute can lead to the need for lawsuit measures as a resolution method, project delays, claims and extinguish occupational means.

The importance to minimise disputes has been highlighted by Cheung (1999) as he stated that developing teamwork and a harmonious working environment helps in reducing disputes occurrences. A more straightforward recommendation from Shittu, Tsado, Salaudeen, Odine and Ibrahim (2020) was that it is crucial to have knowledge of the potential disputes that commonly happened throughout

the construction phases and identify the parties involved. Aligned with this view, there is a proliferation of literature (Ayudhya, 2011; Assaf et al., 2019; Cakmak & Cakmak, 2014; El-Sayegh et al., 2020) being done in categorising the dispute causes, either grouping by common relation, or grouping based on phases or grouping based on the parties initiated the disputes. Having these grouping provided an awareness of the potential disputes based on the categorisation, hence, allowing for more concentrated efforts to tackle the disputes can be implemented.

Although the issue of dispute in the construction industry has dragged a lot of attention to the researchers, the study on this research domain in Malaysian construction projects has only been conducted in the general context of the construction industry, without specializing in any specific type of projects or focusing on the phases of project. Hence, this paper presents findings of a systematic literature review on the types of disputes that occurred in various stages of project phases and strategies to minimise dispute which contributes to the body of knowledge in dispute and risk management area, focusing on building construction projects. This study also adopts the construction project phases model as developed by PMI (2017). According to PMI (2017), the phases for a project are inclusive of the initiation phase, planning phase, execution phase, control and monitoring phase as well as closeout phase.

2. RESEARCH METHODOLOGY

Systematic Literature Review (SLR) is known as a research method being used to identify and critically evaluate relevant research (Liberati et al., 2009). SLR involved the process of identification, selection and critical evaluation of research. SLR has a specific defined protocol where certain criteria have been set clearly before the review is conducted. The review is comprehensive and transparent because specific criteria have been set and the search is done through multiple databases where more coverage of information can be achieved. By using a systematic and organized method to review the articles, it minimized the potential of bias, thus indirectly contributing to reliable findings from which conclusions can be made (Moher, Liberati, Tetzlaff & Altman, 2009).

2.1. SLR Study Research Questions

The following questions were developed for the SLR study:

SLR-RQ1: What are the causes of dispute in building construction projects?

SLR-RQ2: How the occurrences of disputes can be reduced?

2.2. Literature Search Strategy

Xiao and Watson (2017) stated that there is no database which has the whole set of published materials, therefore there is a need for systematic literature review to be drawn from various databases. In this research, the SLR was conducted through searches of relevant publications from multiple electronic sources (Kitchenham & Charters, 2007). The search criteria were established and the research strategy involved two steps. The first step included the search limited to the peer-reviewed papers that were published in recognised journals listed in either Scopus or Web of Science databases. These two databases are widely recognised due to their comprehensive academic databases for various subjects and only journal papers were included in the selection.

Surveys on SLR research in the construction industry were conducted to identify the range of years adopted in the research. Based on the findings, it was found that the range adopted is between 10 to 39 years but two papers specifically focused on dispute area adopted 10 and 20 years respectively (Ilter, Cakmak, Ustuner, & Tas, 2016; Paton-Cole & Aibinu, 2020). Therefore, all publications from 2021 until 10 years back, 2011 were included for SLR research. Accurate and clear keywords are needed to ensure the accuracy of the information received. Xiao and Watson (2017) recommended that the keywords should be derived from the research questions whereby the concept domains are extracted from the research questions forming the keywords (Kitchenham & Charters, 2007). The search rules applied for Scopus and Web of Science databases are as follows:

- (“disputes” OR “construction disputes”) AND (“causes” OR

"impacts" OR "strategies" OR "causes of dispute" OR "impacts of dispute" OR "prevention") AND ("construction industry" OR "construction project"). The search was conducted within the title, abstract and keywords field.

2.3. Literature Selection Procedure

For each search query, the researcher recorded the number of results found through each search query. From these results, the relevance of the journals was determined by reviewing through their title, abstract and keywords sections which facilitated the researcher to identify the candidates for primary publications. The duplicates journals were also removed from the list. The results were further refined to select the primary publications based on the inclusion, exclusion and quality criteria as spell out by Kitchenham and Charters (2007). In terms of professional literature, the search query did not produce a lot of results and it was easier for the researcher to select the relevant publications. The whole process is presented in the following Figure 1.

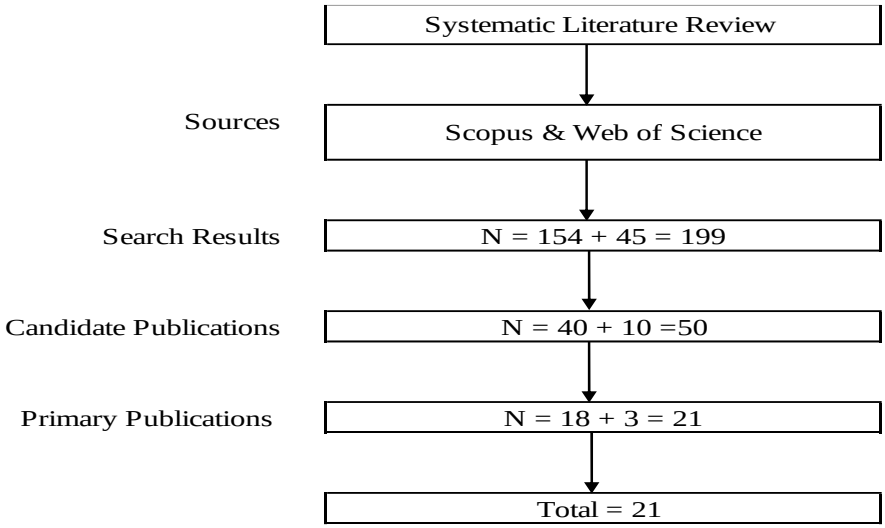

Figure 1: Flow diagram of systematic literature review search and selection breakdown

2.4. Criteria for Inclusion and Exclusion

According to Kitchenham and Charters (2007), the criteria set for both inclusion and exclusion should be practical. In a simpler way, the criteria should be able to classify the research and can produce a manageable amount of literature. In this research, the materials adopted from academic websites for the review were only limited to journal papers while the materials adopted from professional organizations were in the form of reports. Any publications in languages other than English were excluded for practical reasons. Additionally, the journals selected were restricted to the construction industry only.

2.5. Quality Assessment Procedure

For the purpose of quality assessment checking, the guideline provided by Kitchenham and Charters (2007) was adopted. Any journals or publications which does not comply with the guideline were excluded from the list.

2.6. Data Extraction and Analysis

After all primary publications were identified, the main data from each publication were extracted out, recorded and tabulated (Appendix A). The main data is as follows:

- The source of journals or publications
- Title of journals or publications
- Author(s)
- Year of publication
- Aim and research objectives
- Research methodology adopted
- Summary of findings of the journals or publications

3. FINDINGS AND DISCUSSION

This section focuses on the three main areas of the findings namely, causes of dispute in building projects and the strategies to minimise dispute in building projects. Two (2) types of sources were considered for SLR namely academic and professional's literature. Two widely recognised academic databases (Scopus and Web of Science) focusing on English journal papers publication were identified as the credible sources for this research. In total, 21 publications spanned from 2011 to 2021 were shortlisted for the review, resulting in a comprehensive synthesised of the past and present evidence. After going through a detailed selection process, the following summarised the findings of the SLR which have been specifically grouped into project phases, concentrating on the causes of dispute and strategies to minimise the occurrences of disputes.

3.1. Causes of Dispute

The SLR study resulted in the identification of 67 potential causes of dispute and following the selection process, Table 1 summarises the final causes of a dispute which demonstrates the similarity of discussion on the causes of dispute in the construction industry.

Overall, the SLR indicated that six (6) significant causes of dispute were being highlighted by most of the researchers namely,

a) ***Variation order*** - variation orders can be initiated through various events, and it involved the adjustment of the original contract which to a certain extent may partially or entirely alter the original contract terms (Viswanathan, Panwar, Kar, Lavingiya & Jha, 2020). Variation orders may be initiated due to inadequate information on working drawings, design errors, changes in project scope and inaccurate bill of quantities (Mahamid, 2016). These events may result in the massive submission of claims or disagreement between the contractual parties which can adversely affect the project's success, particularly in terms of the project cost and time (Assaf, Hassanain, Abdallah, Sayed & Alshahrani, 2019; El-Sayegh et al., 2020; Mahamid, 2016).

b) ***Failure of the client to honour payments as and when due*** - A contractor expected payment based on the work done duly completed on-site and payment to the contractor may be made either at the end of the contract or progressive payments depending on the size and duration of the project. Nevertheless, the failure of the owner to fulfil the payment obligation due to various reasons such as financial problems (Assaf et. al, 2019) or intended late payment to gain payment interest (Mahamid, 2016; Yildizel, Dogan, Kaplan & Ergut, 2016), may negatively affect the project success as it precipitates the dispute occurrences. Failure to make timely payments will disrupt the contractor's cash flow, which will impede project progress and, in the worst-case scenario, result in the project being halted (Assaf et al., 2019; Mahamid, 2016). The accumulated non-payment of work will later turn up as a huge claim at the end of the project and sometimes unable to be resolved thus leading to dispute occurrences (Mukilan, BalaNivetha, Velumani & Christopher, 2019).

c) ***Ambiguities in the contract documents*** - Construction contract documents governed the roles, responsibilities and deliverables required for a project; thus, a comprehensive understanding of the contract document contributes to the successful project performance. In practice, however, the fact that contract documents are sometimes poorly drafted and contain ambiguities has accelerated the likelihood of a dispute arising. The use of vague terms and legal jargon in the contract document allows for different interpretations (Viswanathan et al., 2020) and contract amendments that

are unclear, ambiguous, or contradictory (El-Sayegh et al., 2020) further exacerbate the situation as it opens up opportunities for dispute arises.

d) ***Poor and ineffective communication between the parties in the project*** – Construction projects are notorious for their competitive nature, and complexity and it involved the collaborative efforts of various professional stakeholders working together over a certain period. Thus, effective communication is very crucial as the development of a project concerned the processes of mutual exchange of information between the parties involved in the project. However, communication issues may arise due to the conflicting interests between the parties (Assaf et al., 2019) and the silos mentality of the team members further escalated the possibilities of miscommunication, which subsequently may trigger disputes to arise (Viswanathan et al., 2020).

e) ***Design errors*** - Design errors occur when there are contradictory elements in the design. Design errors, according to Yildizel et al. (2016), have a negative impact on a project because they cause a design change to compensate for the mistakes. These changes because of design flaws may have an impact on both the project's duration and cost.

f) ***Failure of the major stakeholders in understanding and complying with the contractual obligations*** - Contract documents spell out the various parties' responsibilities for the project, and it's critical that they adhere to their commitments to ensure a smooth construction process. Each contract specifies the activities that each party is required to perform or refrain from performing, and it legally formalises the parties' commitment to comply with their applicable obligations when they sign the contract. Nonetheless, adhering to contractual obligations can be difficult, and non-adherence to contractual obligations can result in a breach of contract, which can lead to further disputes. Contract documents oftentimes were drafted by lawyers and comprised of a lot of legal jargon that practitioners may not be familiar with (Illankoon et al., 2019). This further leads to the inability of the parties to fully comprehend their contractual obligations, thus resulting in a contract breach.

Table 1: Summary of causes of disputes from past researchers

No	Causes	Ilter (2012)	Cakmak & Cakmak (2013)	Treacy et al. (2015)	Mahamid (2016)	Yildizel et al. (2016)	Awwad et al. (2016)	Equbal et al. (2017)	Charehzehi et al. (2017)	Jagannathan & Nidhi (2017)	Al-Zwaimy et al. (2018)	Trangkanont et al. (2018)	Ramonu et al. (2018)	Illankoon et al. (2019)	Elhag et al. (2019)	Assaf et al. (2019)	Mukilan et al. (2019)	El-Sayegh et al. (2020)	Viswanathan et al. (2020)	Yusof et al. (2020)	Kisi et al. (2020)	Total
Initiation Phase																						
1.	Poor estimation practices during feasibility study				✓																	**1**
2.	Unrealistic project planning														✓		✓					**2**
3.	Poor and ineffective communication between parties in the project				✓						✓	✓			✓				✓			**5**
Planning Phase																						
4.	Poor estimation practices				✓																	**1**
5.	Unrealistic project planning														✓		✓					**2**
6.	Delay in obtaining permit or approval from the municipality and the other governmental authoritie																	✓				**1**
7.	Inadequate design information												✓	✓								**3**
8.	Design errors					✓		✓	✓							✓					✓	**5**
9.	Poor quality design		✓																			**1**

10.	Inconsistencies between the drawings and specifications											✓				**1**
11.	Short time available during design stage												✓			**1**
12.	Inadequate and incomplete specification	✓	✓			✓										**3**
13.	Poor and ineffective communication between parties in the project			✓				✓	✓		✓			✓		**5**
14.	Ambiguities in the contract documents	✓	✓		✓	✓					✓			✓		**8**
15.	Types of procurement method adopted									✓						**1**
16.	Misinterpretation of contract documents														✓	**1**
17.	Different interpretations of the contract provisions		✓													**1**
18.	Lack of understanding and agreement on the type of contract									✓						**1**
19.	Incorrect pricing of the works						✓									**1**
20.	Unfair risk allocation		✓			✓					✓					**3**

21.	Selection of contractors based on the low bid only without considering the technical capabilities											✓							**1**
	Execution, Monitoring and Controlling Phase																		
22.	Variation orders	✓		✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	**16**
23.	Change of material specification																✓				**1**
24.	Unforeseen ground conditions			✓							✓		✓								**3**
25.	Failure of the client to honour payments as and when due		✓	✓	✓	✓		✓	✓	✓						✓		✓	✓		**10**
26.	Time overrun			✓								✓									**2**
27.	Cost overrun											✓						✓			**2**
28.	Poorly drafted or incomplete and unsubstantiated claims																✓				**4**
29.	Failure to make interim awards on extension of time and compensation					✓															**2**
30.	Failure of the major stakeholders in understanding and complying with the												✓								**5**

	contractual obligations											
31.	Failure to properly administered the contract							✓				**4**
32.	Mishandle the construction process							✓				**1**
33.	Poor quality of work	✓	✓	✓								**3**
34.	Late giving of site possession					✓						**1**
35.	Delay in work progress					✓			✓	✓		**3**
36.	Technical inadequacy									✓		**1**
37.	Unrealistic contract duration	✓										**1**
38.	Labour inefficiencies	✓										**1**
39.	Inadequate contractor's experience	✓										**1**
40.	Ineffective planning and scheduling of project by contractor	✓	✓		✓							**3**
41.	Unavailability of cash flow faced by contractor	✓										**1**
42.	Request for project acceleration		✓									**1**
43.	Poor productivity									✓		**1**
44.	Disagreement over								✓			**1**

	scope variation													
45.	Delay in issuing site drawings and materials										✓	✓		**2**
46.	Materials damaged during storage										✓			**1**
47.	Late instruction by the employer	✓										✓		**2**
48.	Poor and ineffective communication between the parties in the project		✓			✓	✓		✓			✓		**5**
49.	Breach of contract							✓						**1**
50.	Unrealistic expectation of the client											✓		**1**
51.	Change in rate due to quantity variations												✓	**1**
52.	Change in material source and it cost												✓	**1**
	Closeout Phase													
53.	Defects		✓											**1**

3.2. Strategies to Minimise the Dispute

The SLR resulted in the identification of 35 strategies to minimise disputes in construction projects. Table 2 summarised the strategies for minimising the construction disputes based on the findings of previous researchers.

Table 2: Summary of strategies to minimise construction dispute from past researchers

No.	Strategies	Ilter (2012)	Awwad et al. (2016)	Ramonu et al. (2018)	Perera et al. (2019)	Elhag et al. (2019)	Assaf et al. (2019)	Total
Initiation Phase								
1.	Established a clear definition of project scope	✓					✓	**2**
2.	Preserve a good relationship between the project team members			✓				**1**
Planning Phase								
3.	Execute proper risk allocation		✓	✓		✓		**4**
4.	Allocate adequate time to prepare for contract documentations	✓			✓		✓	**3**
5.	Efficient communication		✓			✓		**2**
6.	Early detection of problems					✓		**1**
7.	Provide timely resolution for problems					✓		**1**
8.	Developed trust between parties					✓		**1**
9.	Developed teamwork between parties					✓		**1**
10.	Developed long term relationship between parties					✓		**1**
11.	Select an experienced contractor to undertake the project	✓					✓	**2**
12.	Contractors should not take the projects beyond their technical capabilities	✓						**1**
13.	Clients should be punctual in giving instructions	✓						**1**
14.	Consultants to prepare clear and comprehensive documentation	✓			✓			**2**
15.	Selecting a professional construction team				✓			**1**
16.	Quality control checking before issuance of documents						✓	**1**
17.	Record keeping				✓			**1**
18.	Ensure full understanding of the contract requirements prior signing of agreement			✓			✓	**2**
19.	Client to prepare effective project planning			✓				**1**
20.	Preserve a good relationship between the project team members			✓				**1**
21.	Adoption of digital technology to facilitate coordination and early detection of problems						✓	**2**
Execution, Monitoring and Controlling Phase								
22.	Efficient communication		✓			✓		**2**
23.	Early detection of problems					✓		**1**

24.	Provide timely resolution for problems					✓		**1**
25.	Developed trust between parties					✓		**1**
26.	Developed teamwork between parties					✓		**1**
27.	Preserve a good relationship between the project team members			✓		✓		**2**
28.	Clients should avoid making unnecessary variations	✓						**1**
29.	Clients should be punctual in giving instructions	✓						**1**
30.	Proper record keeping				✓			**1**
31.	Proper payment schedule			✓				**1**
32.	Payment as at when due			✓				**1**
33.	Adoption of digital technology to facilitate coordination and early detection of problems						✓	**2**

Interestingly, the findings indicated two effective strategies to reduce the likelihood of a project dispute, namely,

a) ***Executing proper risk allocation*** **–** Due to the uniqueness of each project as well as the different nature of the project, each project tends to have a different level of risk. Risk allocation is critical for ensuring a smooth project implementation and reducing the likelihood of disputes (Awwad et al., 2016; Elhag et al., 2019; Ramonu et al., 2018). Elhag et al. (2019) found that a project with an equitable contract and unbiased risk allocation can foster the development of trust, mutual understanding, and respect among the contracting parties, all of which are important criteria for ensuring a smooth project performance.

b) ***Allocate adequate time to prepare for contract documents*** – The contract documents hold a critical role in a project as they governed the development of the project by defining the duties and responsibilities of all parties. However, many disputes arise due to poorly drafted contract documents and ambiguities in contract documents, thus emphasising the need of having comprehensive contract documents. In view of this, several researchers (Ilter, 2012; Perera, Ekanayake, Jayalath & Jayathilaka, 2019; & Assaf et al., 2019) unanimously agreed that allocating sufficient time to draft the contract documents may subsequently reduce the possibility of dispute occurrences in a project.

4. CONCLUSION

Construction sector is one of the important drivers of economic growth in Malaysia. However, a major concern facing the construction industry is the rising trend of contentions filed year-on-year due to the vast occurrences of disputes throughout the project phases which adversely affect the outcome of the construction projects. This study provides an overview of how disputes arise during the construction project phases model as developed by PMI (2017). This SLR study has able to identify several causes of dispute such as variation orders, failure of the client to honour payments as and when due, ambiguities in the contract documents, ineffective and poor communication, design errors as well as failure of the major stakeholders to understand and comply with the contractual obligations and map the occurrence of these causes against the respective construction phases.

The potential strategies that can be adopted to minimise the dispute occurrences were also

identified and mapped against the respective construction phases. The strategies include proper allocation of risks, the establishment of a clear definition of project scope, efficient communication, selection of an experienced contractor to undertake the works, consultants to prepare clear and comprehensive documents and so on. The outcome of this research contributes to advancing the knowledge and understanding of dispute occurrences during the construction phases. The findings of this study could trigger more exciting research in the field of dispute in the Malaysian construction industry.

Appendix A: List of Primary Publications for SLR

Title of journal	Author(s)	Year of Publication	Aim & research objectives	Research methodology	Findings
Identification of the relations between dispute factors and dispute categories in construction projects	Deniz Ilter	2012	To identify the categories of disputes, identify the causes of disputes and impacts of disputes	Interview	The research found that the top three dispute categories are: 1) extension of time, 2) payments and 3) quality of works. In terms of factors of dispute occurrences, the top five factors are 1) variations, 2) late issuance of instructions by the employer, 3) incomplete technical information, 4) ambiguities in contract documents and 5) adversarial approach in managing conflicts
An analysis of causes of disputes in the construction industry using analytical hierarchy process (AHP)	Pinar Irlayici Cakmak & Emre Cakmak	2013	To explore the major causes of disputes in a project	Systematic Literature Review & Analytical hierarchy process	The research concluded that the dispute causes can be classified into several categories which are 1) causes related to owner, 2) causes related to contractor, 3) causes related to design, 4) causes related to contract, 5) causes related to human behaviour, 6) causes related to project related and 7) causes related to external factors.
Significant Causes and Effects of Variation Orders in Construction Projects	Aftab Hameed Memon, Ismail Abdul Rahman and Mohamad Faris Abul Hasan	2014	To determine the main causes of variation orders and its impacts	Questionnaire Survey	The research indicated that the frequent causes of variation were due to inaccessibility of machineries, poor quality of work delivered and due to the design issues. The impact of variations was that it leads to additional cost and project delay.

Micro and macro level of dispute causes in residential building projects: Studies of Saudi Arabia	Ibrahim Mahamid	2016	To determine the direct and indirect causes of disputes in building project in Saudi Arabia	Questionnaire Survey	The research summarized the top five direct causes as: 1) late payment by owner, 2) impractical project duration, 3) variation orders, 4) delivering poor quality work done and 5) inefficient labour. On the other hand, the indirect causes of dispute are 1) inexperience contractors, 2) poor communication, 3) poor planning and scheduling by contractor, 4) financial problem and 5) inaccurate cost estimation.
Major constructional dispute causes In turkey	S.A. Yildizel, E. Dogan, G. Kaplan & A. Ergut	2016	To identify the recent factors of disputes in Turkey	Questionnaire Survey	The research identified the following factors as the major factors of dispute in Turkey – low quality of work done delivered, late in payments, unproductive project management, poorly drafted contract and design errors.
Understanding Dispute Resolution in the Middle East Region from Perspectives of Different Stakeholders	Rita Awwad, Boushra Barakat & Carol Menassa	2016	To identify the causes of dispute and the dispute resolution methods adopted in construction project in Middle East	Questionnaire Survey	The research found that the typical causes of dispute is due to contractual issues and the Middle East practitioners still adopting the traditional dispute resolution even though there are new alternative resolutions available in the industry.
Construction disputes in construction work sites and their probable solutions	Asif Equbal, Rajeev Banerjee, Zishan Raza Khan & Raj Bandhu Dixit	2017	To identify the main causes of disputes, the impacts of dispute and to explore the type of resolution used in India	Questionnaire Survey	The research concluded that the top 3 causes of dispute are 1) related to payment issues, 2) quality of work done delivered and 3) variation orders. In terms of the impact of the dispute, the research found that the disputes can give bad image to the company, severe the business relationship and may cause additional cost to the project. It was also found from the research that the most commonly used resolution method are negotiation, mediation and expert determination.
Building information modeling in construction conflict management	Aref Charehzehi, ChangSaar Chai, Aminah Md Yusof, Heap-Yih Chong & Siaw Chuing Loo	2017	The study aimed to proposed BIM as the tool to manage conflict before it escalates to disputes	Questionnaire Survey	The finding indicated that the BIM software has the ability to manage conflict especially in relation to clash detection, come out with cost estimates, monitoring schedule and project visualization.

Analysis to identify the prevailing causes that leads to arbitration in construction contracts	P. Jagannathan & Herenz Nidhi	2017	To identify the main factors of disputes in construction project	Questionnaire Survey	The research concluded that the most significant factors of dispute were related to late payment and change to the project scope.
Diagnostic of the claims and disputes between the contractor and owner in construction project using narrative analysis approach	Faiq M. S. Al-Zwainy, Firas Kh. Jaber & Saba W. Hachem	2018	To explore the main causes of disputes in a project	Literature Review	The research managed to identify and classify the causes into 4 main categories namely owner-related, contractor-related, consultant-related and others.
Prevention of conflict in construction industry considering; organization, consultancy firm, contractual firm and the professionals' personnel in Nigeria	Ramonu, John A. L., Ilevbaoje, J. O., Olaonipekun O. A., Omotosho A.O, Owamah, H.I. & Adewole Tolulope Abidemi	2018	To establish a conflict preventive plan by identifying the factors contributing to the disputes and its impacts.	Questionnaire Survey	The research identified that the top 3 factors contributing to the disputes were related to contractual matters, payment issues and problem related to land.
Causes of disputes, factors affecting dispute resolution and effective alternative dispute resolution for Sri Lankan construction industry	I. M. C. S. Illankoon, Vivian W. Y. Tam, Khoa N. Le & K. A. T. O. Ranadewa	2019	To determine the main causes of disputes, to explore the contribution factors that lead to selection of dispute resolution and to identify the best ADR method from the view of stakeholders	Questionnaire Survey	The result from the study indicated that the top 3 causes of dispute are 1) due to ineffective management of contract administration, 2) error in the contract documents and 3) design provided is lack of detail information. In terms of significant reason of selecting ADR method, the research showed that most of the participants believed that fast settlement is the main reason and negotiation seemed to be favor by most of the participants.
Moderating claims and disputes through collaborative procurement	Taha Elhag, Smitha Eapen & Tabarak Ballal	2019	To determine whether disputes can be resolved through the implementation of collaborative procurement	Questionnaire Survey	The research found that the main reasons for disputes were variation orders issued out by the clients, selection of the contractor without considering the technical capability of the contractor and biased risk allocation where most of the risk were transferred to the contractor.

Significant causes of claims and disputes in construction projects in Saudi Arabia	Sadi Assaf, Mohammad A. Hassanain, Abdullatif Abdallah, Ahmed M.Z. Sayed & Abdulrahman Alshahrani	2019	To explore the perspectives of different stakeholders on the main causes of dispute	Questionnaire Survey	The research revealed that the following causes were the main causes of disputes: 1) issuance of variation orders by clients, 2) increase in quantities because of client's requirements and 3) delay caused by the contractor
A qualitative study and analysis of causes and disputes in claims in construction industry	Mukilan K., BalaNivetha. M., Velumani P., & Christopher Gnanaraj S.	2019	To determine the most significant factors affecting the occurrences of dispute	Questionnaire Survey	The research classified the causes of dispute into 4 main categories namely causes related to client, contractor, consultant and general. The study also indicated that most common causes of dispute in the region were related to the contract, design and project management.
Construction Disputes in the UAE: Causes and Resolution Methods	Sameh El-Sayegh, Irtishad Ahmad, Malak Aljanabi, Rawan Herzallah, Samuel Metry & Omar El-Ashwal	2020	To determine the main factors of disputes in UAE and to investigate the effectiveness ways of avoiding and resolving the issues	Questionnaire Survey	The research revealed that the most common factors of disputes in UAE were 1) issuance of variations by the clients, 2) issues with getting permit from government authorities, 3) change of material during execution phase, 4) late confirmation by the client and 5) insufficient time allocation for design stage.
Assessing the Malaysian standard form of contract in relation to the current construction dispute and dispute resolution	Suriana Yussof, Afzan Ahmad Zaini, Siti Halipah Ibrahim & Nurakmal Abdullah	2020	To determine the most common dispute causes based on the standard form of contract	Observations & Semi-Structured Interviews	The research found that the most typical dispute issues happened based on the standard form of contract were related to the payment issues and extension of time. The participants preferred arbitration as their resolution method.
Alternative Dispute Resolution Practices in International Road Construction Contracts	Krishna P. Kisi & Namhun Lee	2020	To identify the causes of disputes and the resolution method	Focus group & Questionnaire Survey	The study revealed that the top three common causes of disputes were 1) due to strikes or riot, 2) different rates utilization as a result of quantity change and 3) changes in material source. The participants were more preferred to go with arbitration for dispute resolution.
A study on variation-specific disputes that arise in road projects in Sri Lanka: a qualitative approach	B. A. K. S. Perera, B. J. Ekanayake, Chandana Jayalath & G. R. H. Jayathilaka	2020	To identify strategies to avoid occurrences of variations that may lead to dispute occurrences	Interviews	The research concluded that the strategies that can be used to avoid variation which can lead to dispute occurrences were through proper document preparation, having a systematic record keeping, allocate sufficient time to prepare for design and documents preparation.

Construction disputes in small to medium enterprises in Ireland during recession: Identification of critical factors	David Treacy, John P. Spillane & Paul Tansey	2015	To determine the main causes of disputes in small and medium enterprises (SMEs) particularly during the recession period.	Case Studies & Questionnaire survey	The research identified 7 main causes of disputes during recession in SMEs which are 1) payment issues, 2) physical works conditions, 3) inadequate financial and legal practice, 4) scope changes, 5) time overrun, 6) defects and 7) project acceleration.

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